Policy, Competitiveness and Agricultural Trade: An Application of the Policy Analysis Matrix (PAM) to Israeli Agriculture

by

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Contents

Overview

Our work is a first attempt to construct a policy analysis matrix (PAM) for the purpose of assessing the government support for the Israeli agriculture and its impact on comparative advantage, agricultural trade and social profits. We start with a review of the Israeli fruit and vegetable sector in the last decade. In the second section, we introduce the PAM methodology and review applications of this methodology in other countries. In the main part of the study PAM is developed and applied to explore the impact of varying social prices, availability of domestic factors and to examine the consequences of partial or complete removal of government supports for agricultural producers in Israel. In the last section we conclude our findings, discuss policy implications and feasible ways to extend this framework for future research.

1. Development of the Fruit and Vegetable Sector in Israel[2]

This chapter reviews the development of the Israeli fruit and vegetable sector in the last decade (2000 – 2009). It provides the necessary background information about the crops chosen for the PAM analysis, their importance for Israeli agriculture and their development in the last decade. The evaluation of PAM results and choice of simulations for different policy scenarios takes into account the descriptive analysis presented in this chapter.

Plant production accounts for about 60% of the total value of agricultural production in Israel. The value of Israeli crop production increased substantially in the last decade. Crop production increased from 9.4 billion NIS in 2000 to 15.6 billion in 2009 (2009 prices), corresponding to a yearly growth rate of 5.7%. For comparison, the real GDP (market prices) increased from 2000 to 2009 by 3.0% per year, based on population growth (+2.0% per year) and an increase in the GDP per capita (+1.0% per year).

Most of the growth in the value of crop production is accounted for by an increase in the value of domestic consumption (+4.1 billion NIS) and exports (+2.0 billion NIS) while the value of crop products diverted to the processing industry or to intermediate uses hardly changed (Figure 1). Vegetables (including potatoes and melons) and fruits

[2] All Figures and Tables presented in this chapter are based on Central Bureau of Statistics (CBS) data.

(not including citrus) account for most of the increase in the production value (Figure 2).

Figure 1

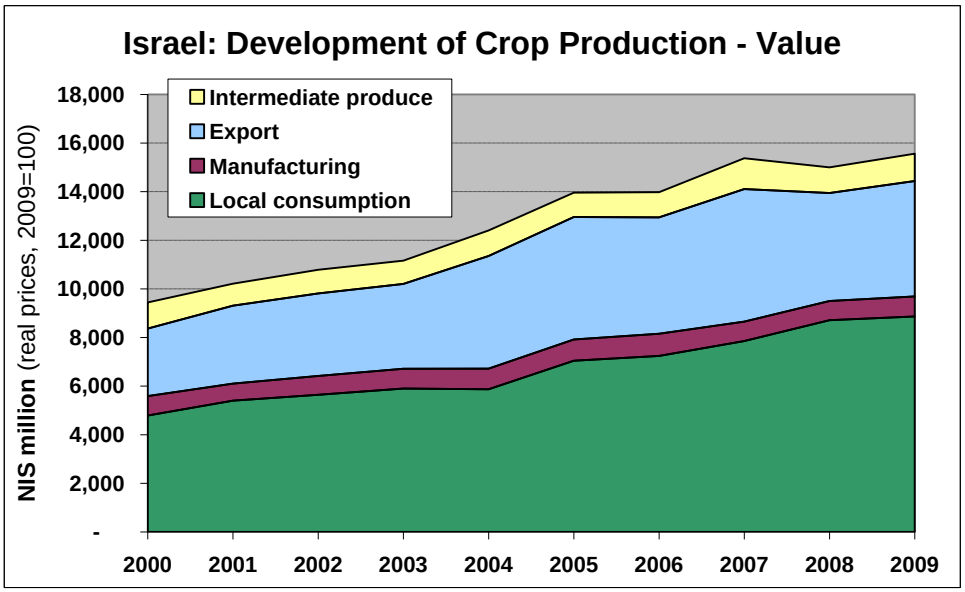
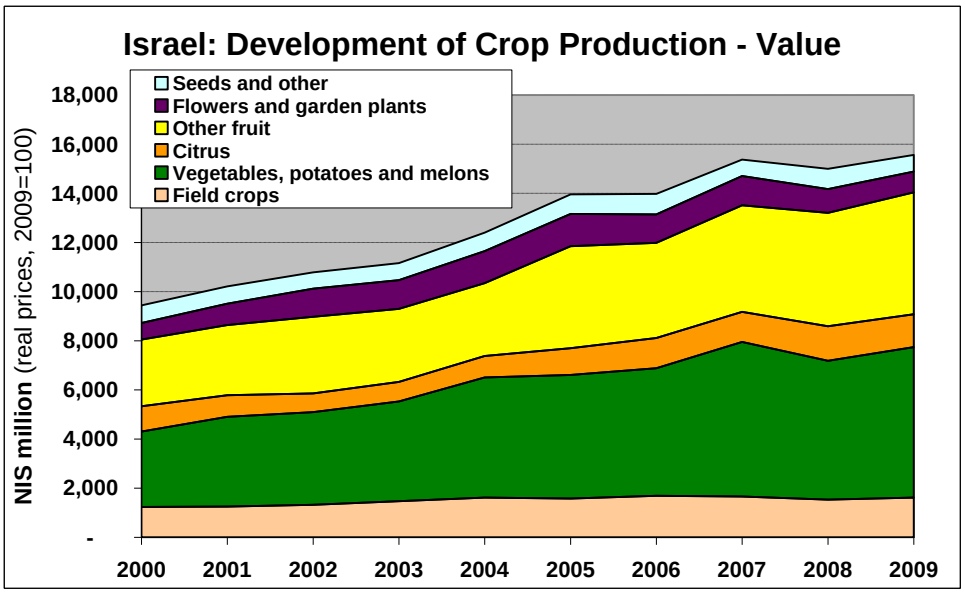


Figure 2



Israel produced in 2009 about 3.7 million tons of fruit and vegetables (Table 1, Figures 3 and 4). Vegetable production increased substantially in the last decade (+2.4% per year), mainly because of growing vegetable exports. On the other hand, total fruit production (citrus and other fruits) hardly changed. For both fruit and vegetables, real grower prices increased substantially. For fruits, prices in recent years

cannot be compared to prices before 2005 because of a change in the data collection method.

Crops selected for PAM analysis include seven crops classified by Israeli statistics as vegetables (regular tomatoes, cherry tomatoes, cucumbers, peppers, strawberries, potatoes, melons) and three crops classified as fruits (table grapes, mangoes, dates).

Table 1 presents the value of production of these crops by main uses, as well as quantity produced and unit values (average prices). The vegetables included in our study account in 2009 for 62% of the production value for vegetables (including potatoes and melons) and for close to 80% of vegetable exports. Selected fruits represent 23% of the production value for fruits (excluding citrus) and 45% of fruit exports (2009). Some of the selected crops are produced nearly exclusively for domestic consumption (cucumbers, strawberries), while a substantial share of the other crops is exported. For three crops included in the study (cherry tomatoes, peppers, dates) exports are considerably more important than domestic consumption.

In the remainder of this chapter we present the development of the different subsectors included in the study. Prices for exported produce are recorded by the CBS as f.o.b. (price level at the port in the exporting country: **f**ree **o**n **b**oard). Prices for produce sold in the domestic market are wholesale prices minus a marketing margin (about 12%) and production board fees. Prices were deflated using the CPI (2009 = 100).

Figure 3

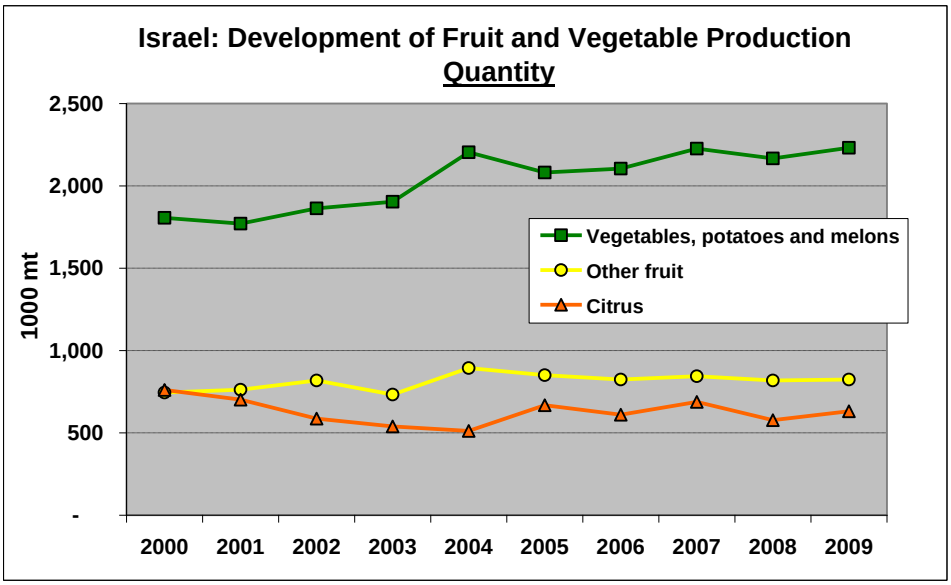
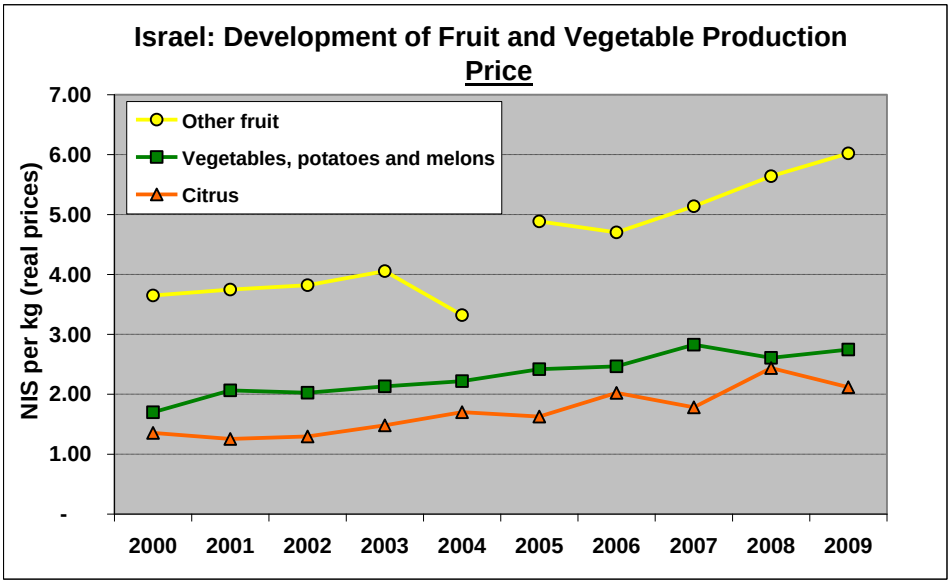


Figure 4



Remark: Beginning with data for 2005, the method of calculating prices of fruit for the domestic market was changed. This caused a break in the series, and these data cannot be compared with previous years (CBS, 2010).

Table 1: Production value for crops analyzed with PAM (2009, Million NIS)

	Production Value 2009 (Million NIS)					Production 2009		Yearly growth rate	
	Total		Domestic Market	Export	Share export	Quantity (1000 mt)	Price (NIS/kg)	Quantity	Price
GRAND TOTAL	**25,581**		**10,182**	**4,821**	19%				
CROPS - TOTAL	**15,562**		**8,867**	**4,745**	**30%**				
FRESH VEGETABLES, POTATOES and MELONS	**6,125**	***100%***	**4,008**	**1,778**	**29%**	**2,231**	*2.75*	**2.4%**	**5.5%**
Vegetables - total	**4,651**	***76%***	**3,063**	**1,403**	30%	**1,472**	*3.16*	**2.4%**	**6.6%**
Regular tomatos for fresh consumption	545	*9%*	429	116	21%	181	3.02	0.4%	5.9%
Cherry tomatoes	274	*4%*	60	214	78%	39	7.06	8.6%	2.5%
Cucumbers	290	*5%*	255	1	0%	117	2.45	-0.7%	4.5%
Peppers	997	*16%*	307	689	69%	202	4.93	9.1%	3.1%
Strawberries	447	*7%*	435	12	3%	24	18.94	4.1%	8.2%
Potatoes	1,106	*18%*	660	347	31%	609	1.82	5.6%	1.7%
Melons (Sugar)	131	*2%*	105	26	20%	39	3.36	-5.7%	5.2%
PLANTATIONS (incl. young plantations)	**6,296**		**4,179**	**1,405**	**22%**	**1,455**	*4.33*	**-0.4%**	**6.3%**
Citrus - total	**1,337**		**491**	**645**	**48%**	**631**	*2.12*	**-2.0%**	**5.1%**
Fruit, excl. citrus - total	**4,958**	***100%***	**3,688**	**760**	**15%**	**824**	*6.02*	**1.1%**	**5.7%**
Table grapes	644	*13%*	582	51	8%	90	7.16	3.0%	6.2%
Mango	171	*3%*	109	63	37%	32	5.40	0.8%	6.9%
Dates	334	*7%*	104	230	69%	22	15.06	8.2%	2.4%

Remarks: Yearly growth rates relate to the years 2000 till 2009. Prices were deflated with the CPI.
Source: CBS

Short summary of the main developments in the production for the crops included in the study (Figures 5 - 14)

Regular tomatoes (Figure 5): Production of regular tomatoes (not including tomatoes for the processing industry) did not increase substantially in the last decade: about 150 to 200 thousand tons tomatoes are produced each year. Nearly all of the production is sold in the domestic market. Prices for domestic production increased somewhat in the last decade to about 2.5 NIS per kg. Export quantities are small (a few thousand tons) and consist mainly of organic and other high quality tomatoes exported to niche markets at high prices.

Cherry tomatoes (Figure 6): The production of cherry tomatoes increased in the last decade, mainly because of an increase in exports. Despite the increase, production quantities are much smaller than those of regular tomatoes – about 40 thousand tons in 2009. The majority of the production is exported. Domestic consumption is about

15 thousand tons per year, at prices substantially higher than regular tomatoes (about 4 NIS per kg). Prices for exported cherry tomatoes are high compared to domestic prices but declined in recent years (to 8 NIS per kg in 2009).

Cucumbers (Figure 7): The production of cucumbers declined somewhat in recent years, to about 120 thousand tons in 2009. Most of the production is consumed fresh in the domestic market, while about 10 to 15 percent of production is grown for the processing industry. Exports of cucumbers are insignificant. Prices for cucumbers for domestic consumption increased during the last decade (to 2.56 NIS/kg in 2009), indicating an increase in grower prices.

Peppers (Figure 8): Pepper production more than doubled in the last decade to 200 thousand tons in 2009, driven by a dramatic development of pepper exports which increased from 22 to 120 thousand tons. Prices for pepper exports are quite variable, indicating changes in market conditions and probably also some data problems. In recent years (2008 and 2009) export prices were quite low (about 5.5 NIS/kg). On the other hand, prices for peppers sold in the domestic market are quite stable and show a tendency to increase (price in 2009: 4.2 NIS/kg). Quantities of pepper marketed domestically hardly changed in the last decade (about 75 thousand tons per year).

Strawberries (Figure 9): Strawberry production in Israel is relatively small compared to other vegetables and fruits, about 20 to 25 thousand tons in recent years. However, because of the high prices in recent years for strawberries marketed domestically (18 – 20 NIS/kg), the value of production of strawberries is quite high (about 450 million NIS in 2009, which is half the production value of peppers and 63% more than the production value of cherry tomatoes). Prices for domestic marketing were much lower until 2006 (about 5 to 7 NIS/kg), and there are some doubts if the high strawberry prices reported in recent years represent average grower prices. The variation of strawberry in the course of the season is higher than for most other fruit and vegetables, and no reliable monthly quantity data to calculate average weighted prices are available (for example, according to wholesale price data collected by the Ministry of Agriculture, strawberry prices in season 2007/08 declined from 46 NIS/kg in October 2007 to 5.3 NIS/kg in April 2008).

Strawberry exports from Israel are small – about 2 to 3 thousand tons during most of the last decade. In recent years exports declined to only one thousand tons in 2009. Because of their short shelf life strawberries are exported by air, generating high transportation costs and decreasing their competitiveness in the European market compared to Spain.

Potatoes (Figure 10): Israeli potato production increased substantially in the last decade, from 400 to close to 700 thousand tons in 2008. Similar to peppers, this development was driven by a large expansion in exports, from about 100 thousand tons per year at the beginning of the decade to a record of 335 thousand tons in 2007. In the last two years, export quantities of potatoes declined and prices for exported potatoes decreased, especially in 2008 (1.0 NIS/kg, compared to 1.5 NIS in the two previous years). Contrary to other vegetables and fruits, prices for exported potatoes are substantially lower than prices for potatoes marketed domestically (about 2.5 NIS/kg in recent years). This price difference is an indication of price discrimination, characterized by potatoes exported to lower priced and more elastic export markets in order to stabilize and increase prices in the domestic market.

Melons (Figure 11): Melon consumption and exports declined in the last decade. In 2009, close to 40 thousand tons of melons were produced in Israel, about 4,000 of them for export. The substantial decline in exports indicates that Israeli melons are not competitive in export markets compared to other suppliers like Spain and Morocco. On the domestic market, and prices increased from about 2 to 3 NIS/kg and consumption declined.

Table grapes (Figure 12): Table grape production increased in the last decade, from 70 to 90 thousand tons. The additional production quantities are marketed mainly in the domestic market. Domestic prices reported by the CBS increased (from about 4 to about 7 NIS/kg)[3], indicating an increase in domestic demand for grapes and an improvement in quality. Export quantities are quite variable and vary between 3 to 10 thousand tons per year. Israel exports table grapes to the European market during a short time period (June – July) before large quantities from European production are ready to be marketed. A decade ago Egypt started to target this market window and

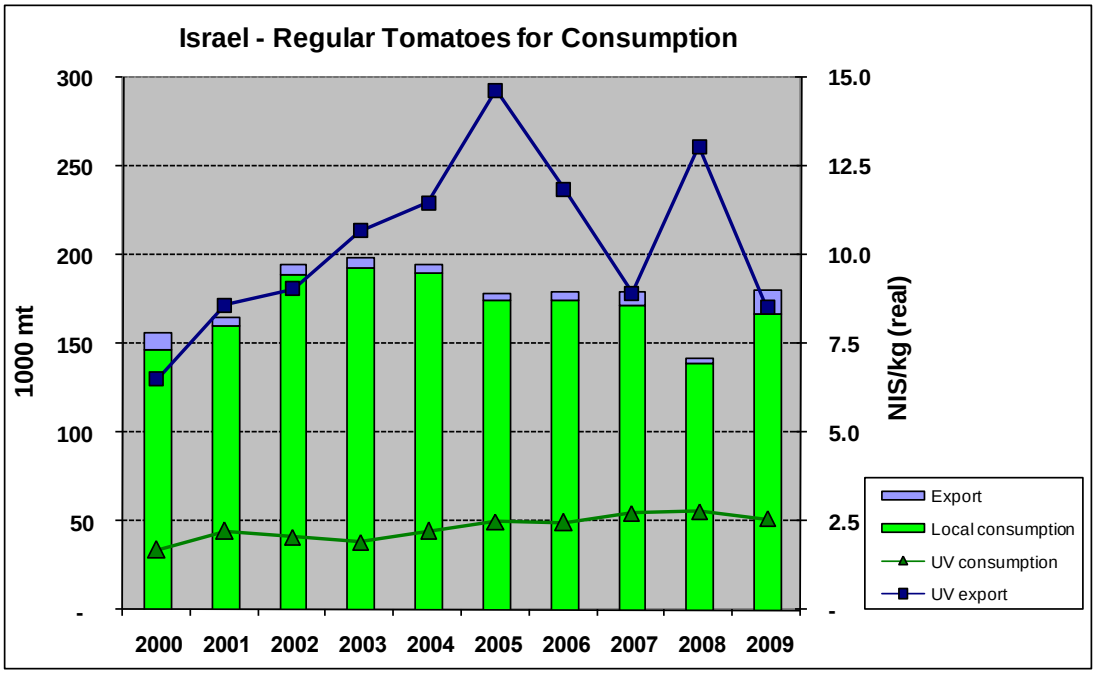
[3] Beginning with data for 2005, the method of calculating prices of fruit for the domestic market was changed, and prices from 2005 cannot be compared with previous years (CBS).

increased table grape production for exports. Subsequently, European Union imports of table grapes from Egypt increased from about 4,000 tons in 2000 to nearly 50 thousand tons in 2009! Competition from Egypt and other producers makes it difficult for Israel to increase its grape exports.

Mangoes (Figure 13): Israeli mango exports increased steadily from 6,000 tons in 2000 to 17 thousand tons in 2008, before declining to 13 thousand tons in 2009. However, quantities marketed domestically did not increase and are about 20 thousand tons per year. Domestic prices from 2005 to 2009 are much higher than unit values in the years before, probably because of a change in data collection for fruit prices (see Footnote 2). Prices for exported fruit vary, depending on market conditions in export markets. Most mangos from Israel are exported to the European Union.

Dates (Figure 14): Date production in Israel doubled in the last decade from 11 to 22 thousand tons. Exports as well as domestic consumption of dates doubled. Exports account for nearly half of the production quantity and close to 70% of the value of production (2009). Israel exports mainly high quality Medjool dates to European markets which are sold at a substantial price premium compared to other date varieties. Israel is the dominant supplier of this variety to Europe. In the Israeli domestic market several date varieties are sold. Prices for dates sold domestically are about 10 NIS/kg, compared to prices of 20 NIS and more for dates exported.

Figure 5



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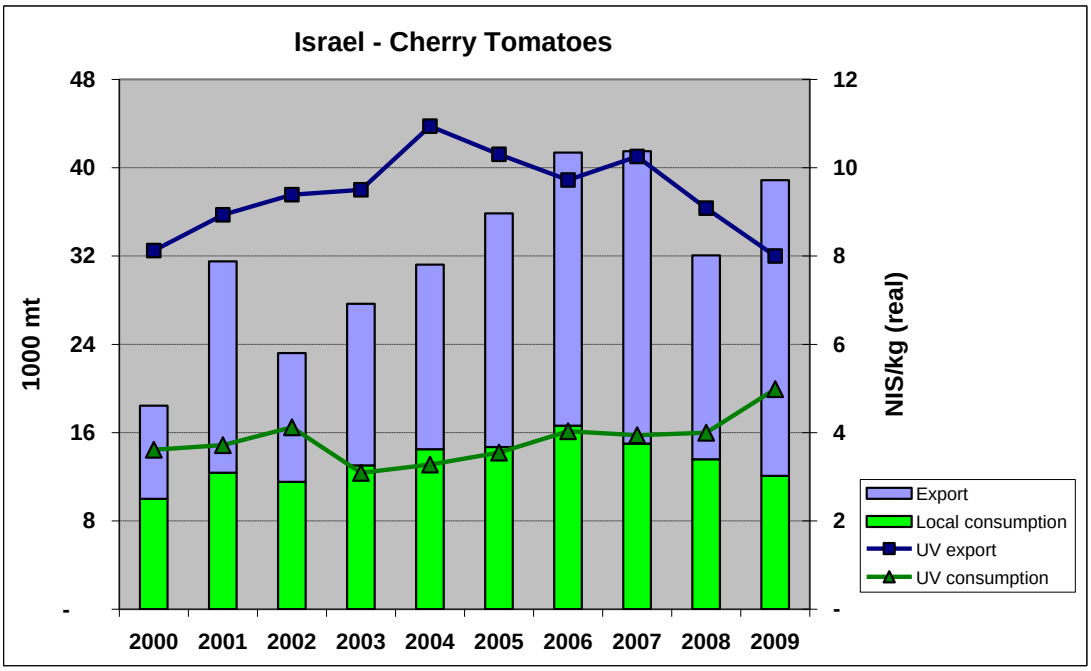

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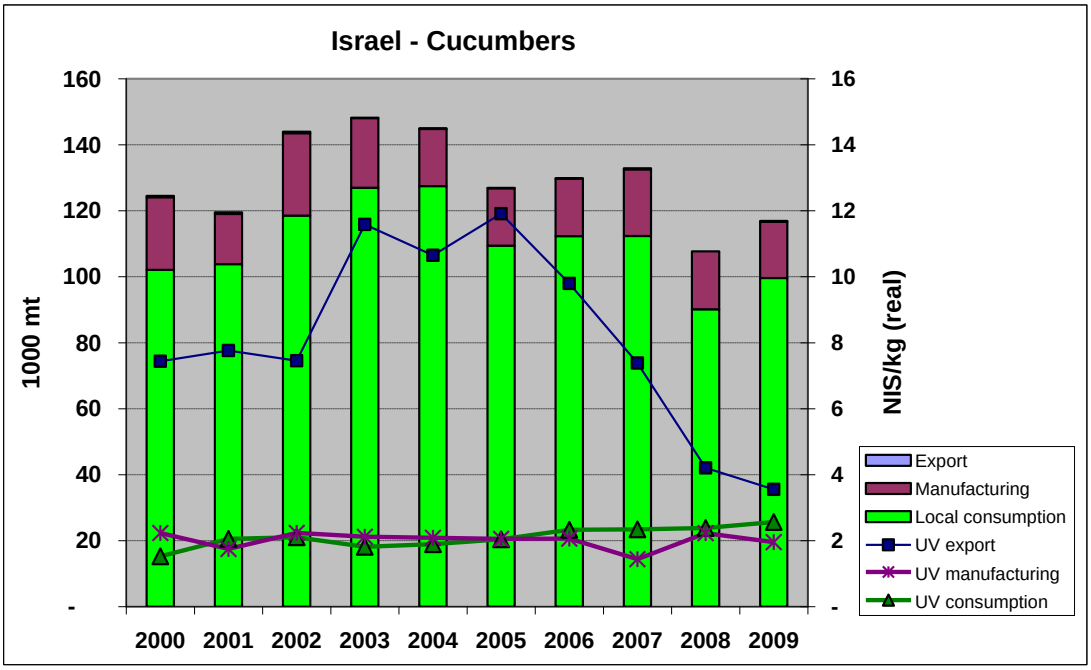

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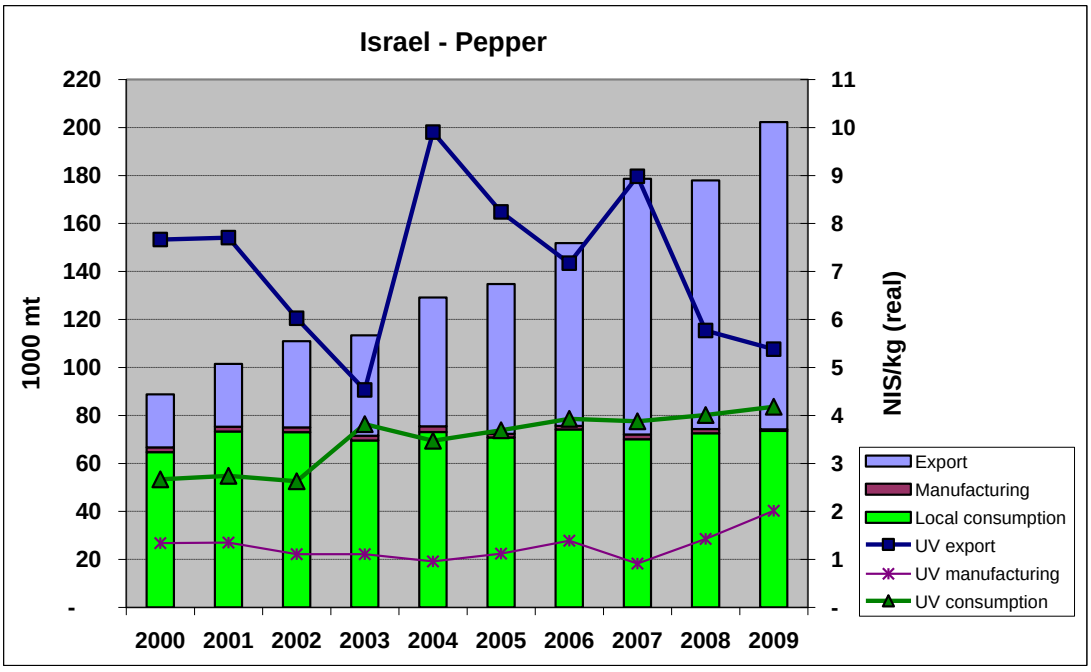


Figure 9

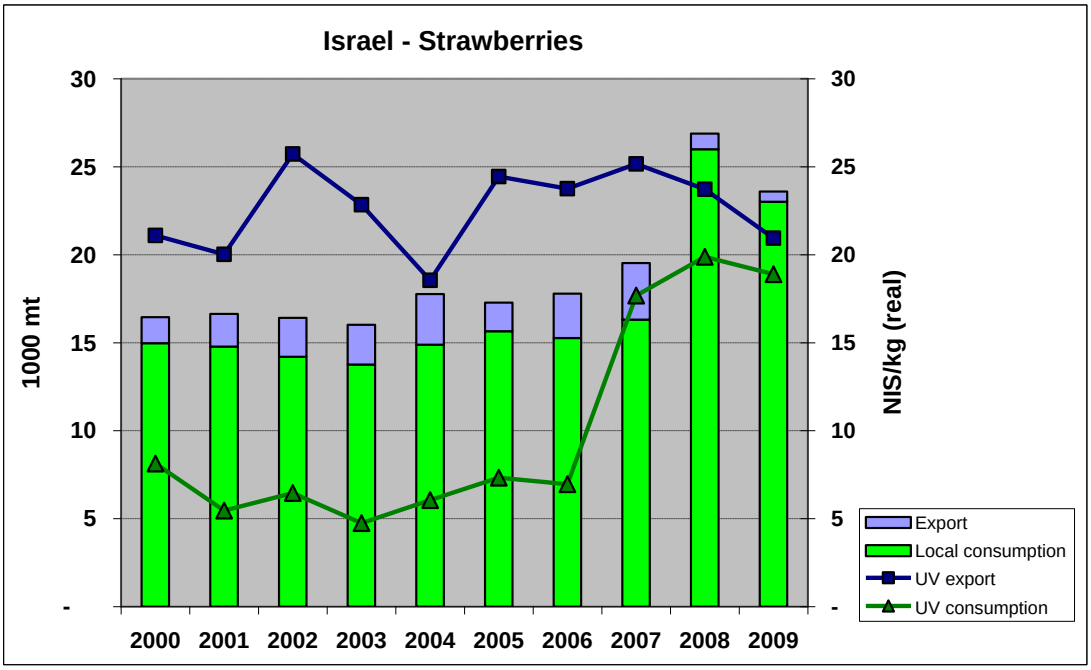


Figure 10

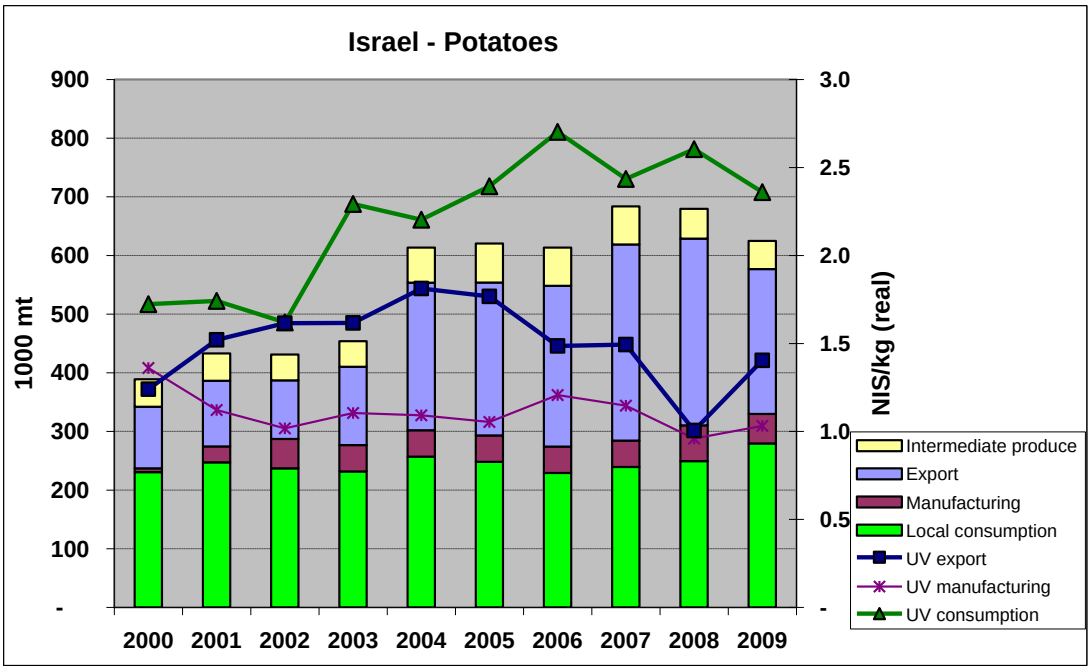


Figure 11

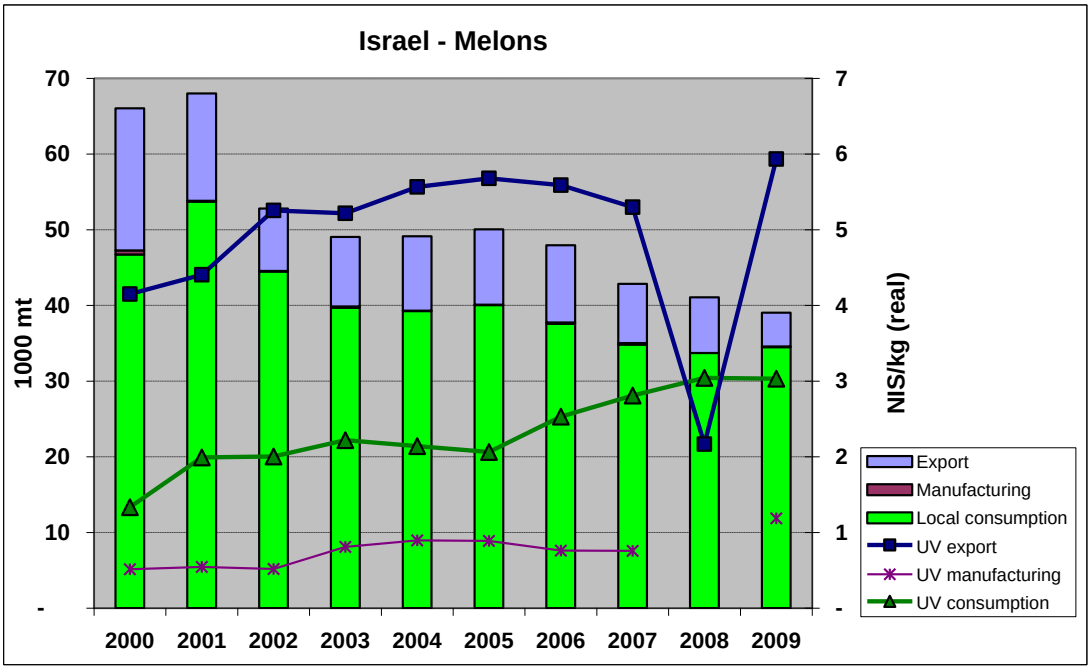


Figure 12

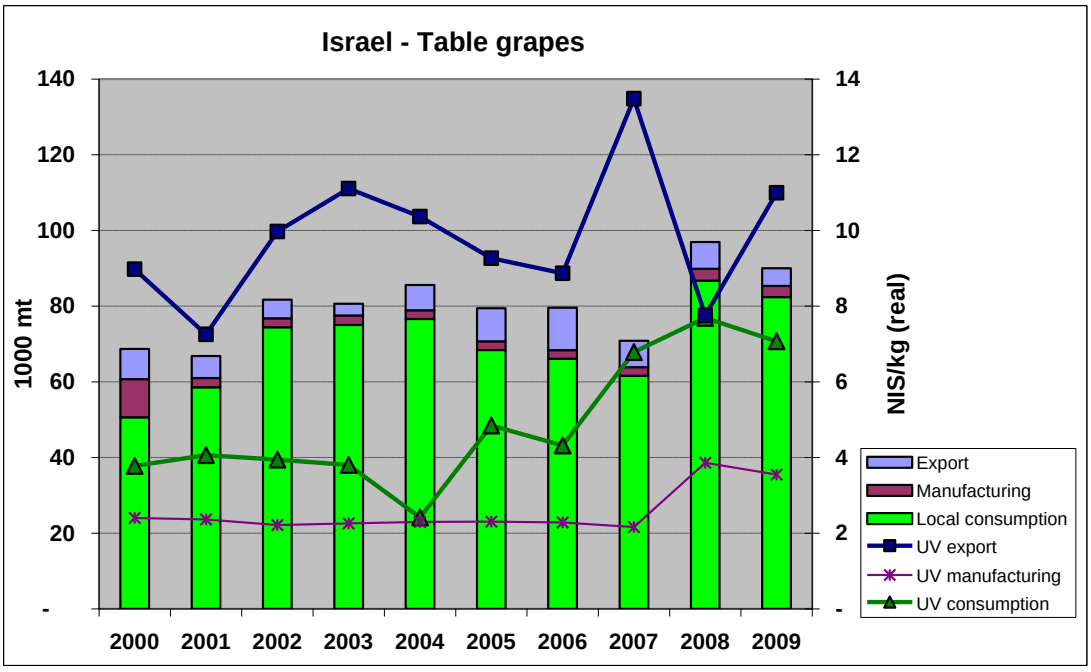


Figure 13

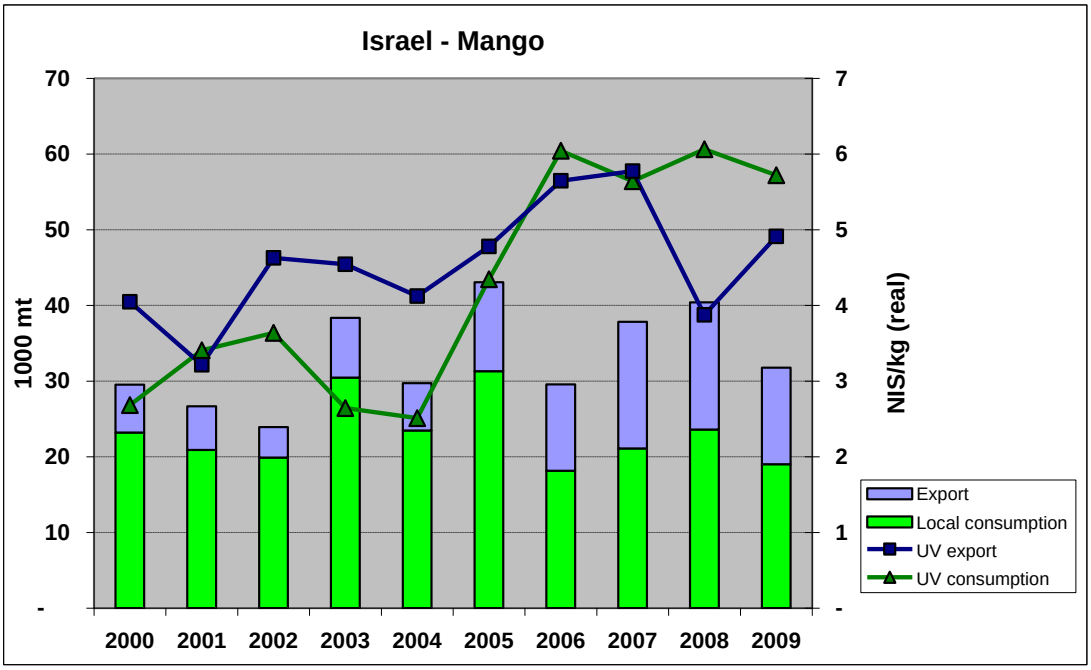
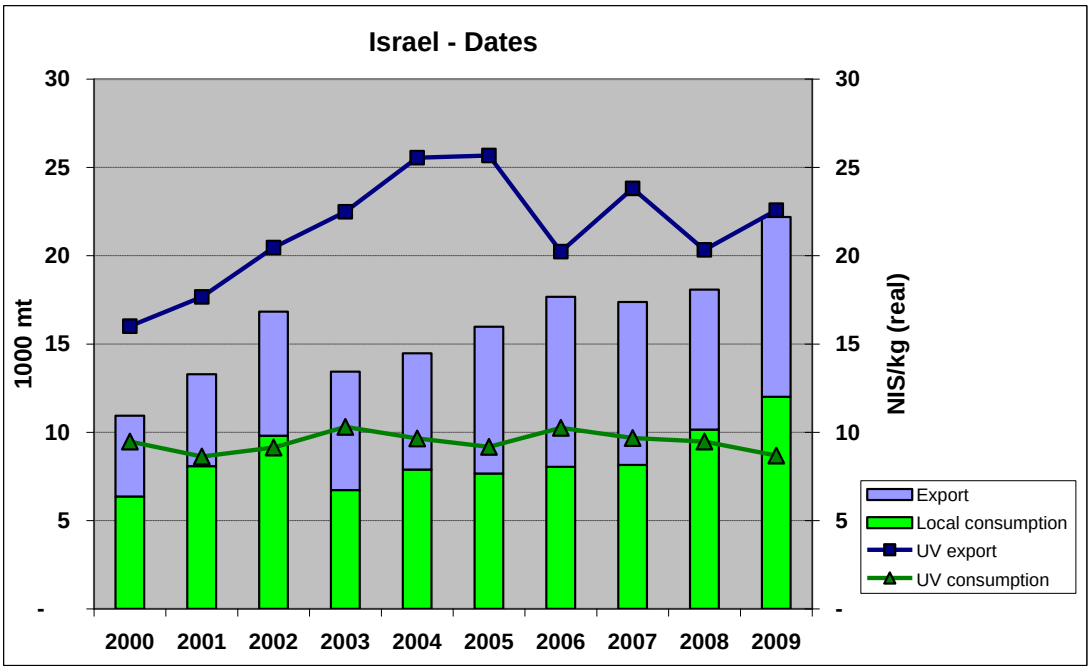


Figure 14



Summary - Development of the Fruit and Vegetable Sector

Crops selected for the PAM analysis account for a substantial part of fruit and vegetable production in Israel. Selected crops are diverse with regard to development of production and main use. Most crops are characterized by higher prices for exports, compared to produce sold on the domestic market. Probably the main reason is the higher quality of exported produce. An additional reason may be higher risk associated with exports (e.g. losses, price risk for growers with consignment contracts). For potatoes (and mangos in 2008 and 2009) prices for exports are lower than prices obtained for the part of the crop marketed locally, suggesting third-degree price discrimination.

2. Policy Analysis Matrix of the Israeli Agriculture

Literature Review

The Policy Analysis Matrix is an accounting method proposed by Monke and Pearson (1989). This analytical tool has been proven useful in numerous practical problems of policy interventions in agriculture. For example, Nelson and Panggabean (1991) utilized PAM to investigate governmental policies concerning sugar production in Indonesia. Other uses of PAM include the evaluations of market power following price liberalization (Staal and Shapiro 1994) and environmental effects and transaction costs associated with technological developments (Kydd, Pearce and Stockbridge 1997).

The competitiveness of three main crops in Thailand (rice, soybean and mungbeans) has been studied by Yao (1997). In this study, PAM was utilized to measure the efficiency losses associated with government intervention for diversification from rice to legume crops. In another paper, PAM was used to study policy shifts from reliance on chemical fertilizers to alternative agroforestry-based natural resource management technologies in maize production in Cameroon (Adesina and Coulibaly 1998). Lastly, Fang and Beghin (2000) assessed the comparative advantage and protection of key crops in China. Their application of the PAM suggested that China has a comparative advantage in labor intensive crops; therefore it should diverge from land intensive crops as grain and oilseed. In particular, they claim that grain self-sufficiency policy in China incurs efficiency losses.

Methodology

We employ the PAM approach in the following steps. First we construct a farm budget, which assesses the revenues and costs of every fruit and vegetable crop included in the study. We divide the agricultural inputs into tradable inputs and domestic factors. This disaggregation is useful as it allows the assessment of policies concerning trade in intermediate inputs and those targeting the supply of domestic factors. Then a double columns bookkeeping is taking place. Market prices are used to estimate farmers' revenues, costs and profitability (i.e. private prices). The second

column is the valuation of the agricultural activity at social prices. For example, cost figures in this column are the real costs related to the use of inputs in agriculture which may include policy interventions. A third column is used to determine the difference between the entries in each row. If social prices are lower than private prices (or social costs are higher than private costs) it means that some kind of government support is present. Accordingly, the opposite implies that a producer tax is levied.

Table 2: Policy Analysis Matrix (based on Monke and Pearson 1998)

	Values at private prices	Values at social prices	Divergence
Revenues	A	E	I
Tradable inputs	B	F	J
Domestic factors	C	G	K
Profits	D	H	L

Notice that

D = A - (B + C) = Private profits

H = E - (F + G) = Social profits

L = I - (J + K) = Net policy transfers

Data

Farm crop-specific budgets are constructed from recent available data composed by the extension service unit of the Israeli Ministry of Agriculture and Rural Development (2010). These are the most updated and detailed estimates of costs and expected grower prices available. The farm budgets we used are not final yet, and some updating of our calculations might be necessary when the final budgets will be published. We use this data to compute private and social costs of production (entries B, C, F and G in table 1). For private revenue, we multiply expected yields by grower price. Grower prices for the domestic market and export (if applicable) used in the analysis are the prices suggested by the extension service unit (table 2). For social revenues we do the following. First we compute a reference world price for each crop. This price represents the lowest possible price available for importing goods of

similar quality to substitute for domestic production (the reference price is calculated at the growers' price level, see Appendix 1 for details). Then we multiply expected yields by the lower figure between the reference price and the grower price for each crop, as this is the lowest price available. For example, if the reference world price is the lower of the two then it is also the social price and it means that import should take place. In any case, if we observe that A > E it implies that there is a binding tariff or another form of trade barrier because domestic prices are higher than world prices.

The basic unit in our analysis is one cultivated dunam. We had access to farm budgets for several varieties and/or growing technologies for each crop. In order to focus our analysis we choose varieties/growing technologies that comply with one or two of the following: crops which are most commonly grown in Israel for domestic consumption and those which are more suited for exports. This is an important distinction because the PAM is designed to handle the analysis of homogenous goods. However, in practice, the quality of fruit and vegetables consumed domestically is generally lower than the quality exported by Israel. Therefore, we present results for alternatives that are important for domestic consumption and those which are more relevant for exports. In this sense our analysis is conservative because we are careful not to overestimate the domestic willingness to pay.

Table 2: Yields, grower prices and export share

Export share	Export price	Domestic price	Yields ton/dunam	Crop
				Melons
60%	4000	3000	9	Melon Galia, trellising, Nov-Jan
75%	3000	2000	4	Melon Galia, open field, July-Sep
75%	4500	2000	7	Melon Charentais, Spring
				Cucumbers
0%	-	2000	28	Cucumbers 3 cycles
0%	-	2000	23	Cucumbers 2 cycles
				Cherry Tomatoes
75%	7000	4000	14	Cherry clusters greenhouse
80%	7500	4500	7.5	Cherry tomatoes open field
				Tomatoes
0%	-	2600	25	Tomatoes clusters greenhouse
55%	4000	3000	18	Tomatoes greenhouse
				Sweet pepper
0%	-	4500	12	Pepper, Dutch trellising, greenhouse, Apr
0%	-	4500	12	Pepper, Spanish trellising, greenhouse, Apr
80%	5500	4000	9	Pepper, Spanish trellising, greenhouse, Aug
75%	5500	4000	7.5	Pepper, Spanish trellising, net, Aug
60%	6500	4000	22	Pepper, Dutch trellising, greenhouse, heating & cooling, July
				Strawberries
12%	20180	6754	7	Strawberries
				Potatoes
0%	-	2200	5	Potatoes Spring
80%	1700	2200	3.5	Potatoes Fall
				Mango
50%	4900	3500	2.79	Mango Maya
				Table grapes
0%	-	5000	3.5	Grapes Thompson
0%	-	3500	3.24	Grapes Redglobe
				Dates
60%	18000	9500	1.06	Dates Medjool

Remark: All prices are for crops sorted and packed, with the exception of mangoes and dates which do not include packaging costs.

Government interventions

A recent OECD report indicates that the level of government support to the Israeli agricultural sector decreased over time (2010). In particular, it is currently below the average support of OECD and EU27 countries. On the other hand, an implicit consumer burden index, also computed in this report, suggests that the social cost paid by consumers in Israel due to government intervention is higher relative to the social cost in the respective countries. This is mostly because the support in Israel shifted to relatively more distortive policy instruments such as high tariff rates that may lead to domestic market prices which are higher than world prices. In addition, the Israeli government subsidizes key input factors, e.g., water, labor and capital, which may distort their allocation. This implies that although direct transfers to producers declined over time, private prices and social prices may diverge significantly. According to OECD calculations, most of the support to agriculture is provided to livestock sectors while support of plant production and especially fruit and vegetable production is relatively small.

Information regarding agricultural policies for this study is composed from several sources (e.g. OECD, WTO, Israeli officials and interactions with professionals in the field). This study includes government support of the following types; water for irrigation, hired labor, capital investment, tariff and crop insurance.

Land and water

Most Israeli land is state-owned (94%). Land use rights for farmers are allocated by the Israel Land Administration for a small fee and no market mechanism takes place. Some land transactions between farmers may take place at the margin but in these cases the price is strongly linked with associated water rights. Water resources are state-owned as well and the quota for agriculture use is coupled with agricultural land. Water for agriculture use is subsidized. While the price of water for urban consumption is 4.5 NIS/m^3, it is only 1.5 NIS/m^3 for agriculture. We assume desalination cost of 2.75 NIS/m^3 and couple that with 1 NIS/m^3 to account for delivery costs. Therefore, the social cost of supplying water for agriculture in our study is 3.75 NIS/m^3. In addition, with recent increase in the regulated price of water in Israel it was agreed that 0.15 NIS/m^3 of the farmer price is allocated back to rural communities for maintaining and investing in water infrastructure. Therefore, for the

purpose of PAM we subtract this amount from the grower price such that in our analysis the farmer faces a real cost of 1.35 NIS/m^3.

Hired labor

Government support for labor in agriculture is provided by licenses for hiring foreign workers (mostly from Thailand). The employer cost of an unskilled foreign worker in agriculture is estimated as 68% of that of the Israeli unskilled worker (Eckstein 2007). Based on the estimation of Kimhi et al. (2010), we employ 226 NIS/day for hiring a foreign worker which in turn implies that the cost of an unskilled Israeli worker is 332 NIS/day. Our calculations based on CBS labor survey data yield similar estimates.
However, the availability of foreign-workers is limited by the number of approvals issued annually by the Israeli government. Recent statistics show that the share of foreign workers in agriculture is about 50% of hired laborers (CBS). Accordingly, we estimate that unskilled hired labor in Israeli agriculture is subsidized at rate of 25%.

Capital investment

The policy goals and magnitude of support given for investment in capital in agriculture varies over time and across crops and type of capital. For example, at the present support at rate of 40% is given for farmers investing in machinery which substitutes unskilled labor and limited funds provide 20% subsidy for investments related to export crops. To be time consistent we employ 20% government funding for all investment in capital. That is to say that we assume that this rate reflects the long term support provided for investments in agriculture.

Crop Insurance

Lastly, the Israeli growers enjoy a subsidized crop insurance plan. We assume that insurance program is actuary fair so premiums reflect true value of expected risk in agricultural production. Since agricultural risk is systematic and cannot be diversified this insurance program should not create inefficiency in production. The share paid by the government is 35% of the premium for natural damages insurance for all crops. Crop specific premiums are available from KANAT. That is the agricultural insurance company receiving the payments for the basic coverage subsidized by the Israeli government. Our most recent data contain costs of insurance for the year 2006. The

social cost of insurance varies between 12 NIS/dunam (Melon) and 1,027 NIS/dunam (Mango) for the crops considered in this study.

Fruit and vegetables crops considered

We provide a detailed analysis for the following crops: Tomatoes, cherry tomatoes, cucumbers, melons, potatoes, mango, sweet peppers, strawberries, dates and grapes.

Being annual plants, the analysis of vegetable crops is more suited for the PAM framework because most agricultural activities related to the cultivation of the vegetable crop are performed over one season or one year. Fruits on the other hand are perennials; which means that the related agricultural activities are spread asymmetrically over number of years. To enable the PAM analysis for perennials we convert their budgets to construct a "representative year" over the life of the plant. First we compute the present values of the different activities in the multi-year budget. Then we use interest rate to reallocate the activities such that all years are financially identical. That allows us to use the representative year of the crop directly in the PAM framework. Another key difference between vegetable and fruit budgets in our analysis is with regard to investment in capital. In the farm budgets for vegetables it is assumed that investments are being made by the farmer to purchase the required machinery. We make use of these expenses to incorporate the subsidy for capital investment. On the other hand, in the budget for fruit crops it is assumed that the farmers are leasing machinery and equipment as needed. To account for subsidy in these budgets we assume a competitive market were the renting firms pass on the subsidy they received to invest in capital such that the farmers' price reflects the subsidy.

Next, we present the results of our base-case scenario analysis and compare it to three scenarios representing availability of low quality water at lower prices to agriculture, regional peace enabling Palestinian workers to replace foreign workers, and the removal of government support for agriculture. Figures 15 to 21 present the results for the base-case scenario and Table 3 summarizes results for all four scenarios. For more details see Appendix 2.

Results for selected scenarios

Scenario 1: Base-case assumptions

The results for this scenario are based on the assumptions we listed above. We start by looking at the profits in agriculture (figures 15–17). The social profits associated with the cultivation of the selected crops in this study showed to be negative in all cases but two; Mango Maya and one cultivation method of Pepper. Moreover, for some crops the losses are quite substantial (e.g. strawberries, open field cherry tomatoes, and two and three cycles of cucumbers and pepper production for export with heating and cooling which is grown on a very small scale). Private profits are negative in many cases as well. The result itself is not surprising because the extension service farm budgets that we use as a platform for the analysis suggest that negative profits are common. However, it is unreasonable to assume that the estimated negative profits are sustainable. The answer for this may be the wage from labor of the farmer himself. In the farm budgets the wage for skilled worker and the farmer in particular are up to 580 NIS/day. It might be the case that the real opportunity cost of the farmer is lower than that. In order to examine this idea we present the farmers wage from labor as well (figures 15-17). We see that for some crops the farmer income from wage may be seen as compensation for the negative profits.

The considered components of government support to agriculture are depicted in figures 18 - 20. Hired labor and water for irrigation are the most subsidized domestic factors. They account jointly for roughly 80%-90% of government support and may exceed 10,000 NIS/dunam for some crops.

Potato crops are an exception to the above; it is the only crop in our study for which the imposition of tariff is effective. For potatoes the domestic price is higher than the world reference price and still exports are taking place. The observed situation can not reflect a perfectly competitive market as one would expect that growers market their output where prices are higher (i.e. domestically). This in turn should push domestic prices down until there is no arbitrage in trade. In fact, prices of other crops may peak during some periods over the year and at that times tariff may be binding. However, being a static model the PAM is incapable of capturing events like these. In this sense it might be the case that we underestimate the effect of government interventions in trade (We investigate the impact of seasonality in reference prices on price differentials in Appendix 1. Results indicate that also during low prices abroad tariffs

are not effective for tomatoes, peppers and strawberries but protect farmers from low-priced grape imports).

Other type of support depicted are insurance and subsidy for investment in capital. However the share of these two is relatively small compare to the support given to the other domestic factors considered.

Seeing the significant gap between the social and private revenues, we are interested to assess the overall transfer of consumers (tax payers) to agricultural producers. That is not a new idea. The OECD uses Producer Support Estimates (PSE) as an index to measure the size of the overall transfer. The PSE is computed as the share of overall support per unit of its market price.. The minimum estimated PSE in our study is 17% for Red Globe grapes and the maximum is for spring potatoes with 39%, which is due to the gap between domestic and world prices (Figure 21). The median PSE of the considered crops is 25.7%. In order to get a better grasp of the average government support per crop one should weight these figures with shares of production. Our estimates are significantly higher compared to OECD estimates for fruit and vegetables (See appendix 3 for a detailed comparison).

Scenario 2: Lower social cost of irrigation

In this scenario the social cost of irrigation is assumed to be 2 NIS/m^3. The purpose of this scenario is to analyze the case in which water of lower quality is available for agricultural producers.

The results suggest that the consumer burden is less significant with some crops changing the sign from negative to positive social revenues. These are the two varieties of potatoes, additional cultivation method of pepper, dates majul, red globe grapes and greenhouse clusters cherry tomatoes. In addition, social revenues of pepper for the domestic market have been increased by 38%. For mango which just barely broke even in the base-case, the social profits in this case are fairly noticeable.

Scenario 3: Regional Peace

The supply of hired workers from the Palestinian Authority is unbounded in this scenario. That is to say that the social cost of hiring unskilled worker in agriculture is at the rate of the minimum wage of an Israeli worker plus benefits. We add to that transportation cost which gives us 237 NIS/day. We construct this scenario by substituting this new social cost of hiring unskilled worker with the 332 NIS/day

which we used in the base-case scenario. To be clear, we assume that there are no foreign workers in Israel other than from the Palestinian Authority.

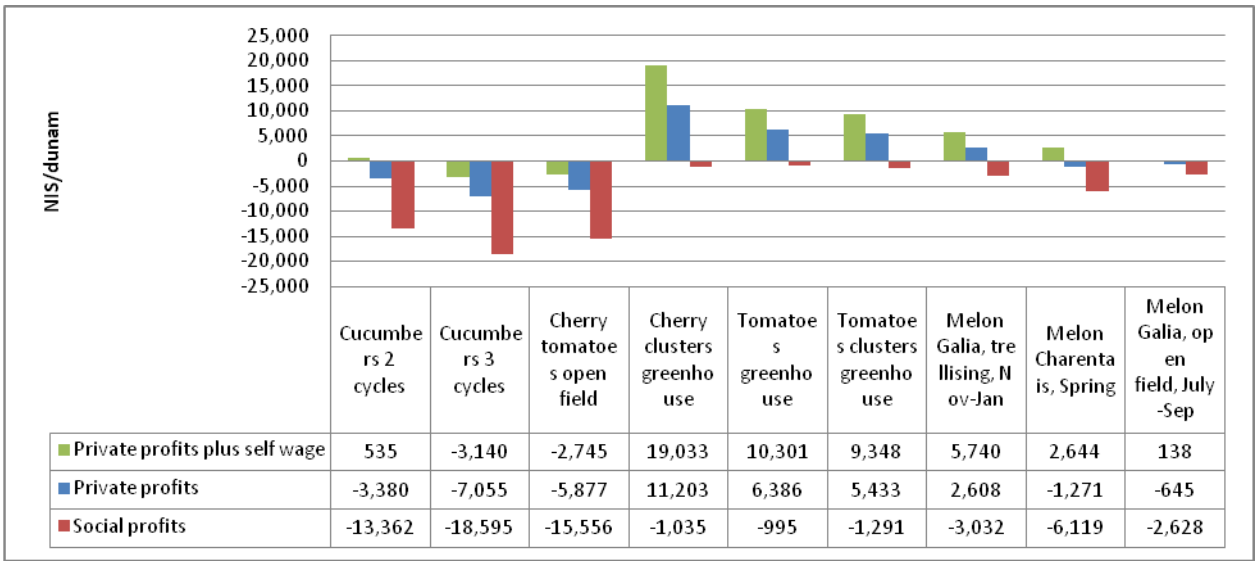
The results of this scenario imply that when we relax the subsidy for hired labor the consumer burden is lowered considerably. This is because for most crops hired labor is the largest subsidized domestic factor. First, in this case the estimated social revenues of 11 crops are positive. Second, for large number of crops overall government support is cut by more than 50%.

Scenario 4: No government support for investment in capital

The purpose of this scenario is to evaluate the sensitivity of our results to the assumption of 20% fixed government support for investments in capital. We find this scenario useful because the legislation regarding the subsidy for investments is updated periodically according to changes in policy and prioritizations.

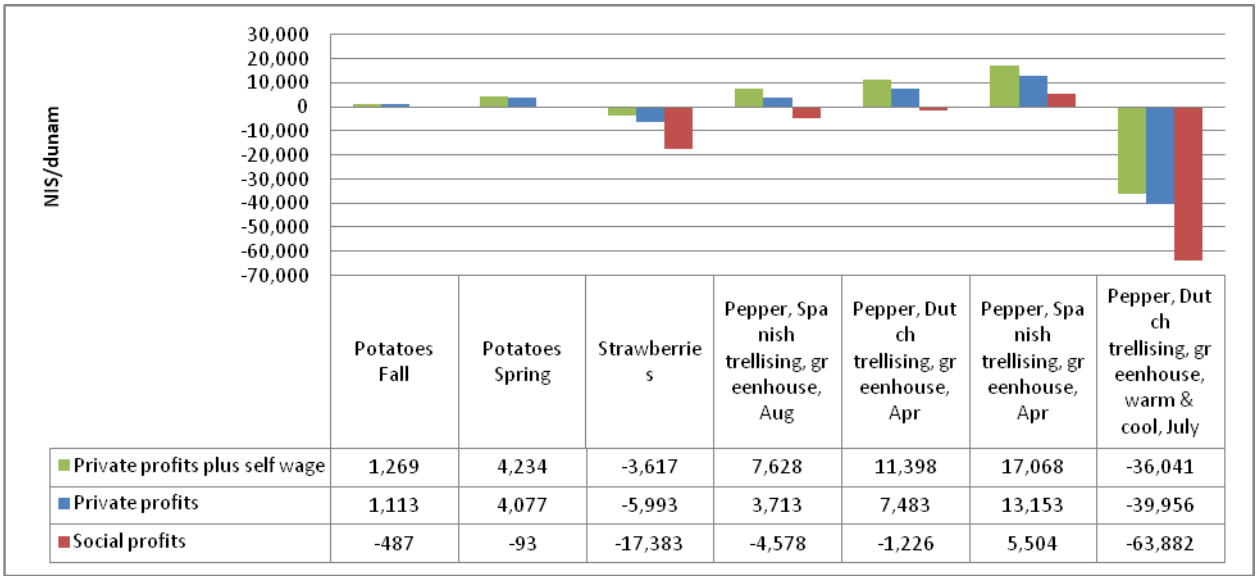
In this case the results are clear. Removal of the subsidy for investment in capital does not create a considerable change in our results. In other words, in the case that one assumes subsidy of smaller rate, it should not make much difference with regard to the conclusions of this study. In addition, in the case that subsidy is given to investment in specific machinery or equipment which provides non-proportional government support it may affect the profitability of one crop over the other but in any case, this component is too small to have a significant impact on the gap between social and private profits.

Figure 15: Profits in vegetable crops - Scenario 1



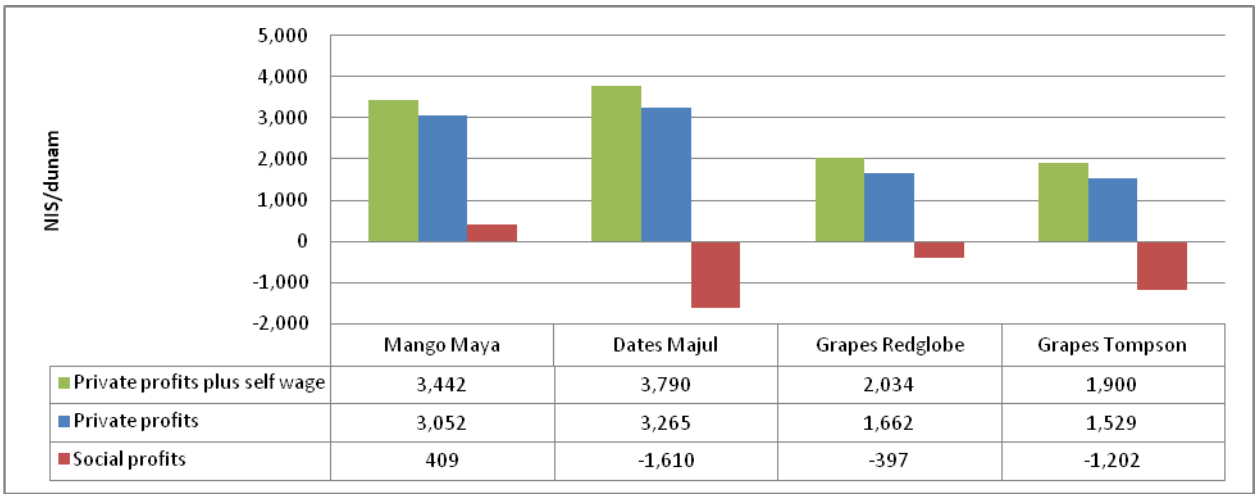
	Cucumbers 2 cycles	Cucumbers 3 cycles	Cherry tomatoes open field	Cherry clusters greenhouse	Tomatoes greenhouse	Tomatoes clusters greenhouse	Melon Galia, trellising, Nov-Jan	Melon Charentais, Spring	Melon Galia, open field, July-Sep
Private profits plus self wage	535	-3,140	-2,745	19,033	10,301	9,348	5,740	2,644	138
Private profits	-3,380	-7,055	-5,877	11,203	6,386	5,433	2,608	-1,271	-645
Social profits	-13,362	-18,595	-15,556	-1,035	-995	-1,291	-3,032	-6,119	-2,628

Figure 16: Profits in vegetable crops (cont) - Scenario 1



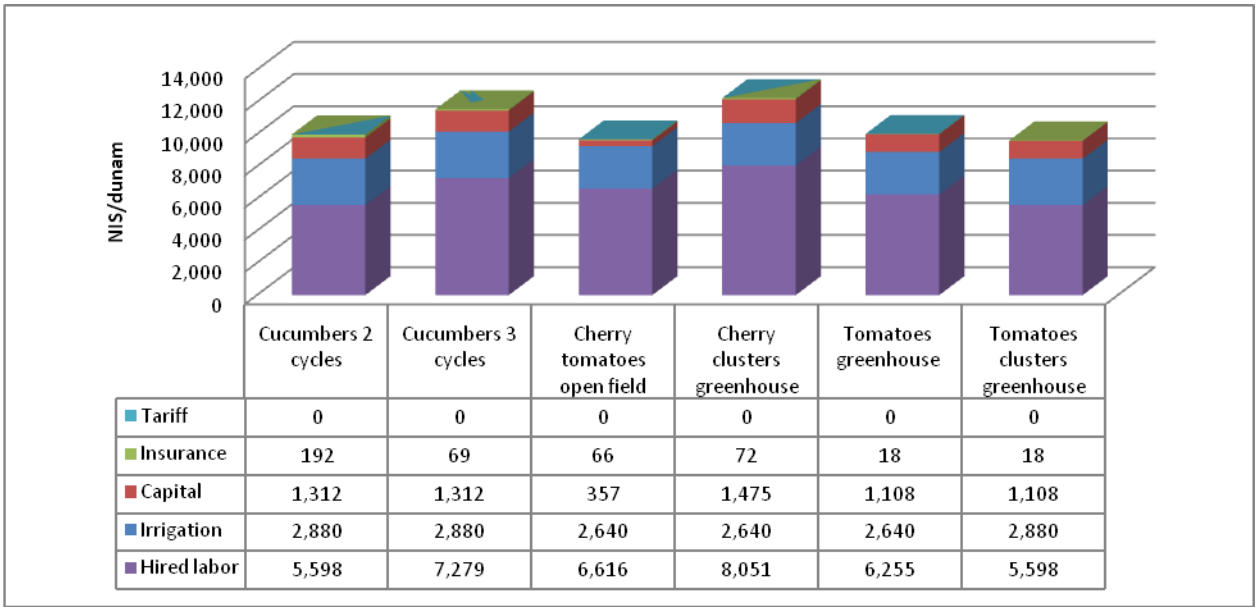
	Potatoes Fall	Potatoes Spring	Strawberries	Pepper, Spanish trellising, greenhouse, Aug	Pepper, Dutch trellising, greenhouse, Apr	Pepper, Spanish trellising, greenhouse, Apr	Pepper, Dutch trellising, greenhouse, warm & cool, July
Private profits plus self wage	1,269	4,234	-3,617	7,628	11,398	17,068	-36,041
Private profits	1,113	4,077	-5,993	3,713	7,483	13,153	-39,956
Social profits	-487	-93	-17,383	-4,578	-1,226	5,504	-63,882

Figure 17: Profits in fruit crops - Scenario 1



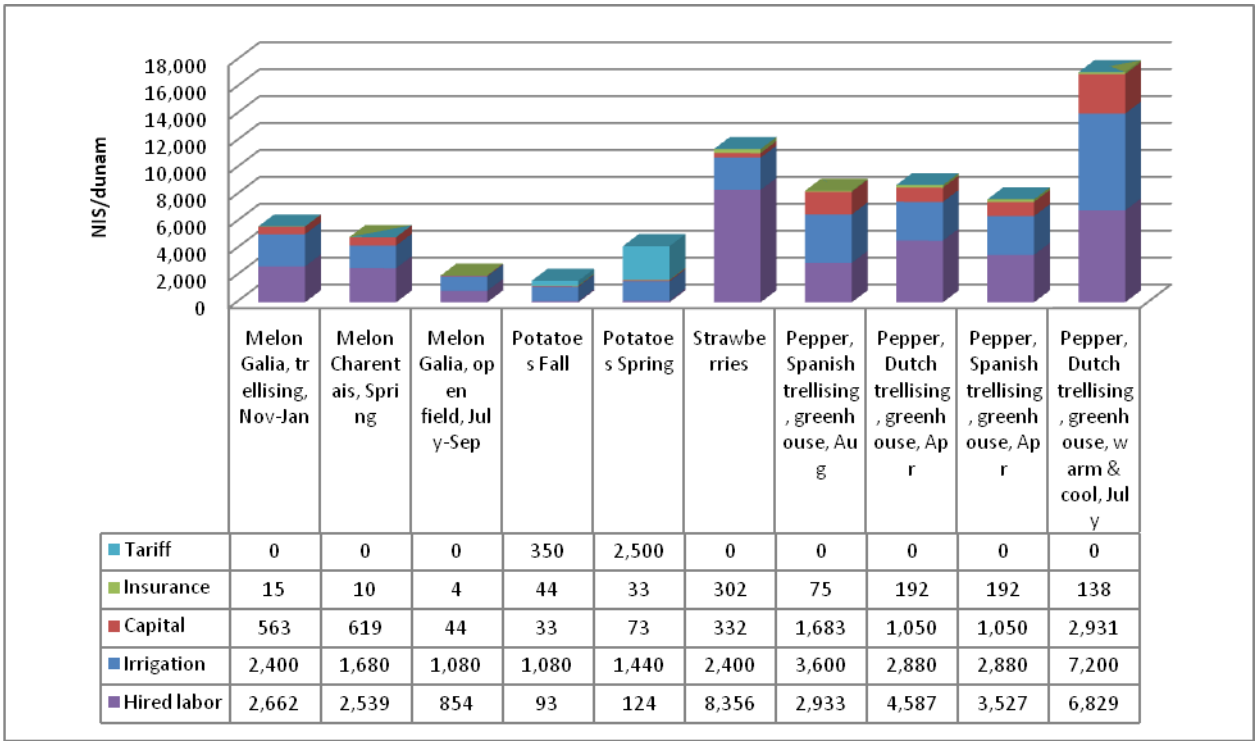
	Mango Maya	Dates Majul	Grapes Redglobe	Grapes Tompson
Private profits plus self wage	3,442	3,790	2,034	1,900
Private profits	3,052	3,265	1,662	1,529
Social profits	409	-1,610	-397	-1,202

Figure 18: Government support for vegetable crops - Scenario 1



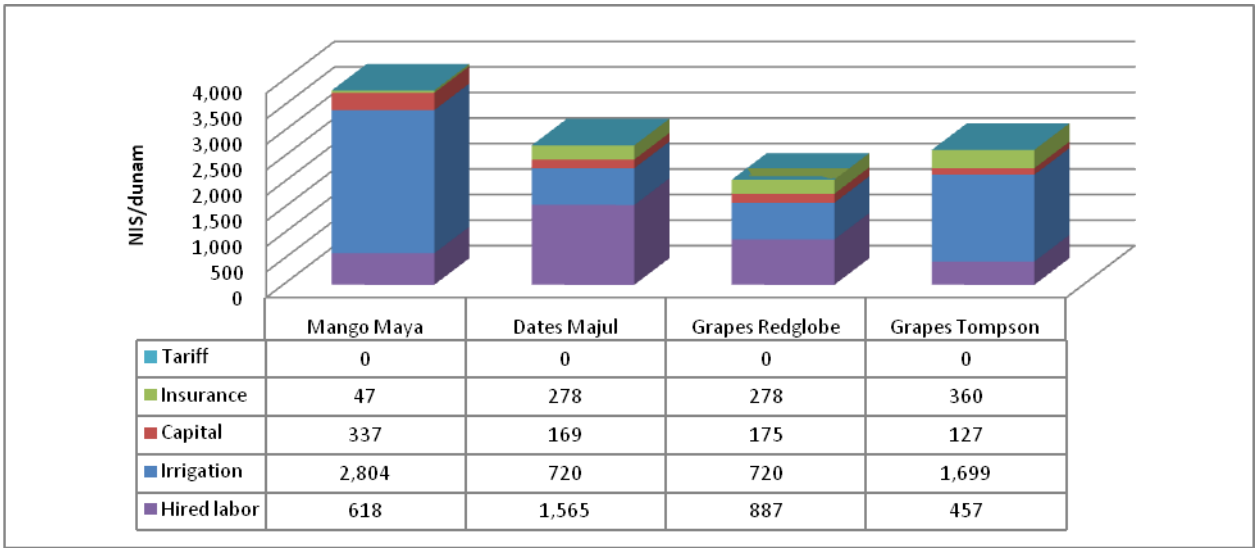
	Cucumbers 2 cycles	Cucumbers 3 cycles	Cherry tomatoes open field	Cherry clusters greenhouse	Tomatoes greenhouse	Tomatoes clusters greenhouse
Tariff	0	0	0	0	0	0
Insurance	192	69	66	72	18	18
Capital	1,312	1,312	357	1,475	1,108	1,108
Irrigation	2,880	2,880	2,640	2,640	2,640	2,880
Hired labor	5,598	7,279	6,616	8,051	6,255	5,598

Figure 19: Government support for vegetable crops (cont) - Scenario 1



	Melon Galia, trellising, Nov-Jan	Melon Charentais, Spring	Melon Galia, open field, July-Sep	Potatoes Fall	Potatoes Spring	Strawberries	Pepper, Spanish trellising, greenhouse, Aug	Pepper, Dutch trellising, greenhouse, Apr	Pepper, Spanish trellising, greenhouse, Apr	Pepper, Dutch trellising, greenhouse, warm & cool, July
Tariff	0	0	0	350	2,500	0	0	0	0	0
Insurance	15	10	4	44	33	302	75	192	192	138
Capital	563	619	44	33	73	332	1,683	1,050	1,050	2,931
Irrigation	2,400	1,680	1,080	1,080	1,440	2,400	3,600	2,880	2,880	7,200
Hired labor	2,662	2,539	854	93	124	8,356	2,933	4,587	3,527	6,829

Figure 20: Government support for fruit crops - Scenario 1



	Mango Maya	Dates Majul	Grapes Redglobe	Grapes Tompson
Tariff	0	0	0	0
Insurance	47	278	278	360
Capital	337	169	175	127
Irrigation	2,804	720	720	1,699
Hired labor	618	1,565	887	457

Figure 21: Producer Support Estimates – Scenario 1

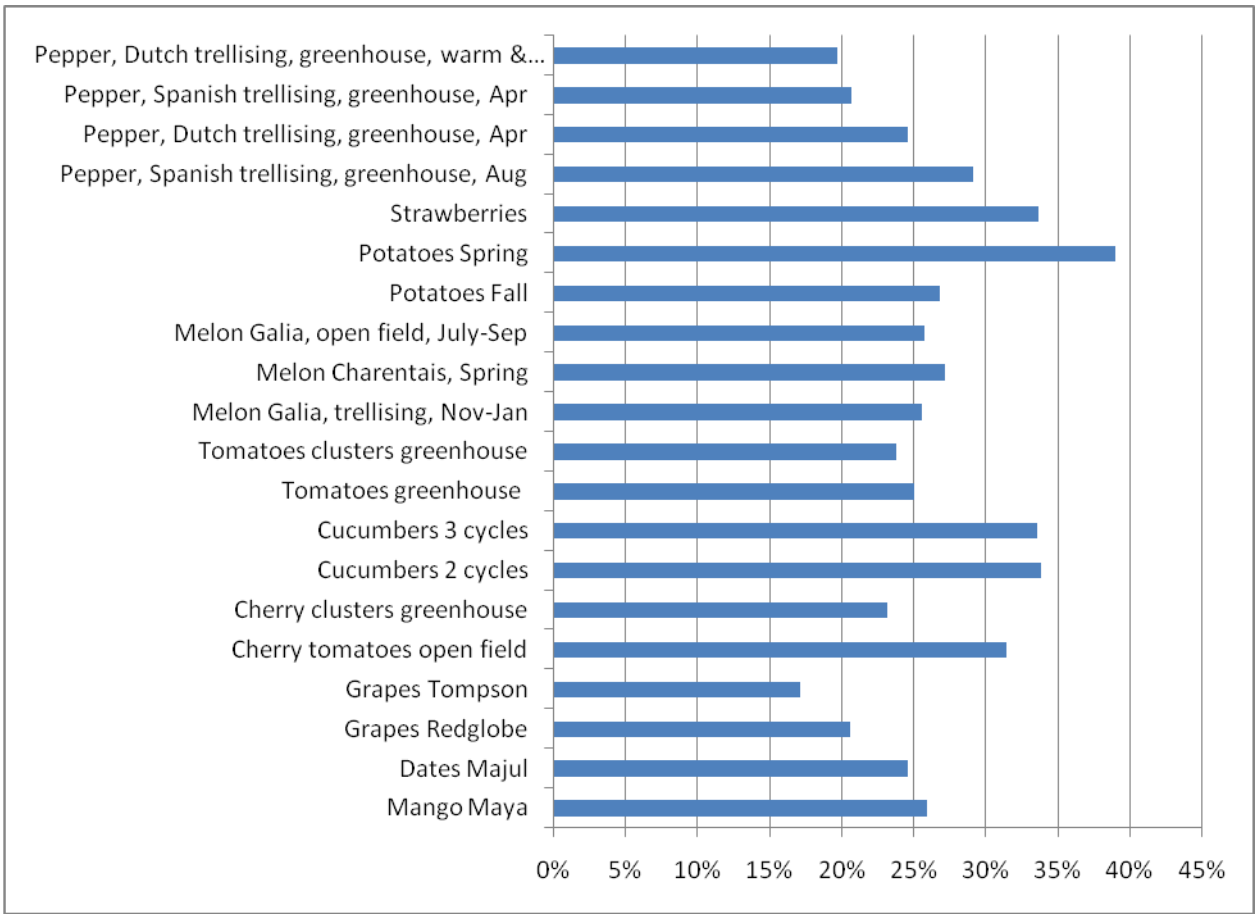


Table 3: Comparison of Different Scenarios (NIS per dunam)

Scenario	(1) Base-case			(2) Lower social cost of irrigation			(3) Regional peace			(4) No goverment support for investment in capital		
Profits	A	B	C	A	B	C	A	B	C	A	B	C
Cucumbers 2 cycles	-3,380	535	-13,362	-3,380	535	-11,262	1,732	5,647	-2,652	-3,380	535	-12,050
Cucumbers 3 cycles	-7,055	-3,140	-18,595	-7,055	-3,140	-16,495	-470	3,445	-4,732	-7,055	-3,140	-17,283
Cherry tomatoes open field	-5,877	-2,745	-15,556	-5,877	-2,745	-13,631	8	3,140	-3,055	-5,877	-2,745	-15,199
Cherry clusters greenhouse	11,203	19,033	-1,035	11,203	19,033	890	18,044	25,874	13,857	11,203	19,033	440
Tomatoes greenhouse	6,386	10,301	-995	6,386	10,301	-995	11,791	15,706	10,665	5,278	9,193	-995
Tomatoes clusters greenhouse	5,433	9,348	-1,291	5,433	9,348	-1,291	10,182	14,097	9,056	4,325	8,240	-1,291
Melon Galia, trellising, Nov-Jan	2,608	5,740	-3,032	2,608	5,740	-1,282	4,980	8,112	2,002	2,608	5,740	-2,469
Melon Charentais, Spring	-1,271	2,644	-6,119	-1,271	2,644	-4,894	944	4,859	-1,364	-1,271	2,644	-5,499
Melon Galia, open field, July-Sep	-645	138	-2,628	-645	138	-1,840	146	929	-983	-689	94	-2,628
Potatoes Fall	1,113	1,269	-487	1,113	1,269	300	1,200	1,357	-306	1,113	1,269	-454
Potatoes Spring	4,077	4,234	-93	4,077	4,234	957	4,195	4,352	149	4,077	4,234	-20
Strawberries	-5,993	-3,617	-17,383	-5,993	-3,617	-15,633	587	2,963	-2,447	-5,993	-3,617	-17,051
Pepper, Spanish trellising, greenhouse, Aug	3,713	7,628	-4,578	3,713	7,628	-1,953	6,280	10,195	921	3,713	7,628	-2,895
Pepper, Dutch trellising, greenhouse, Apr	7,483	11,398	-1,226	7,483	11,398	874	11,375	15,290	7,253	6,433	10,348	-1,226
Pepper, Spanish trellising, greenhouse, Apr	13,153	17,068	5,504	13,153	17,068	7,604	16,217	20,132	12,095	12,104	16,019	5,504
Pepper, Dutch trellising, greenhouse, warm & cool, July	-39,956	-36,041	-63,882	-39,956	-36,041	-58,632	-27,878	-23,963	-38,147	-42,887	-38,972	-63,882
Mango Maya	3,052	3,442	409	3,052	3,442	1,648	3,414	3,804	1,228	3,052	3,442	536
Dates Medjool	3,265	3,790	-1,610	3,265	3,790	435	3,755	4,280	-503	3,265	3,790	-1,273
Grapes Redglobe	1,662	2,034	-397	1,662	2,034	127	2,365	2,736	1,192	1,662	2,034	-222
Grapes Thompson	1,529	1,900	-1,202	1,529	1,900	-678	2,769	3,140	1,602	1,529	1,900	-1,033

A Private profits before self wage
B Private profits plus self wage
C Social profits without self wage

3. Conclusions

In this study we constructed a first policy analysis matrix for the Israeli agricultural sector. The study accounts for a substantial part of fruit and vegetable production in Israel. Therefore, the results may be seen as representative estimates of government support to vegetables and fruit crops. We find that in most cases the social net value of agricultural production activities is negative. With regard to private profits, fruit crops present positive profits. The profits from vegetable crops vary greatly. In some cases profits are negative, however, this may be the result of the high opportunity wages for farm operators assumed by the extension service. In addition, we observe higher private profits for the crops that have a relatively higher share of export, for instance, some cultivation methods of pepper, medjool dates, some varieties of tomatoes and cherry tomatoes, melons and mangoes.

We find that government support is as high as10,000 NIS/dunam for many of the crops that are produced for the domestic markets, e.g. tomatoes and cucumbers. Next in the level of support is strawberry, which is labor intensive and relies heavily on foreign labor, followed by peppers which enjoy support of about 8,000 NIS/dunam. Overall support for fruit crops is lower in most cases than support for vegetables, in our study it ranges between 2300 and 3800 NIS/dunam.

High support for some agricultural crops suggests that there exists an important potential for specialization and regional trade, once barriers to trade are removed. For example, both Israel and the Palestinian authority may benefit from transferring the production of labor intensive crops such as strawberries to the Palestinian authority. Cucumbers are characterized by high social losses in Israel and indicate the potential for imports from the Palestinian authority and Jordan. Egypt is very successful in grape exports to Europe, while exports of Israeli grapes declined. Probably Egyptian grapes could compete successfully with Israeli grapes also in the domestic Israeli market.

Extensions for the base-case scenario provided three important lessons. First, scarce water is a binding constraint for the development of agricultural production. The ability to recycle water for irrigation is a key for lowering the consumer burden related to the supply of agricultural commodities domestically. Second, regional peace

can bring unskilled labor which can replace the highly subsidized foreign workers in agriculture. Third, government support for capital investments in agriculture affects the profitability of some crops in the margins only and does not have a significance impact on social prices.

There are some limitations for utilizing PAM. First, the methodology is essentially a static measure. Namely, it is based on observed price system and assesses the associated social transfers. On the downside, it cannot forecast accurately changes which may rise due to policy modifications. That is mainly because PAM does not model the effect of changes in government intervention on demand and supply forces. Second, we use thorough this study fixed grower and reference prices. In reality, prices fluctuate during the year. This means that it might be the case that at times of high world prices export may be higher than in other times. On the other hand, other short periods may be characterized by lower world prices which give rise to binding tariffs. That cannot be observed using PAM. Third, There is spatial diversity with regard to agricultural activities which is not treated here. Crops are being cultivated in various regions in Israel. Since regions are not homogeneous with respect to domestic factors, social prices should not be similar in different regions (for example, water availability). An advanced study should look at these differences.

Future research

Our research is a first application of the PAM methodology to Israeli agriculture. Obvious direction for future research is the extension of the PAM calculations to additional crops, especially fruits, and additional agricultural sectors, e.g. livestock production. However, a more challenging route to extend the analysis is to construct a regionalized PAM model that allows identifying the relative advantages of various regions within Israel. Perhaps most important is the development of regional PAM analysis for Israel and the neighboring countries including the Palestinian Authority. This is a necessary next step in completing the analysis of competitiveness of Israeli agriculture and evaluate the potential for extending regional cooperation and development of regional trade.

Appendix 1

Estimation of Social Prices for Fruit and Vegetables included in the PAM study

The main objective of this appendix is to establish relevant social prices for crops that could be imported to Israel. Trade barriers like custom duties and or phytosanitary restrictions may hamper fruit and vegetable imports into Israel. In this case, social prices are expected to be lower than the private prices faced by Israeli growers. Most of the crops selected for the study are exported by Israel but these exports are often of a higher quality compared to consumption in the domestic market. Therefore, even in the case of exports it might be that the import of lower quality produce is restricted, creating a price wedge between world prices and domestic prices.

Our analysis is based on European Union (EU) trade data for the crops selected for the PAM analysis. Annual unit values calculated from EU trade data from import and export quantities and values provide an indication of the average price level for each supplying country. For some crops (e.g. cucumbers, regular tomatoes, strawberries, grapes) imports from the Palestinian Authority, Jordan or Egypt might provide a lower cost alternative compared to EU produce. We plan to explore this alternative if reliable data on prices become available.

In addition, the analysis of the development of EU markets provides an important background for the examination of comparative advantage of the selected crops. 9 of the 10 crops selected for the study are exported by Israel, and the EU is the main export market. It is also expected that in the short run the main beneficiaries of a reduction of custom duties for fruit and vegetables in Israel will be EU countries, especially for the more perishable fruit and vegetables.

The data presented in this chapter were extracted from Eurostat (the statistical bureau of the EU) in August 2010. Data relate to the EU27 (27 countries), INTRA-trade is the trade between member countries, while EXTRA-trade relates to imports from third countries or exports to third countries.

Calculation of reference prices for importable fruit and vegetables

The reference price stands for the price at which produce can be imported to Israel. The calculation of reference prices is based on **unit** import or export **values** (UV) derived from EU trade date. Based on the analysis of EU trade data we selected the

most relevant potential supplier for each product. We then added transport and additional marketing costs to calculate reference prices at the border in Israel and deducted a wholesale margin to obtain the reference price at the growers' level.

The choice of the relevant reference price for Israel was based on the following criteria:

(a) **Crops not grown in the EU**, or grown just in small quantities (dates, mangos): the relevant price is the UV obtained by the main supplier of this crop from outside the EU in the main import country of the crop. If there are several important import countries the one closer to Israel is chosen.

(b) **Crops grown in the EU, small imports from Extra-EU** (cucumbers, potatoes from storage, strawberries): Export UV from main EU export country close to Israel (e.g. UVs from France or Italy are preferred on UVs from the UK).

(c) **Crops grown in the EU and also imported in significant quantities from non-EU countries** (tomatoes, sweet pepper, cucumbers, new potatoes): decision on relevant price after comparison of UVs for Extra EU imports from main suppliers to UVs for main suppliers from the EU.

To verify the reliability of the data we studied the development of UVs in the last decade, and compared unit values for main suppliers, and unit values in different markets. In addition, we compared UVs to import prices in the Netherlands and wholesale prices in Germany. Overall, UVs seem to provide a reasonable approximation of the price level in the EU market for the selected fruit and vegetables. We calculated the average unit value for the last three years (2007-2009) to obtain a representative reference price. For details about the choice of the relevant reference price see the explanations and detailed data on the development of EU trade for the selected fruit and vegetables in this Appendix.

Calculations of reference prices are presented in Table 1. If the reference price is lower than the price obtained by Israeli growers, obstacles to imports manage to increase prices in Israel. In this case, the relevant social price is the reference price. If grower prices are lower, there is no market price support, and domestic prices are identical to social prices.

We compare reference prices to two sets of grower prices: (1) prices reported by the Extension Service and used in the farm budgets which are the basis of the PAM calculations, (2) UVs for the domestic market calculated from CBS data. These UV's are based on wholesale prices minus a marketing margin (12%) and marketing board fees.

Domestic UVs are lower than reference prices for most of the fruit and vegetables in our study. Exceptions are potatoes, table grapes, dates and strawberries. For potatoes, reference prices are lower compared to both sets of grower prices, indicating that import restrictions are significant in protecting domestic growers. For table grapes and strawberries, prices reported by the CBS are higher than corresponding reference prices but prices reported by the Extension Service are lower than reference prices. There are indications that prices for strawberries and table grapes reported by the CBS are higher than actual prices received by growers. The prices for dates of the Extension service is higher than the reference prices but it is for high quality Medjool dates while the reference price represents lower priced Dekel Nour dates. Thus, our analysis indicates that with regard to the selected crops for our study import restrictions are only relevant for potatoes.

The remainder of this appendix contains an analysis of EU trade for each crop included in the study which provides the necessary information for the choice of the relevant reference prices. In addition, we investigate if qualitative results for price differentials change if we consider seasonality of reference prices. We also compare grower prices of Israeli and Palestinian farmers for four fruit and vegetables (see Sensitivity Analysis on page 65).

Results indicate that also during low prices abroad tariffs are not effective for tomatoes, peppers and strawberries but protect farmers from low-priced grape imports. Tomato, potato, grape and strawberry prices of Palestinian farmers are lower than prices received by Israeli farmers. This indicates quality differences but also potential for specialization and trade but has to be verified based on more reliable data for Palestinian growers.

Table 1: Calculation of Reference Prices for Selected Fruit and Vegetables Grown in Israel (based on EU trade unit values)

		Euro/mt				NIS/mt					
	Description of selected UV	**UV (avg. 07-09)**	**Transport to Israel**	**Additional expenses**	**Ref. price importer's level**	**Ref. price importer's level**	**Ref. price grower's level**	**Price domestic market (1)**	**Price domestic market (2)**	**MPD (1)** (acc. to higher p)	**MPD (2)**
Dates	Import UV for Tunisia in France	**1,714**	150	105	**1,969**	10,766	**9,501**	12,500	9,277	**1,734**	**-224**
Mangos	Import UV for Brazil in Netherlands	**956**	257	78	**1,290**	7,056	**6,264**	5,000	5,808	**-1,264**	**-456**
Table grapes	Export UV Italy (all exports)	**1,115**	175	81	**1,371**	7,497	**6,518**	5,000 / 3,500	7,181	**-1,518**	**663**
Melons	Export UV Spain (all exports)	**625**	232	61	**918**	5,021	**4,617**	3,000 / 2,000	2,961	**-1,617**	**-1,656**
Tomatoes	Import UV for Turkey in Bulgaria	**780**	172	65	**1,017**	5,561	**5,193**	3,000 / 2,600	2,694	**-2,193**	**-2,499**
Cherry tomatoes	Export UV Italy (intra exports)	**1,538**	240	111	**1,889**	10,332	**9,745**	4,500 / 4,000	4,307	**-5,245**	**-5,438**
Cucumbers	Import UV for Turkey in Bulgaria	**663**	172	60	**895**	4,897	**4,565**	2,000	2,429	**-2,565**	**-2,136**
Sweet pepper	Export UV Spain (intra exports)	**1,246**	321	101	**1,668**	9,123	**8,575**	4,500 / 4,000	4,021	**-4,075**	**-4,554**
New potatoes	Import UV for Egypt in Italy	**336**		35	**371**	2,030	**1,694**	2,200	2,466	**506**	**772**
Old potatoes	Export UV France (intra exports)	**166**	170	36	**372**	2,037	**1,700**	2,200	2,466	**500**	**766**
Strawberries	Export UV Spain (all exports)	**1,722**	1,208	233	**3,163**	17,295	**14,730**	6,754	18,817	**-7,976**	**4,087**

Remarks: Translation from Euro to NIS with the average exchange rate in 2009 (5.4685 NIS/Euro). This rate is nearly identical to the average rate in 2007-2009 (5.45 NIS/Euro).
Additional expenses: include harbor expenses and importer's commission.
Price domestic market (1): Grower prices - Source: Extension Service, Ministry of Agriculture (For dates and mangos, we added sorting and packing costs (1500 and 3000 NIS respectively)
Price domestic market (2): Grower prices at the entrance of the wholesale market, Source: CBS
Following OECD methodology for Israel, we assume that wholesale margins for fruit and vegetables in Israel are 12% and calculate margins for each crop based on CBS unit values. To compare reference prices with grower prices, margins are deducted from the reference price at importer's level.

EU trade of selected fruit and vegetables

***Dates** (EU Imports)*

There is little commercial date production in the EU, and most of the supply is imported from third countries. The main import country is France. Part of the imported dates are re-exported to other EU countries (INTRA-trade). Until 2007, date imports to the EU from third countries increased substantially and reached 74,000 mt (see Graph).

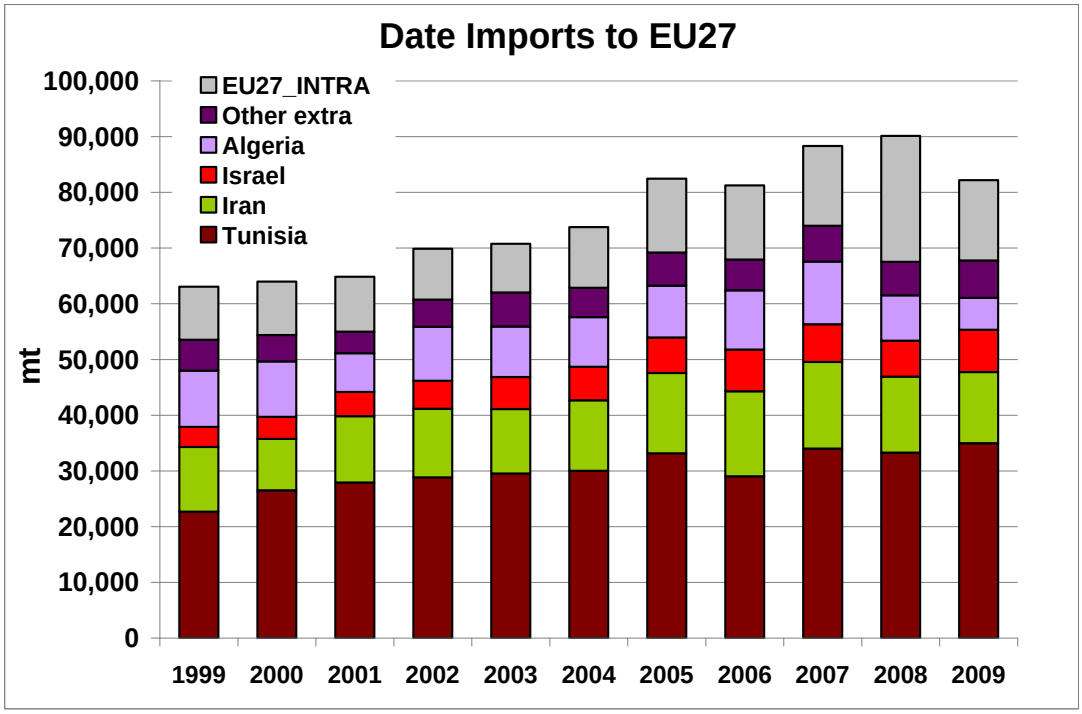
EU IMPORT 2009	1000 mt			Euro/kg		Remarks
MARKETS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27	**82**	**68**	**14**	**1.87**	**2.44**	About half of supply from Tunisia
France	24	**23**	1	1.80	3.50	
UK	13	11	1	1.51	2.80	
Germany	11	9	2	1.89	2.72	
Italy	8	8	0	2.42	2.82	
Spain	7	5	2	2.28	1.59	
Netherlands	4	3	1	2.95	2.17	
other	15	9	6			

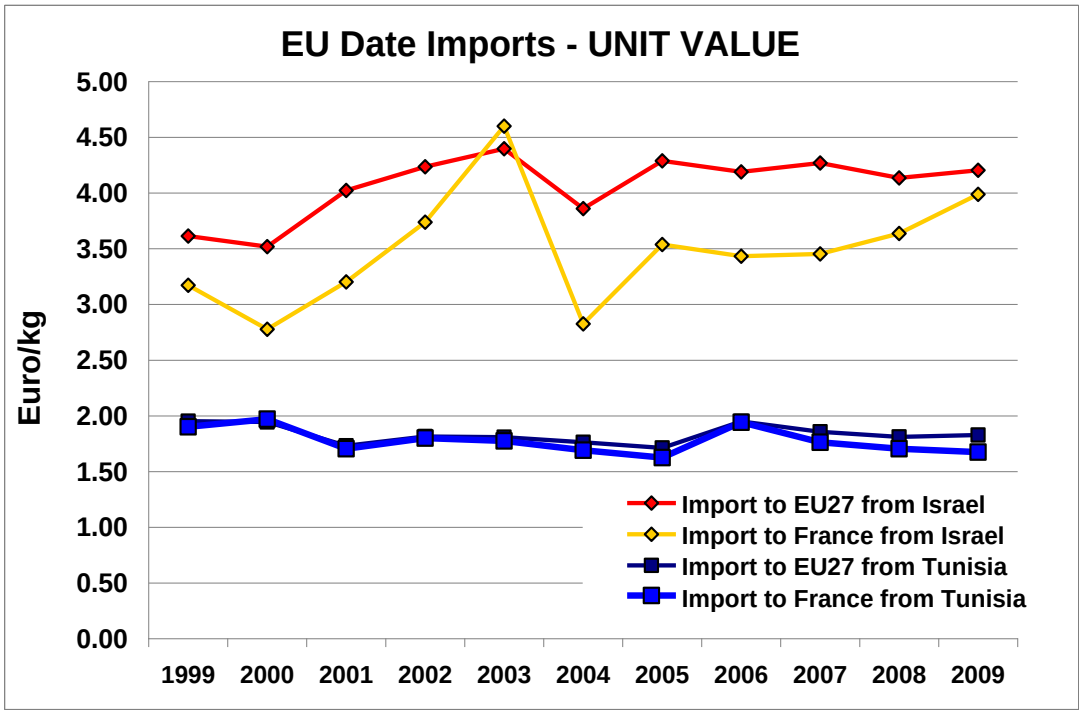
Tunisia is the main supplier of dates to the EU, supplying about 50% of EXTRA-EU dates. Iran is an additional important supplier at low prices (less than half of Tunisia). Israel supplies high quality dates, mainly Medjool, which are sold at very high prices compared to other suppliers. Israel supplies most of the Medjool dates imported by the EU. Date imports from Israel increased substantially in the last decade, while prices remained stable – indicating an increase in demand for Medjool dates.

SUPPLIERS to EU	1000 mt			Euro/kg		
	2007	2008	2009	2007	2008	2009
Imports to EU27 (extra+intra)	88.3	90.1	82.2			
EU27_EXTRA	**74.0**	**67.5**	**67.8**	**1.76**	**1.76**	**1.87**
TUNISIA	34.0	33.3	35.0	1.86	1.81	1.83
IRAN	15.6	13.6	12.8	0.75	0.75	0.89
ISRAEL	6.8	6.4	7.6	4.27	4.14	4.20
ALGERIA	11.3	8.2	5.7	1.27	1.37	1.40
Other extra	6.4	6.0	6.7			
EU27_INTRA	14.3	22.6	14.4	2.44	1.53	2.44
Imports to FRANCE (extra+intra)	27.4	24.9	24.1			
EU27_EXTRA	**26.9**	**24.3**	**23.0**	**1.76**	**1.82**	**1.80**
TUNISIA	13.6	13.7	15.7	1.76	1.71	1.68
ALGERIA	10.3	7.7	5.5	1.27	1.37	1.40
ISRAEL	2.2	2.3	1.3	3.45	3.64	3.99
IRAN	0.2	0.2	0.2	1.60	1.77	2.47
Other extra	0.5	0.4	0.4			
EU27_INTRA	0.5	0.6	1.2	3.29	2.71	3.50

Import price for PAM: 1.714 Euro/kg (Import UV of date imports to France from Tunisia, avg. 2007-09) + transportation cost from France to Israel (we assume direct imports from Tunisia are not feasible at the moment).

This price is the estimated world price for medium quality dates supplied to the domestic market in Israel. High quality Medjool dates are sold at much higher prices in export markets.


Date Imports to EU27
mt
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
EU27_INTRA
Other extra
Algeria
Israel
Iran
Tunisia
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009


EU Date Imports - UNIT VALUE
Euro/kg
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Import to EU27 from Israel
Import to France from Israel
Import to EU27 from Tunisia
Import to France from Tunisia
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

Mangos *(EU Imports)*

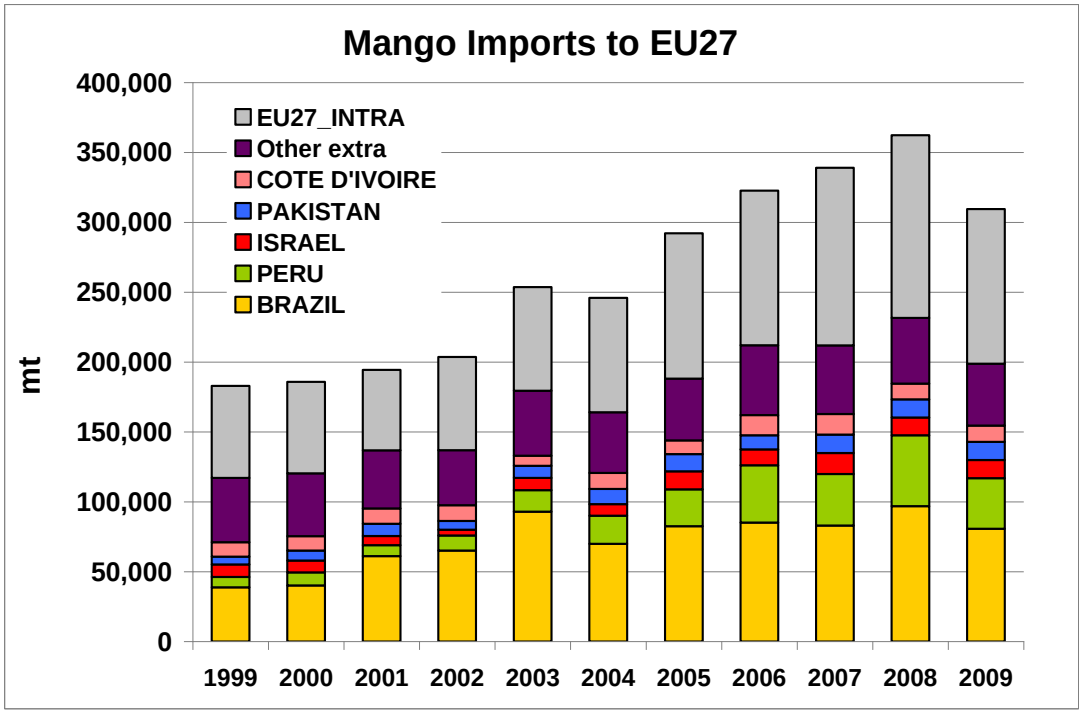
There is little commercial mango production in the EU, and most of the supply is imported from third countries (The data presented here include in addition to mango small quantities of guava and mangosteen). A large part of the mango imports arrive in the Netherlands and are re-exported.

EU IMPORT 2009	1000 mt			Euro/kg		Remarks
MARKETS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27	**309**	**199**	**110**	**1.19**	**1.16**	
Netherlands	113	**106**	7	1.01	1.04	Imports mainly for re-export
UK	48	37	11	1.19	1.08	
Spain	18	16	2	1.10	1.18	
Belgium	18	14	4	1.38	1.38	
France	28	7	21	2.44	1.12	
Italy	9	6	3	1.11	1.42	
Other	75	13	62			

Brazil is the main supplier of mango to the EU and accounted for 41% of EU imports from third countries in 2009. Imports from Peru increased very much in the last decade, and Peru is now the second most import supplier of mangos to the EU. Mangos from Peru do not compete with mangos from Israel because of different supply seasons (Peru: Dec. – April; Israel: July – Sep.). The increase of EU mango imports from Israel is relatively moderate.
A small part of Israel's supplies to the EU are high quality mangos (ready to eat). Mangos from Pakistan are mainly supplied to the UK market.

SUPPLIERS to EU	1000 mt			Euro/kg		
	2007	2008	2009	2007	2008	2009
Imports to EU27 (extra+intra)	339	362	309			
EU27_EXTRA	**212**	**232**	**199**	**1.30**	**1.17**	**1.19**
BRAZIL	83	97	81	1.04	1.04	1.06
PERU	37	51	36	0.91	0.91	1.15
ISRAEL	15	13	13	2.36	1.81	1.17
PAKISTAN	13	13	13	1.45	1.41	1.32
COTE D'IVOIRE	15	11	12	1.88	1.10	1.04
Other extra	49	47	44			
EU27_INTRA	127	131	111	1.20	1.13	1.16
Imports to NETHERLANDS (extra+intra)	112	132	114			
EU27_EXTRA	**103**	**125**	**107**	**0.99**	**0.96**	**1.01**
BRAZIL	53	65	52	1.00	0.94	0.93
PERU	24	34	28	0.82	0.84	1.02
COTE D'IVOIRE	4	4	6	0.69	1.17	0.98
UNITED STATES	5	5	4	0.97	0.95	0.97
ISRAEL	2	2	3	1.07	1.08	1.02
Other extra	14	14	14			
EU27_INTRA	9	7	7	1.48	1.30	1.04

Import price for PAM: 0.956 Euro/kg (Import UV of mango imports from Brazil to Netherlands, avg. 2007-09) + price difference transportation to Israel.


Mango Imports to EU27
mt
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
EU27_INTRA
Other extra
COTE D'IVOIRE
PAKISTAN
ISRAEL
PERU
BRAZIL
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

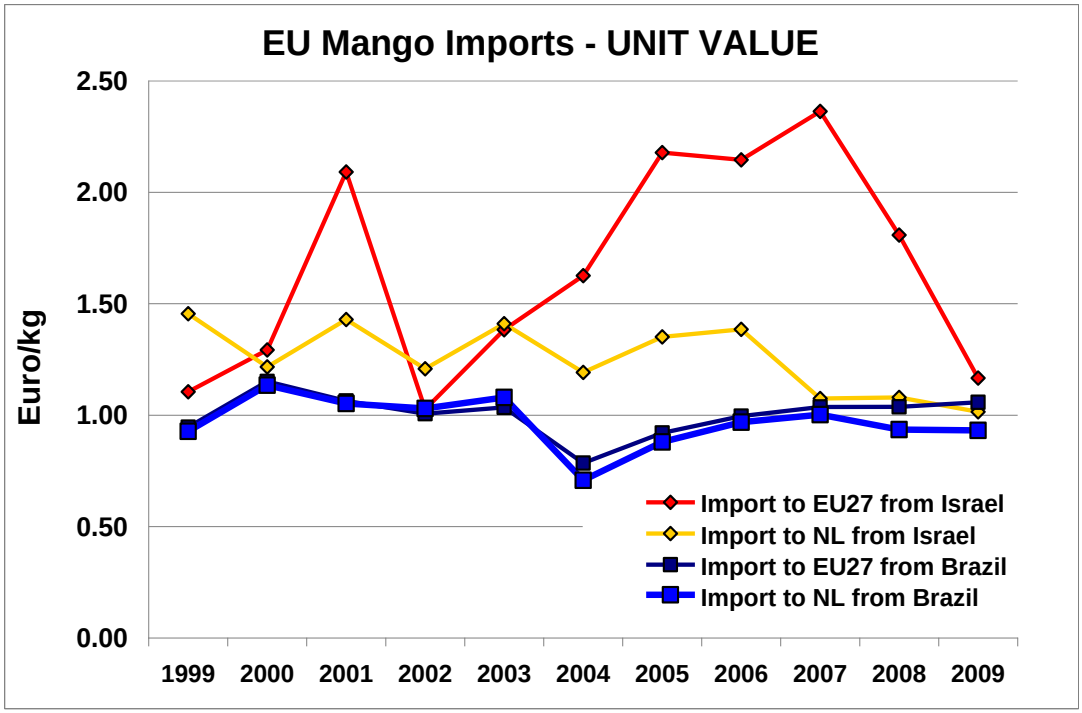

EU Mango Imports - UNIT VALUE
Euro/kg
2.50
2.00
1.50
1.00
0.50
0.00
Import to EU27 from Israel
Import to NL from Israel
Import to EU27 from Brazil
Import to NL from Brazil
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

Table Grapes *(EU Exports and Imports)*

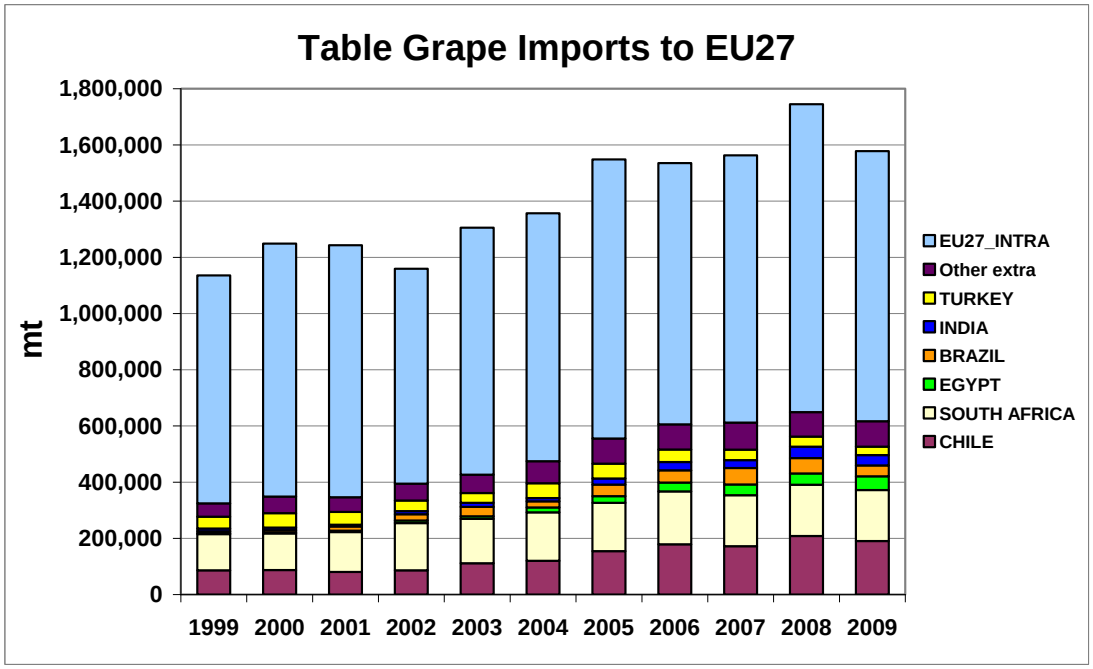
The EU is a large producer of table grapes and supplies the majority of grapes consumed in the EU. Main EU countries exporting table grapes are Italy and Spain. Most of their exports are going to other EU countries. In addition to EU supply, in the off-season substantial quantities of table grapes are imported from third countries, mainly from Chile and South Africa (see Graph). EU imports from third countries doubled in the last decade.

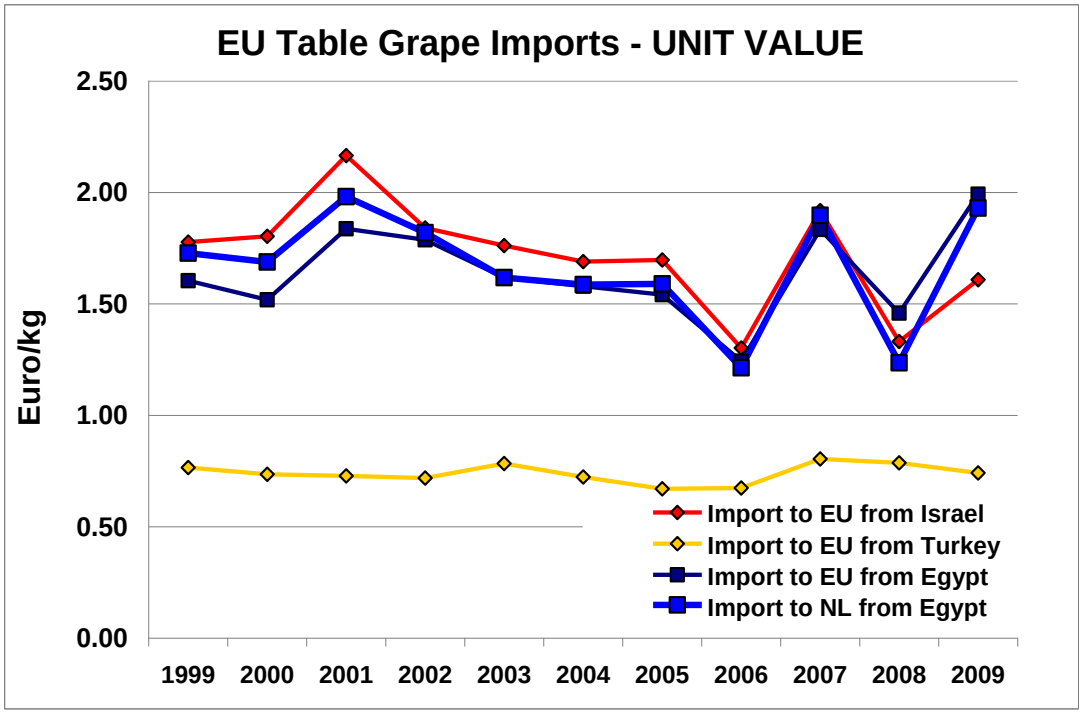
EU EXPORT 2009	1000 mt			Euro/kg		Main Markets
SUPPLIERS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27	**965**	**118**	**847**	**1.28**	**1.33**	
Italy	**389**	48	341	1.18	1.06	Ger. 96, France 55, Poland 37
Netherlands	242	20	221	1.87	1.69	Re-exports
Spain	**101**	7	94	1.32	1.46	UK 30, Germany 21, Portugal 16
Greece	77	7	71	0.87	1.24	
Belgium	39	1	39	1.85	1.45	Re-exports
Germany	30	2	29	1.63	1.56	
other	86	33	53			

EU IMPORT 2009	1000 mt			Euro/kg		Remarks
MARKETS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27	**1,578**	**617**	**961**	**1.59**	**1.24**	
Netherlands	374	292	83	1.67	0.65	Mainly for re-export
UK	242	173	69	1.68	1.57	
Belgium	71	41	29	1.42	1.65	Mainly for re-export
Germany	307	23	283	1.50	1.35	
Spain	41	19	23	1.48	1.16	
other	543	69	474			

Grape imports from Egypt increased substantially in recent years while imports from Israel declined. The supply season for both origins as well as unit values are similar (see Graph). Both countries supply grapes to the EU mainly in June when local supplies are still relatively small. This explains the relatively high UVs for Egyptian and Israeli grapes in comparison to EU supplies.

SUPPLIERS to EU	1000 mt			Euro/kg		
	2007	2008	2009	2007	2008	2009
Imports to EU27 (extra+intra)	**1,563**	**1,745**	**1,578**			
EU27_EXTRA	**612**	**649**	**617**	**1.51**	**1.54**	**1.59**
CHILE	172	208	190	1.37	1.45	1.53
SOUTH AFRICA	181	183	181	1.58	1.73	1.64
EGYPT	38	40	49	1.83	1.46	1.99
BRAZIL	59	55	39	2.00	1.85	1.91
INDIA	28	41	37	1.32	1.25	1.30
TURKEY	37	36	30	0.80	0.79	0.74
ISRAEL	6	4	4	1.92	1.33	1.61
Other extra	91	84	87			
EU27_INTRA	**951**	**1,096**	**961**	**1.33**	**1.30**	**1.24**
Imports to NETHERLANDS (extra+intra)	**342**	**389**	**382**			
EU27_EXTRA	**265**	**309**	**296**	**1.52**	**1.57**	**1.67**
CHILE	85	113	102	1.41	1.45	1.61
SOUTH AFRICA (incl. NA ->1989)	94	98	101	1.48	1.68	1.66
INDIA	13	25	24	1.35	1.26	1.33
EGYPT	9	11	15	1.90	1.24	1.93
ISRAEL	1	1	1	1.86	1.47	1.80
Other extra	63	62	53			
EU27_INTRA	**77**	**79**	**86**	**0.76**	**0.74**	**0.66**



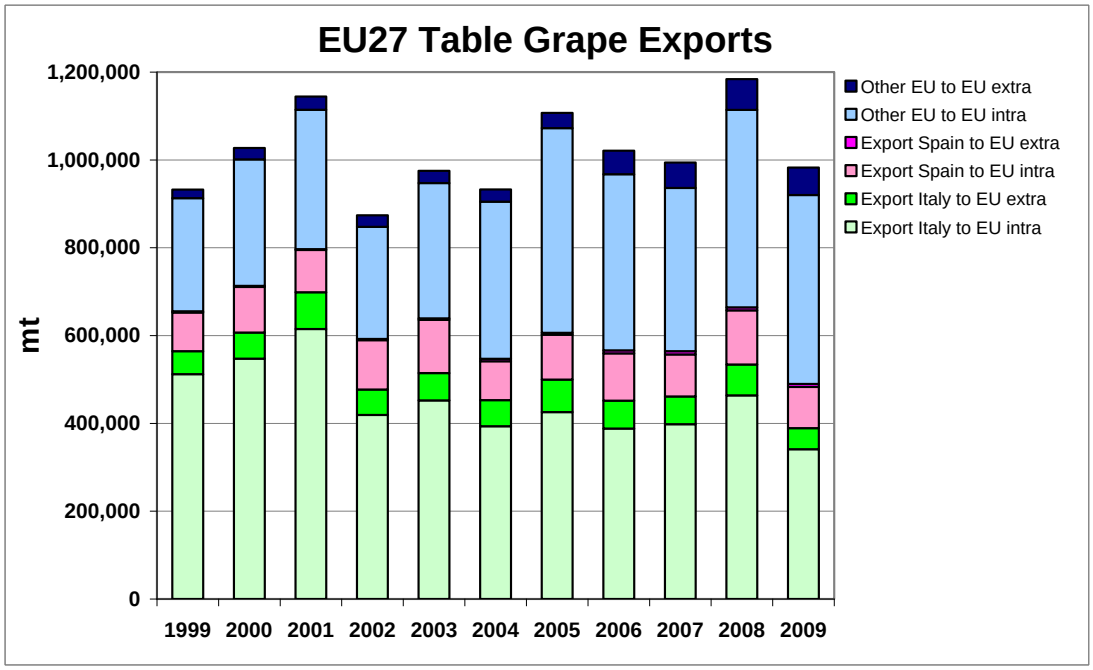


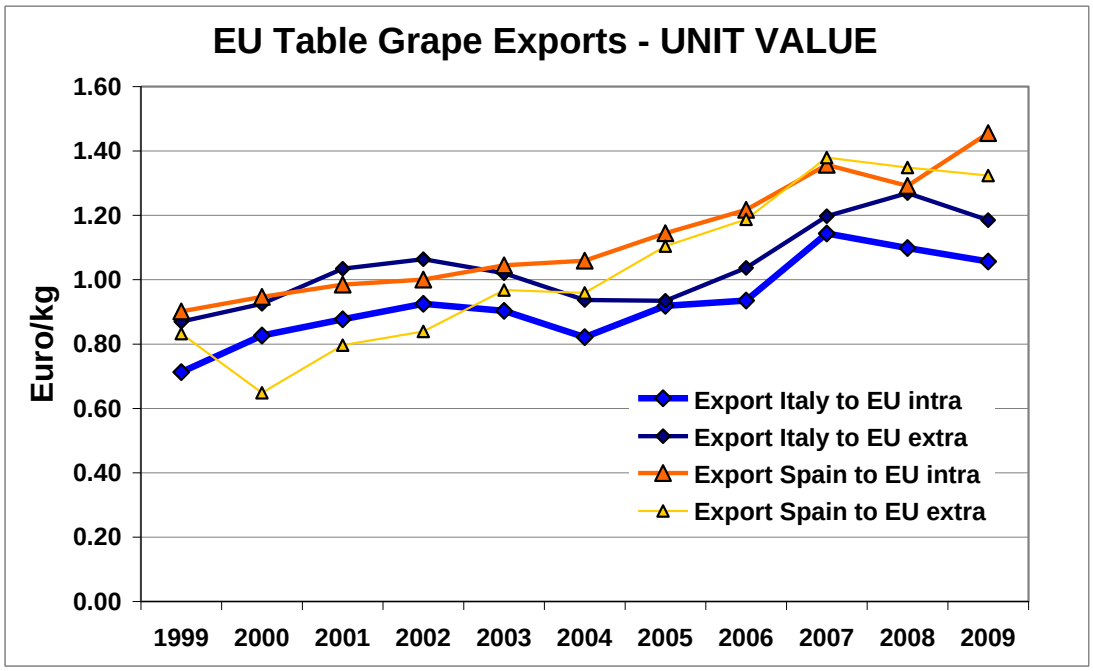
EU countries export each year around 1 million mt table grapes, mainly to other EU countries. Export unit values for Spanish and Italian grapes increased in the last decade. Export UVs for Spanish grapes are generally higher, probably because a substantial share of exports are marketed in the high quality – high price UK market (see Graphs on next page).

We consider EU export UVs to be a better approximation of relevant prices for export to Israel, compared to the EU import UV for Egyptian grapes, because Egyptian grapes are supplied to the EU mainly during a short period at the beginning of the EU

season when prices are still high. Italian grape prices are chosen as relevant import price for Israel because Italy is closer to Israel compared with Spain. Additionally, Italy markets just small quantities of grapes to the UK, therefore the average quality of exported grapes is probably closer to the quality sold in the domestic market in Israel.

Import price for PAM: 1.115 Euro/kg (Italy, avg. export UV for all exports in 2007-09) + marketing costs to Israel.





Melons *(EU Exports and Imports)*

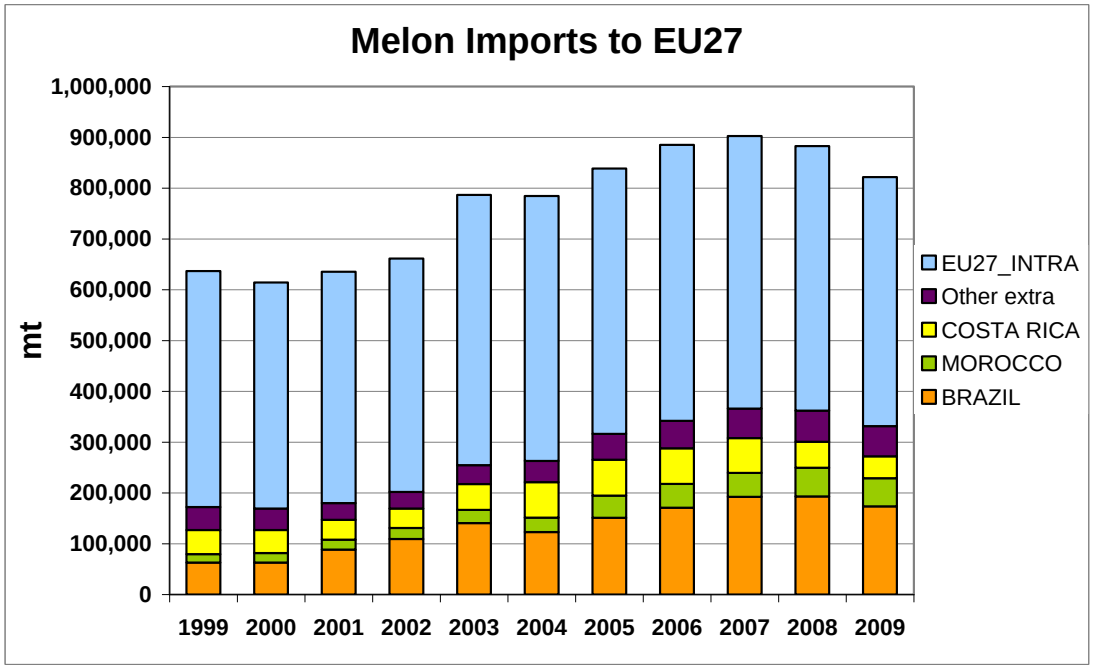
Melons are produced in the Mediterranean EU countries and in addition imported from Central and South America (mainly Brazil) and Morocco. Spain is the dominant supplier in the EU and accounted for nearly 70% of EU exports in 2009. EU imports from third countries increased while imports from other EU countries are stagnating (see Graph on next page). Imports from Israel declined very much, from about 20,000 mt in 1999 to less than 5,000 mt in 2009.

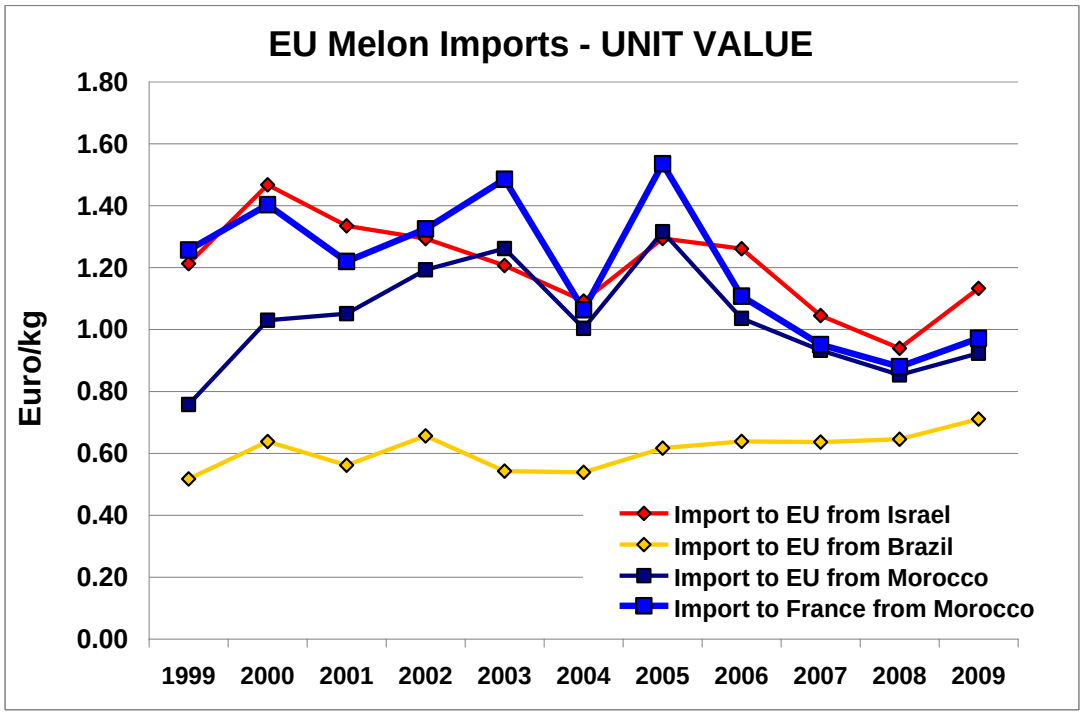
EXPORT 2009	1000 mt			Euro/kg		Main Markets
SUPPLIERS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27	**532**	**37**	**496**	**0.96**	0.68	
Spain	363	12	351	0.76	0.57	Germany 87, France 64, UK 60
Netherlands	80	7	73	1.01	0.83	Mainly re-exports
France	39	11	29	1.20	1.37	Italy 10, Belgium 9, Switzerland 9
Italy	18	3	16	1.08	0.70	
Other	31	4	27			

IMPORT 2009	1000 mt			Euro/kg		Main EU Extra Suppliers
MARKETS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27	**822**	**331**	**490**	**0.81**	**0.73**	Brazil 173, Morocco 55, Costa R. 43
Netherlands	151	110	40	0.84	0.65	Brazil 60, Costa R. 26, Honduras 14
UK	137	73	64	0.79	0.69	Brazil 53, Honduras 8, Costa Rica 8
Spain	65	62	3	0.67	0.74	Brazil 47, Morocco 7
France	141	50	92	1.01	0.69	Morocco 48
Italy	35	11	24	0.79	0.99	
Other	293	26	266			

Imports unit values for melons from Morocco and especially Israel are high compared to supplies from South and Central America and from Spain. Probably most of the melons from Morocco and Israel are supplied before the main domestic season when prices are still high. Unit values for Turkish melons are very low. Average yearly UVs for melons from Brazil in the last decade were relatively stable while UVs for Moroccan and Israeli melons declined (see Graph on next page). Melons from Morocco are mainly imported by France.

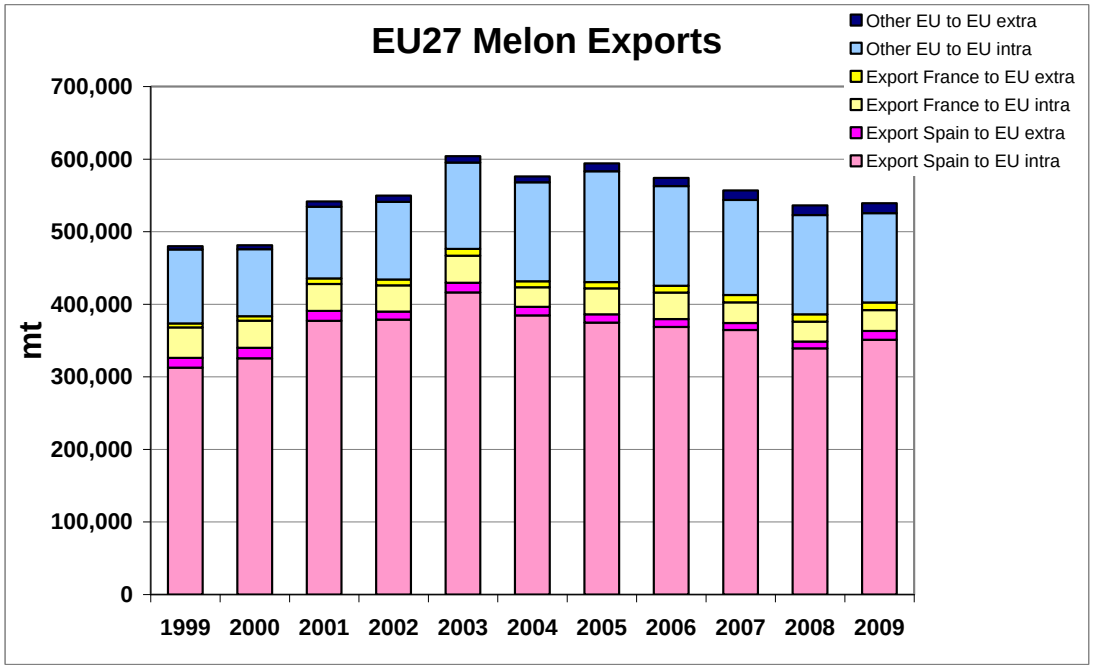
SUPPLIERS to EU	1000 mt			Euro/kg		
	2007	2008	2009	2007	2008	2009
Imports to EU27 (extra+intra)	**903**	**883**	**822**			
EU27_EXTRA	**366**	**362**	**331**	**0.75**	**0.73**	**0.81**
BRAZIL	192	193	173	0.64	0.65	0.71
MOROCCO	47	57	55	0.93	0.85	0.92
COSTA RICA	68	51	43	0.73	0.70	0.82
HONDURAS	14	17	23	0.86	0.75	0.90
PANAMA	18	20	13	0.71	0.72	0.76
TURKEY	7	8	7	0.37	0.38	0.46
ISRAEL	8	4	5	1.05	0.94	1.13
Other extra	12	12	12			
EU27_INTRA	**537**	**521**	**490**	**0.75**	**0.78**	**0.73**
Imports to FRANCE (extra+intra)	**138**	**147**	**141**			
EU27_EXTRA	**46**	**52**	**50**	**1.00**	**0.91**	**1.01**
MOROCCO	37	46	48	0.95	0.88	0.97
Other extra	8	6	2			
EU27_INTRA	**93**	**95**	**92**	**0.78**	**0.83**	**0.69**

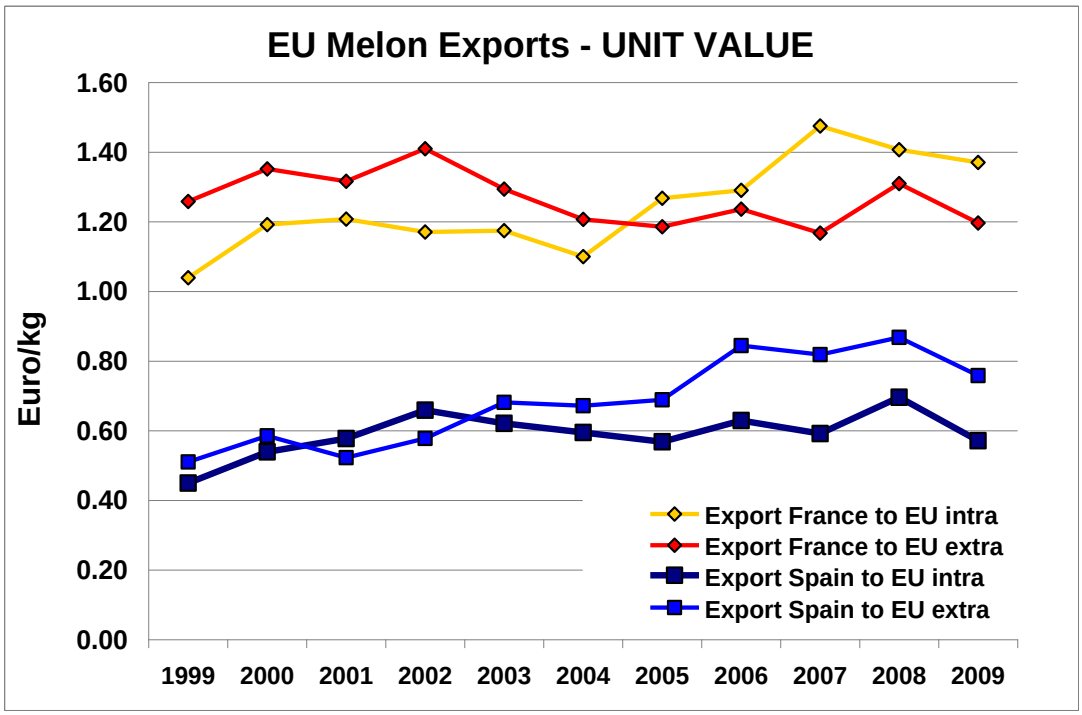




EU countries export each year more than half a million ton melons, nearly all of them to other EU countries (see next Graph). Spain is the dominant supplier. Spains climate and supply season is comparable to Israel, and Spanish export unit values are chosen as basis for the approximation of world prices for melon supplies to Israel.

Import price for PAM: 0.625 Euro/kg (Spain, avg. export UV for all exports in 2007-09) + marketing costs to Israel.


EU27 Melon Exports
Other EU to EU extra
Other EU to EU intra
Export France to EU extra
Export France to EU intra
Export Spain to EU extra
Export Spain to EU intra
mt
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009


EU Melon Exports - UNIT VALUE
Euro/kg
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Export France to EU intra
Export France to EU extra
Export Spain to EU intra
Export Spain to EU extra

Strawberries *(EU Exports and Imports)*

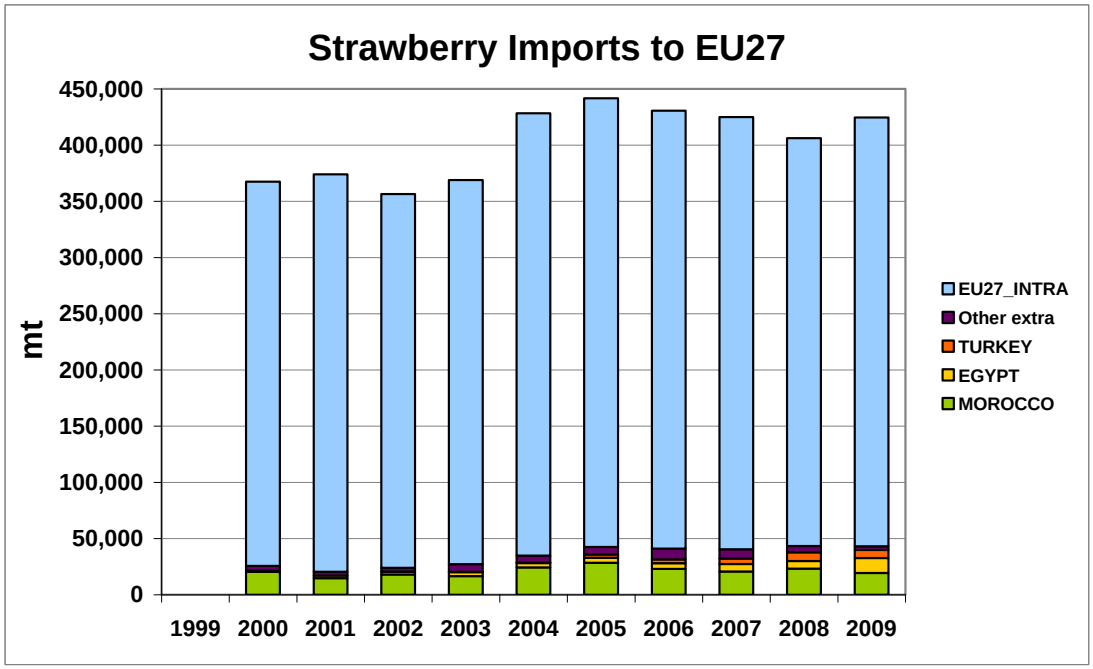
Most of the strawberries consumed in the EU are grown in the EU. Third countries – mainly Morocco, Egypt and Turkey – supply about 10% of EU imports (43,000 mt in 2009). EU strawberry imports from third countries increased in the last decade. In the last 5 years, imports from third countries as well as other EU countries are more or less stagnant (see Graph on next page).

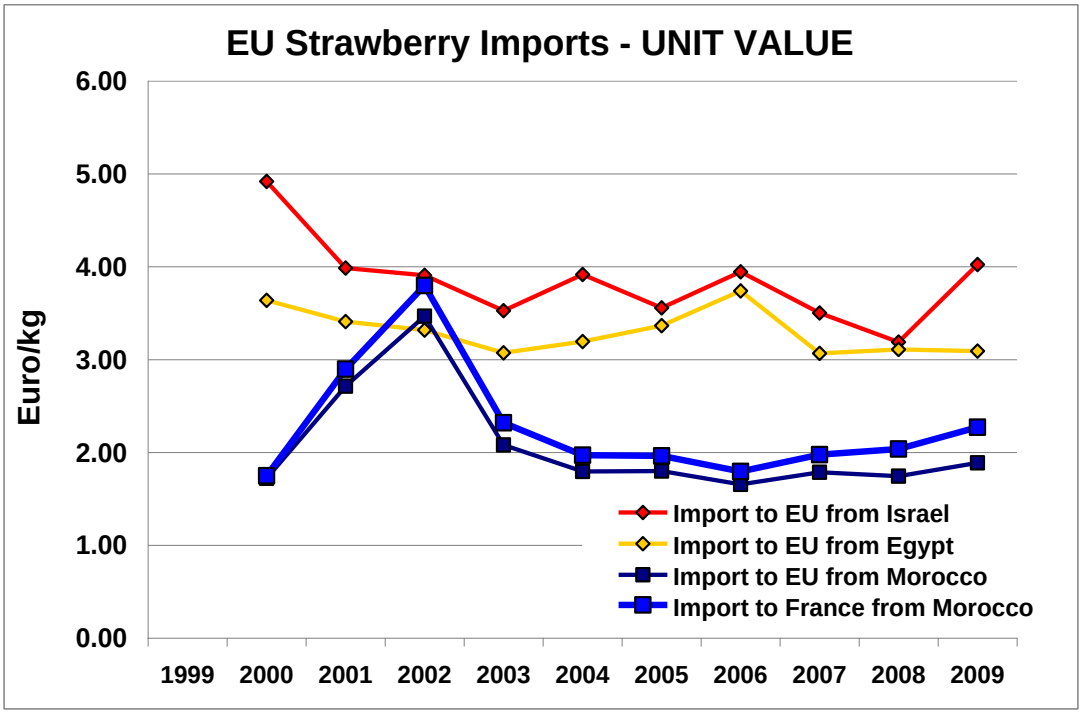
EU EXPORT 2009	1000 mt			Euro/kg		Main Markets
SUPPLIERS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27	**396**	**36**	**360**	**2.41**	**2.02**	
Spain	225	7	217	2.35	1.66	France 72, Ger. 68, Italy 18
Netherlands	39	4	35	4.25	3.72	Belgium 11, Germany 9
Belgium	38	5	33	3.57	3.00	
France	23	2	21	3.08	1.88	Germany 8, Italy 6
Italy	17	3	14	2.13	1.96	
Poland	17	7	10	1.14	0.67	
Germany	12	1	12	2.62	2.31	
Greece	9	5	4	1.48	1.53	
Other	17	3	14			

EU IMPORT 2009	1000 mt			Euro/kg		Remarks
MARKETS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27	**424**	**43**	**381**	**2.09**	**1.96**	
France	107	14	92	2.35	1.61	
UK	39	7	32	2.22	3.05	
Belgium	29	5	23	3.75	2.06	
Romania	6	5	1	0.25	2.05	
Germany	104	4	100	1.50	1.79	
Spain	4	3	2	1.57	2.11	
Other	135	4	131			

Israel supplies small quantities of strawberries in winter at high prices. EU imports from Israel declined from 2000 – 3000 mt per year during most of the last decade to 950 mt in 2008 and 450 mt in 2009. Strawberries from Israel compete with supplies from Egypt which increased very much – from 1000 mt in 2000 to 13,000 mt in 2009. Average unit values for supplies from the EU and from other third countries are much lower compared to UVs for strawberries from Israel and Egypt. This is explained by the supply of limited quantities in winter months which have to be transported by air-freight.

SUPPLIERS to EU	1000 mt			Euro/kg		
	2007	2008	2009	2007	2008	2009
Imports to EU27 (extra+intra)	**425.0**	**406.1**	**424.6**			
EU27_EXTRA	**40.5**	**43.3**	**43.1**	**2.03**	**1.78**	**2.09**
MOROCCO	20.6	23.3	19.4	1.79	1.74	1.89
EGYPT	6.7	6.8	13.3	3.07	3.11	3.09
TURKEY	4.9	7.7	7.1	0.50	0.47	0.44
ISRAEL	2.0	0.9	0.4	3.50	3.19	4.02
Other extra	6.2	4.6	2.8			
EU27_INTRA	**384.5**	**362.8**	**381.5**	**1.81**	**2.10**	**1.95**
Imports to FRANCE (extra+intra)	**108.9**	**106.9**	**106.8**			
EU27_EXTRA	**14.2**	**15.7**	**14.4**	**2.09**	**2.09**	**2.35**
MOROCCO	11.9	13.2	12.0	1.98	2.04	2.27
UNITED STATES	1.3	1.5	1.4	2.27	1.78	2.36
EGYPT	0.8	0.8	1.0	3.17	3.51	3.18
Other extra	0.2	0.1	0.0			
EU27_INTRA	**94.7**	**91.3**	**92.4**	**1.66**	**1.78**	**1.61**



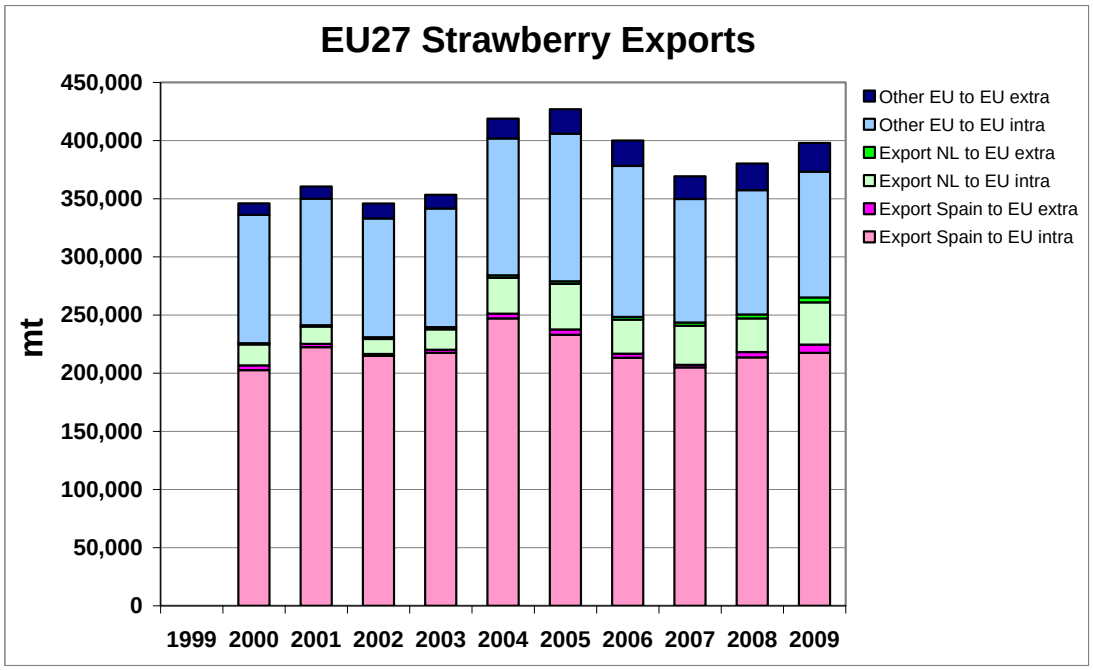


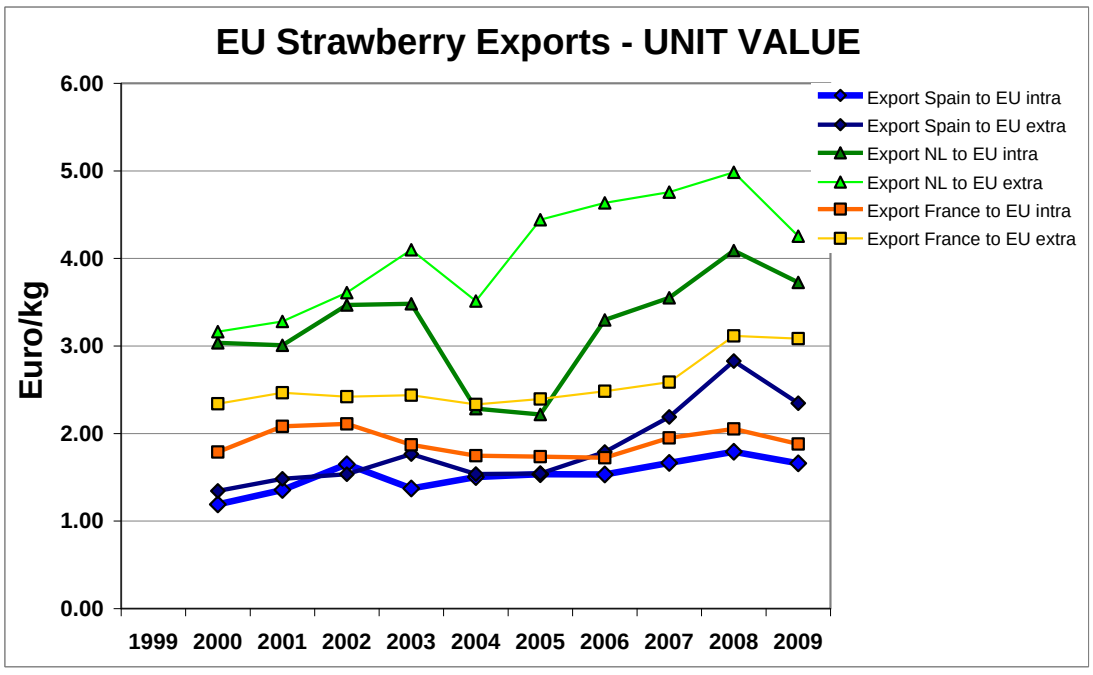
EU countries export each year about 400,000 mt strawberries, nearly all of them to other EU countries (see next Graph). Similar to melons, Spain is the dominant supplier of strawberries in the EU. In 2009, exports from Spain accounted for nearly 60% of all strawberry exports of EU countries. Exports to third countries are mainly to Switzerland (Spain and France) and Norway and Russia (Netherlands).

Unit values of strawberries from main suppliers to the EU market in recent years are close to 2 Euro/kg (Spain 1.7 – 1.8 Euro/kg, France about 2 Euro/kg; Morocco Import UV about 2 Euro/kg). Strawberries are highly perishable and have to be transported by Israel by airfreight. Airfreight costs are high (about 1.4 €/kg, plus additional export

costs (air terminal costs, commission, interest) of about 0.6 €/kg), so that the relevant import price of European strawberries to Israel is expected to be close to 4 €/kg, higher than the price for strawberries in Israeli wholesale markets in most months. For example, wholesale prices for strawberries were close to 20 NIS/kg in December 2009 and January 2010 but declined to 11 NIS in February and to 6-7 NIS in March/April. Spanish strawberries are mainly exported in March to May. We conclude that relevant import prices for strawberries to Israel are prices of strawberries grown in the Westbank or the Gaza Strip, or strawberries from Jordan or Egypt.

Import price of strawberries from Europe: 1.722 €/kg (Spain, avg. export UV for all exports in 2007-09) + marketing costs to Israel.





Tomatoes *(EU Exports and Imports)*

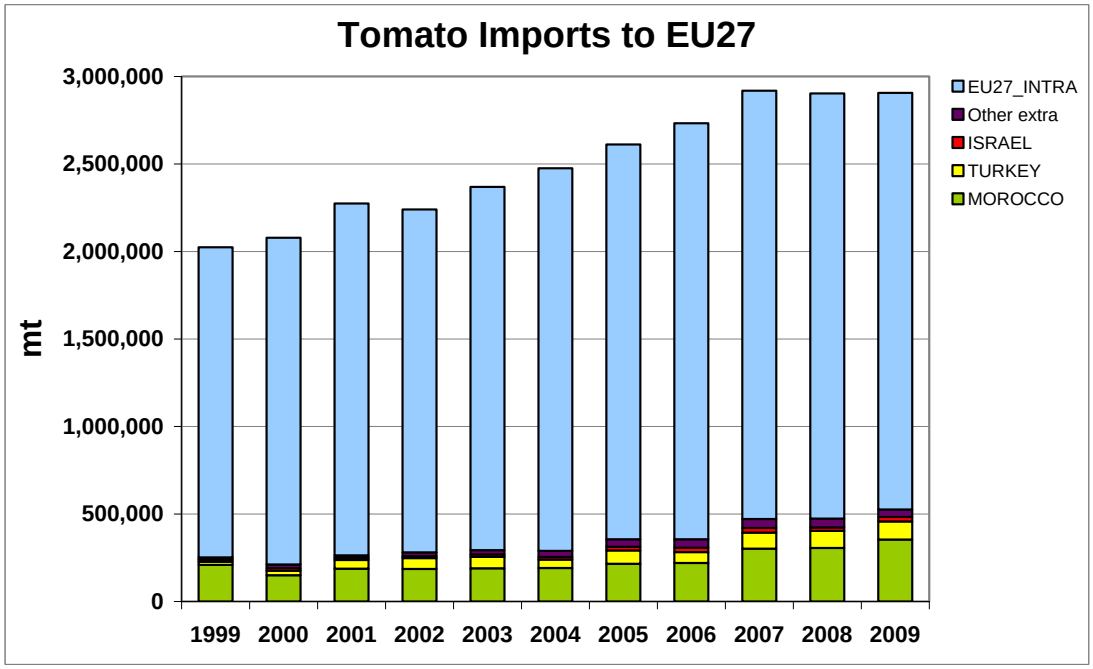
EU countries imported in recent years close to 3 million mt tomatoes per year, mainly from other EU countries. Main EU suppliers of tomatoes are the Netherlands and Spain. Main third country supplier is Morocco (see Tables and Graph on next page). The majority of tomato exports from Morocco to the EU are imported by France.

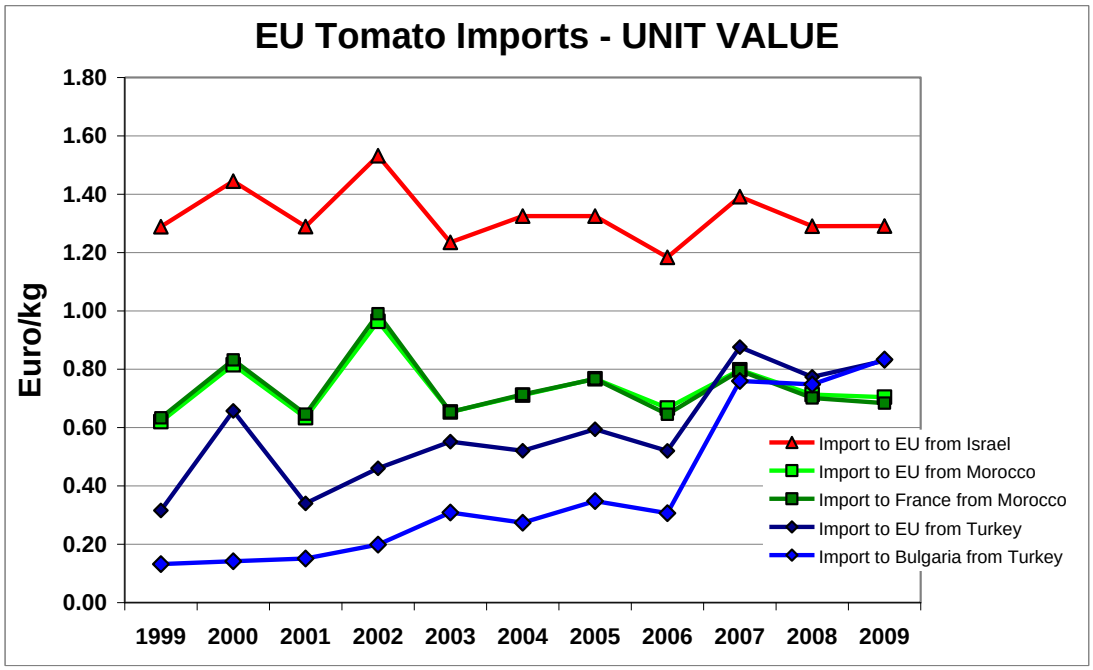
EU EXPORT 2009	1000 mt			Euro/kg		Main Markets
SUPPLIERS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27	**2,592**	**167**	**2,425**	**1.13**	**1.00**	Ger. 736, UK 370, France 234
Netherlands	964	57	907	1.44	1.13	Ger. 400, UK 172, Sweden 51
Spain	830	23	807	1.01	0.93	Ger. 161, UK 159, France 135
Belgium	200	17	184	0.97	0.84	
France	196	9	187	1.29	1.08	Ger. 68, Italy 25, Belgium 20
Portugal	107	0	106	0.94	0.22	
Italy	93	6	87	1.85	1.55	Germany. 30, Austria 15, UK 9
Other	203	56	147			

EU IMPORT 2009	1000 mt			Euro/kg		Main Suppliers
MARKETS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27	**2,899**	**524**	**2,375**	**0.76**	**1.06**	
France	535	300	235	0.70	0.76	Morocco 289, Tunisia 7
Bulgaria	80	77	3	0.73	0.42	Turkey 60, Macedonia 11
Spain	192	31	161	0.75	0.32	
Romania	41	27	13	0.66	0.90	
UK	397	21	375	0.96	1.16	
Netherlands	180	16	164	1.10	1.11	
Italy	130	14	116	1.01	0.86	
Slovenia	21	8	13	1.05	0.93	
Other	1,324	30	1,294			

In addition to Morocco, the EU imports substantial quantities of tomatoes from Turkey and Israel. Imports from Turkey increased in the last decade from about 20,000 mt to about 100,000 mt while imports from Israel doubled from 12,000 mt in 1999 to 25,000 mt in 2009. Average import unit values of Israeli tomatoes are higher than UVs of other suppliers, probably mainly because Israel supplies primarily off-season cherry tomatoes and organic tomatoes to the EU.

SUPPLIERS to EU	1000 mt			Euro/kg		
	2007	2008	2009	2007	2008	2009
Imports to EU27 (extra+intra)	**2,919**	**2,903**	**2,906**			
EU27_EXTRA	**471**	**473**	**525**	**0.84**	**0.73**	**0.76**
MOROCCO	302	306	354	0.80	0.71	0.70
TURKEY	91	98	103	0.88	0.77	0.83
ISRAEL	27	19	25	1.39	1.29	1.29
Other extra	51	51	43			
EU27_INTRA	**2,448**	**2,430**	**2,381**	**1.13**	**1.10**	**1.06**
Imports to FRANCE (extra+intra)	**494**	**483**	**535**			
EU27_EXTRA	**274**	**267**	**300**	**0.83**	**0.73**	**0.70**
MOROCCO	255	251	289	0.80	0.70	0.68
EU27_INTRA	**219**	**216**	**235**	**0.91**	**0.87**	**0.76**
Imports to BULGARIA (extra+intra)	**40**	**58**	**80**			
EU27_EXTRA	**38**	**55**	**77**	**0.50**	**0.54**	**0.73**
TURKEY	23	35	60	0.76	0.75	0.83
MACEDONIA	12	17	11	0.09	0.13	0.23
SYRIA	0	0	2	0.66	0.78	0.89
JORDAN	1	2	2	0.48	0.48	0.50
EU27_INTRA	**2**	**3**	**3**	**0.40**	**0.41**	**0.42**





EU tomato exports increased in the last decade. The large majority of tomatoes is exported to other EU countries – the main markets are Germany, the UK and France. Exports to third countries approached 170,000 mt in 2009 and accounted for only 6% of total exports. Main third country markets are Russia, Switzerland and Norway.

We consider Spain, Italy and Turkey to be potential suppliers of tomatoes to Israel. Unit values for these three countries (average 2007-09) are:

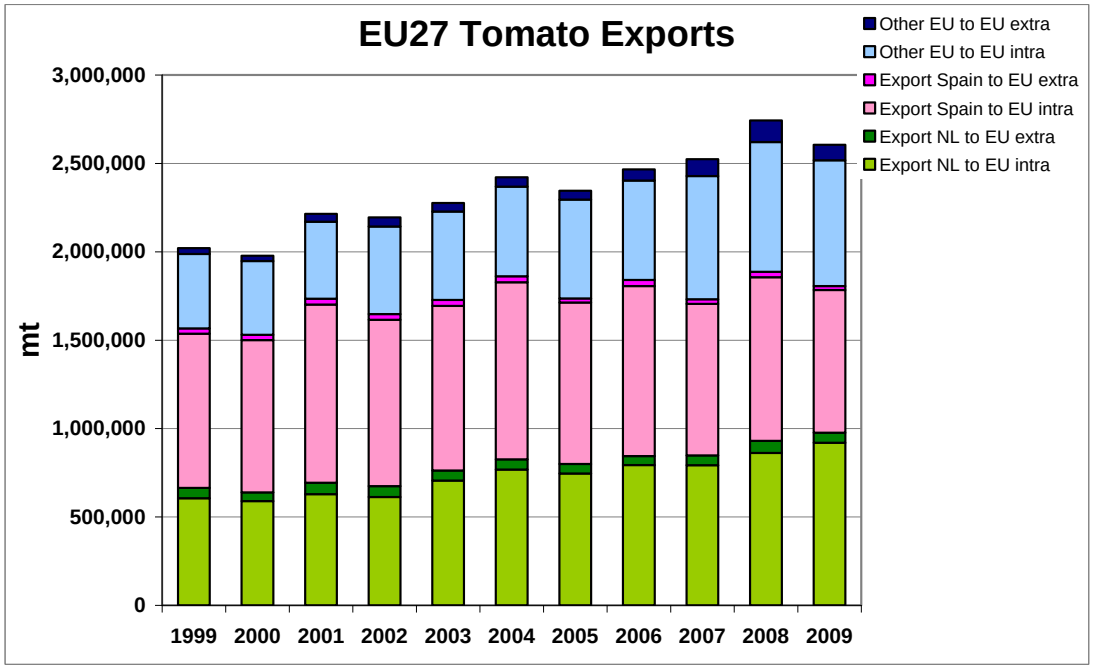
Turkey – Import UV in Bulgaria: **0.780 €/kg** (slightly higher than the UV for Moroccan tomatoes imported to France = 0.727 €/kg, probably mainly regular tomatoes)

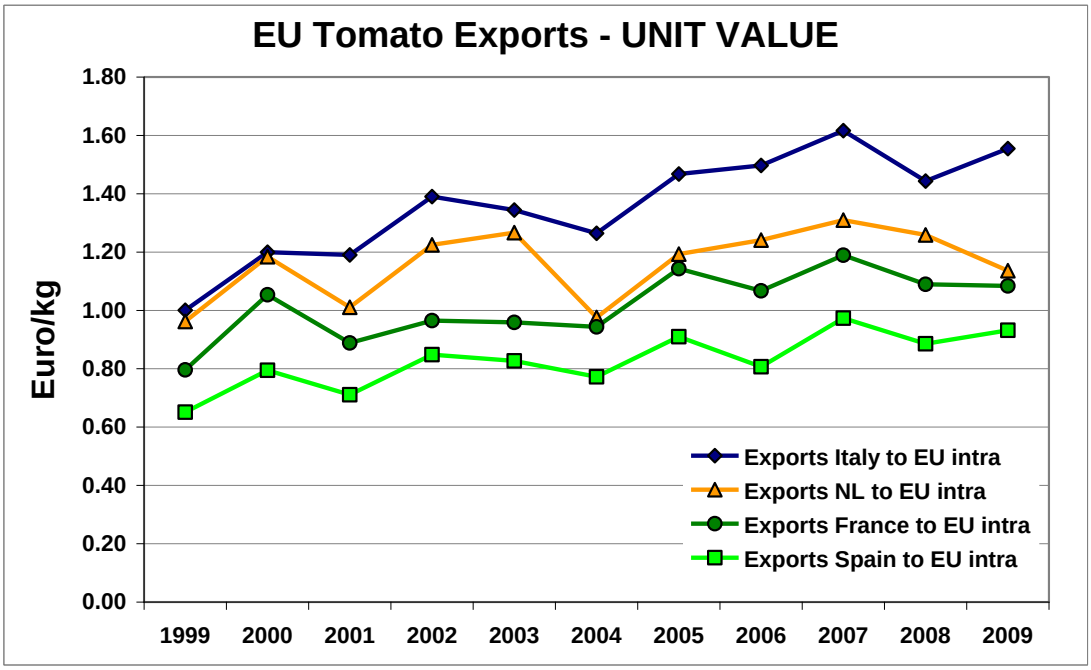
Spain – Export UV for EU-intra trade: 0.930 €/kg (regular and cherry tomatoes)

Italy – Export UV for EU-intra trade: **1.538 €/kg** (mainly cherry tomatoes)

We choose the UV for Turkish tomatoes for approximating the import price for regular tomatoes, and the Italian export unit value for approximating the import price for cherry tomatoes (transport costs to Israel have to be added to both UVs).

Alternatively, tomatoes might be imported to Israel from the West Bank, the Gaza Strip or Jordan. Price statistics indicating import prices are currently not available.





Cucumbers *(EU Exports and Imports)*

Nearly all cucumbers consumed in the EU are supplied by EU countries. Similar to other salad vegetables, the main suppliers are Spain and the Netherlands.

Imports from third countries account for about 3% of cucumber quantities imported by EU countries (33,800 mt in 2009). The dominant third country supplier is Turkey.

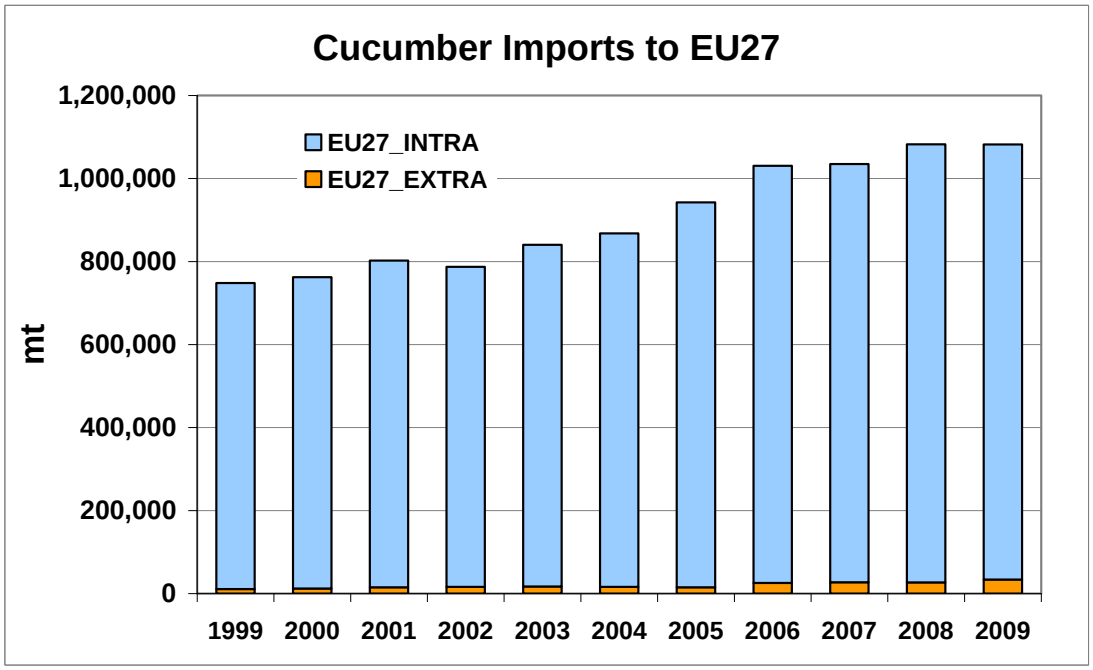
EU EXPORT 2009	1000 mt			Euro/kg		Main Markets
SUPPLIERS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27	**978**	**37.0**	**941**	**1.03**	**0.80**	**Ger. 437, UK 132, NL 76**
Spain	438	12.9	425	0.86	0.84	Ger. 153, NL 70, UK 56
Netherlands	398	9.7	388	1.38	0.77	Ger. 239, UK 74, Czechia 18
Germany	29	1.7	27	0.96	0.62	
Belgium	28	0.6	27	1.40	0.75	
Greece	13	1.1	12	1.10	1.18	
Austria	12	0.5	12	0.94	0.72	
Poland	11	1.1	10	0.63	0.68	
Bulgaria	9	0.1	9	0.63	1.00	
Other	40	9.4	30			

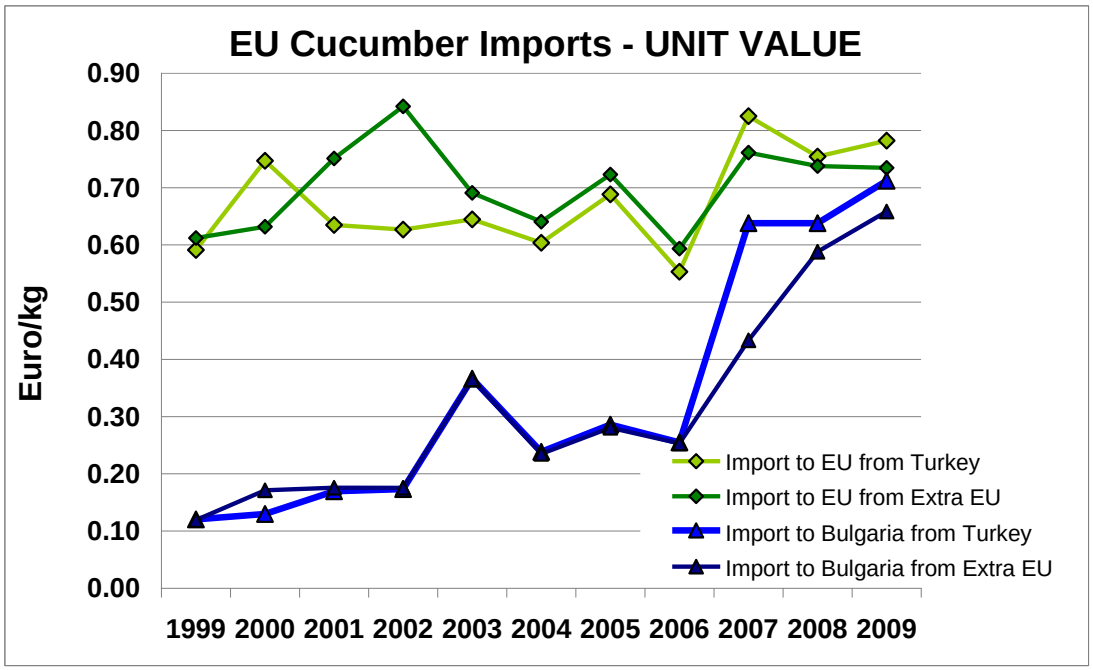
EU IMPORT 2009	1000 mt			Euro/kg		Main Extra-EU Suppliers
MARKETS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27*	**1,082**	**33.8**	**1,048**	**0.73**	**0.56**	**Turkey 20, Morocco 3.3**
Bulgaria	11	8.2	2	0.66	0.43	Turkey 6.1
Germany	469	5.5	464	0.53	0.76	
Austria	28	4.4	23	1.14	0.94	
Romania	8	3.1	5	0.64	0.84	
Hungary	12	2.2	10	0.44	0.51	
France	71	1.7	69	0.98	0.74	
Slovenia	5	1.4	3	0.50	0.77	
Other	479	7.3	471			

* EU Eurostat data contained a mistake with regard to imports from Czechia (Czech imports in 2009 according to Eurostat: 450,000 mt, instead of about 12,000 mt in previous years). Total imports in the table above were corrected to account for the mistake.

Cucumber trade in the EU increased in the last decade. Also imports from third countries increased but they are still very small (see Graph on next page).

Unit values for cucumbers imported to the EU from Turkey increased in recent years (2007-09) to about 0.8 €/kg. Previous years were characterized by very low UVs for Turkish cucumbers in Bulgaria (low quality or incorrect reporting?). Similar to tomatoes, Bulgarian import UVs for Turkish cucumbers increased substantially with the inclusion of Bulgaria in the EU in 2007.





Spain and the Netherlands account for more than 80% of EU cucumber exports (see Graph on next page). Average export unit values for Spanish and Dutch cucumbers exported to other EU countries are very similar most of the years (see next page). Export unit values for third country exports can be quite different – they are probably less reliable indicators of relevant prices for potential Israeli imports from the EU because EU cucumber exports to third countries are very small and targeted to a few markets with specific characteristics (main third country markets are Switzerland, Russia and Norway).

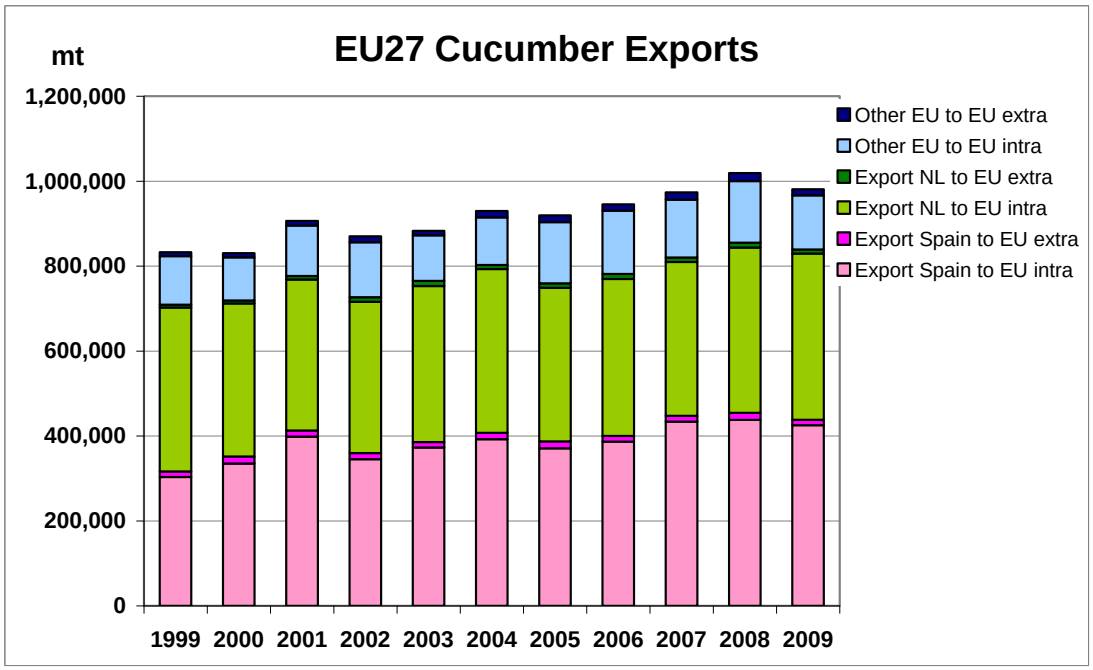
Alternative import prices for PAM (average unit values 2007-09):

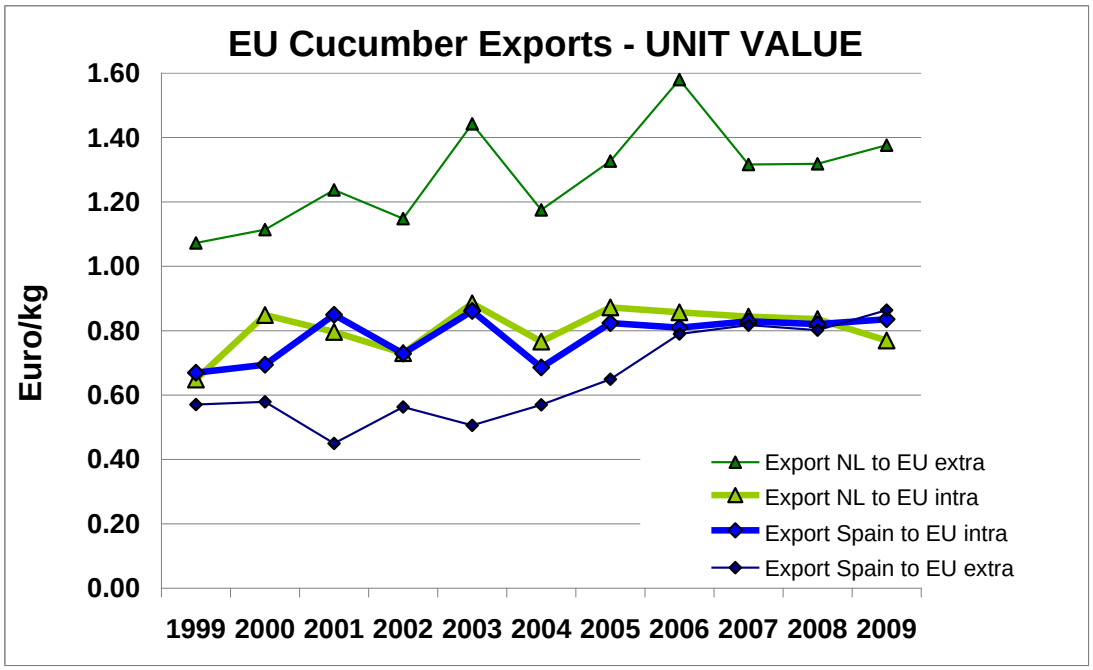
0.828 €/kg (Export UV of Spanish cucumbers to other EU countries) – add transportation costs to Israel

0.663 €/kg (Import UV of Turkish cucumbers to Bulgaria) – add transportation costs to Israel

We assume that Turkish cucumbers are similar to Israeli cucumbers while most Spanish salad cucumbers are of the larger type mainly consumed in Europe. Hence, we choose the UV for Turkish cucumbers.

Alternatively, tomatoes might be imported to Israel from the West Bank, the Gaza Strip or Jordan. We do not have access to reliable price statistics for these countries.





Sweet Pepper *(EU Exports and Imports)*

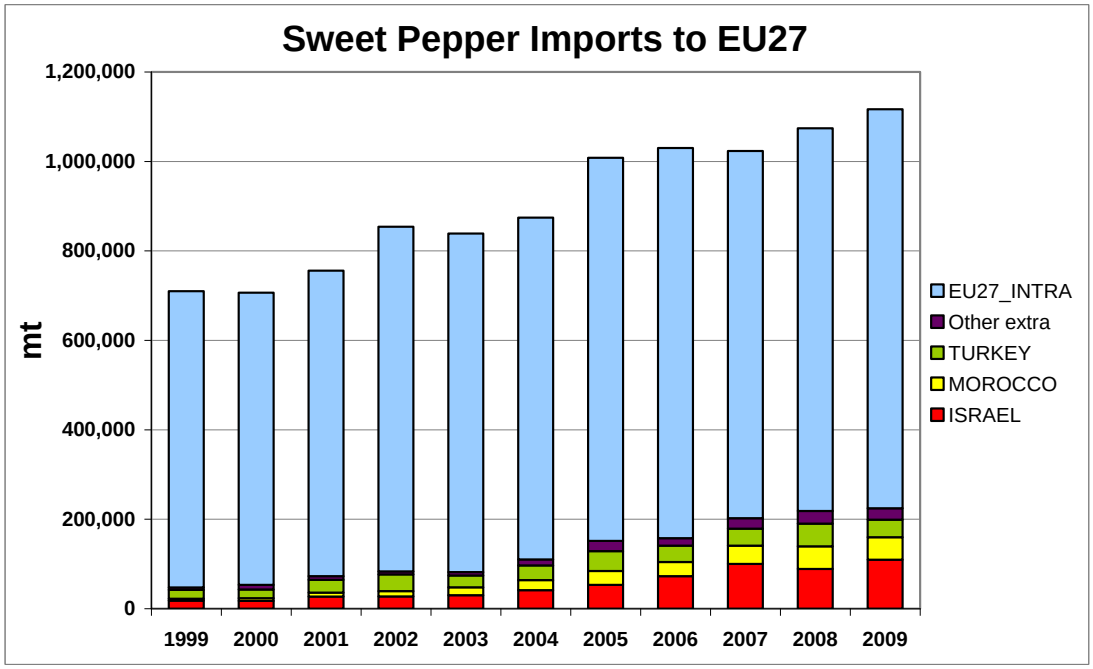
Pepper imports to the EU increased substantially in the last decade. In recent years, EU countries imported more than a million mt of pepper per year. Supplies from the EU (mainly from Spain and the Netherlands) are completed by imports from third countries (see tables and Graph on next page).

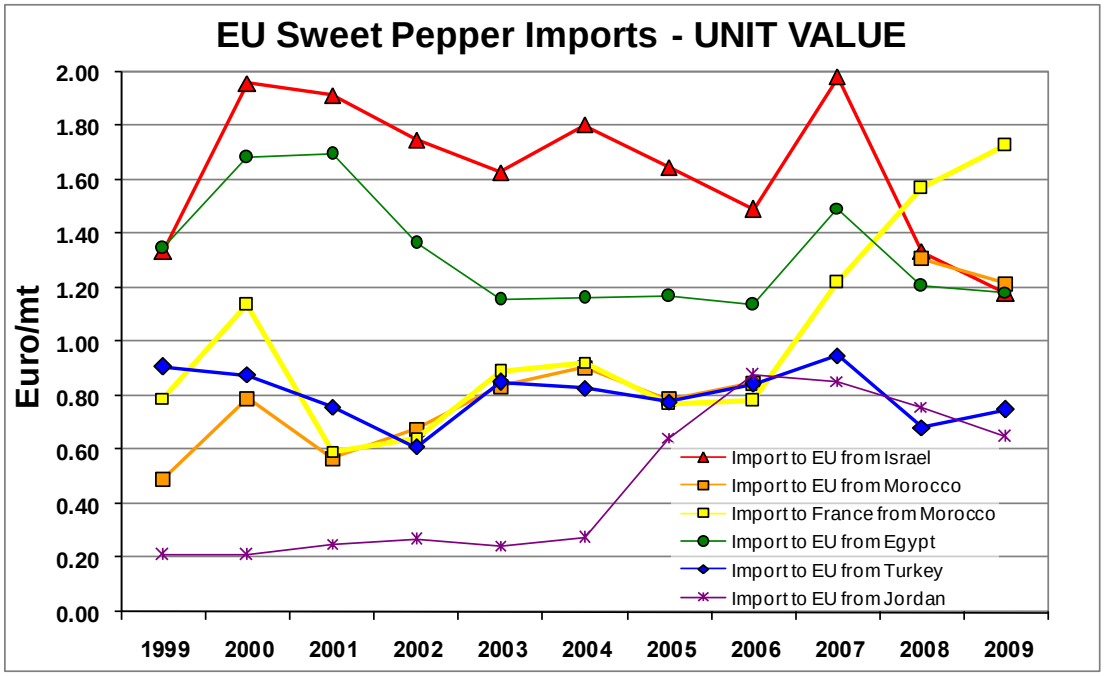
EU EXPORT 2009	1000 mt			Euro/kg		Main Markets
SUPPLIERS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27	**1,112**	**115**	**996**	**1.68**	**1.20**	**Ger. 330, UK 136, France 110**
Spain	453	18	435	1.38	1.03	Ger. 123, France 92, Italy 56
Netherlands	442	66	376	1.99	1.41	Ger. 157, UK 94, Russia 19
Slovenia	40	2	37	0.90	1.09	
Italy	28	1	27	1.57	1.28	
Hungary	26	2	24	0.63	0.93	
Belgium	23	3	20	1.49	1.11	
France	22	3	20	1.41	1.16	
Other	78	19	58			

EU IMPORT 2009	1000 mt			Euro/kg		Main Extra-EU Suppliers
MARKETS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27	**1,117**	**225**	**892**	**1.04**	**1.30**	Isr.109, Morocco 50, Turkey 39
Slovenia	47	41	6	1.04	1.18	Israel 37
Netherlands	87	42	45	1.24	1.10	Israel 39
Spain	29	27	2	0.96	1.20	Morocco
Italy	90	23	67	1.19	1.01	Israel 22 (just in 2009)
Bulgaria	21	20	1	0.27	0.43	Turkey 12
France	115	17	98	1.69	1.02	Morocco 15
Other	729	56	672			

Israel is the main third-country supplier of sweet peppers to the EU. Imports from Israel increased very much in the last decade. Israel can supply peppers in winter and most exports are shipped in the months between the main Spanish and Dutch seasons. Israeli pepper imports to Slovenia and Italy increased in 2009 while imports to France decreased: this is because the largest Israeli exporter shifted from harbor Marseille to Koper in Slovenia. Parallel to the increase in imports from Israel, also competitors developed off-season pepper exports to the EU (mainly Morocco, also imports from Turkey increased, and there are small supplies of pepper from Jordan and Egypt).

SUPPLIERS to EU	1000 mt			Euro/kg		
	2007	2008	2009	2007	2008	2009
Imports to EU27 (extra+intra)	**1,023**	**1,074**	**1,117**			
EU27_EXTRA	**202**	**218**	**225**	**2.44**	**1.07**	**1.04**
ISRAEL	100	89	109	1.98	1.34	1.18
MOROCCO	41	50	50		1.31	1.22
TURKEY	38	51	39	0.95	0.69	0.75
MACEDONIA	11	15	10	0.23	0.24	0.27
JORDAN	1	4	6	0.86	0.76	0.65
EGYPT	5	5	4	1.50	1.21	1.19
Other extra	6	5	6			
EU27_INTRA	**821**	**856**	**892**	**1.71**	**1.56**	**1.30**
Imports to FRANCE (extra+intra)	**128**	**127**	**115**			
EU27_EXTRA	**36**	**38**	**17**	**1.87**	**1.42**	**1.69**
MOROCCO	13	17	15	1.22	1.57	1.73
ISRAEL	22	21	1	2.26	1.34	1.21
Other extra	0	1	0			
EU27_INTRA	**92**	**89**	**98**	**1.27**	**1.25**	**1.02**



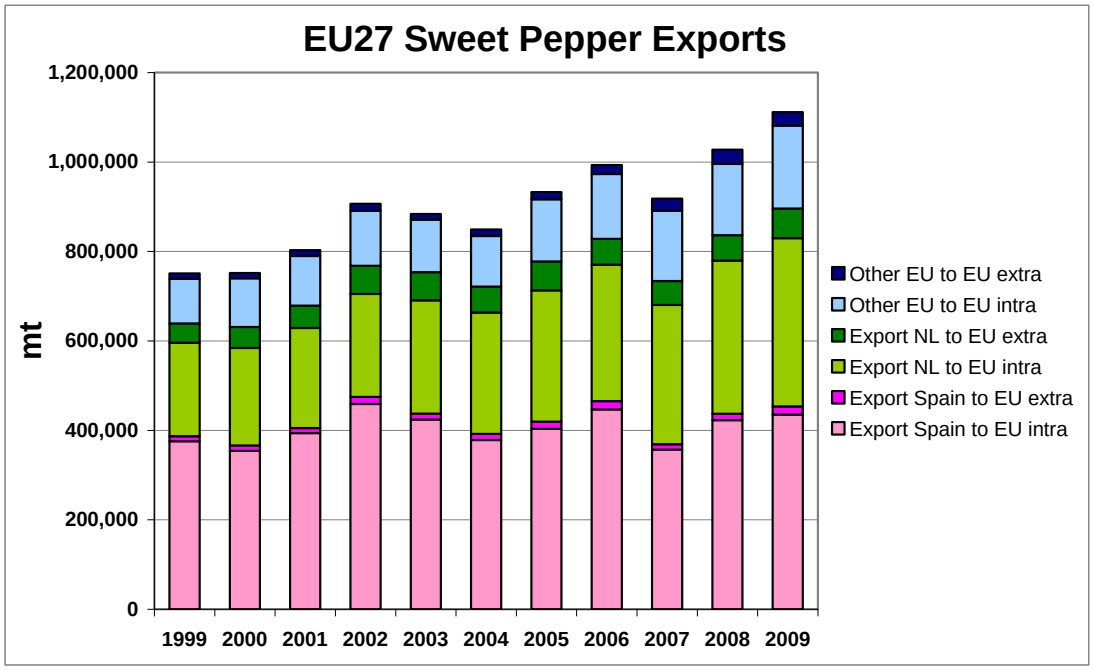


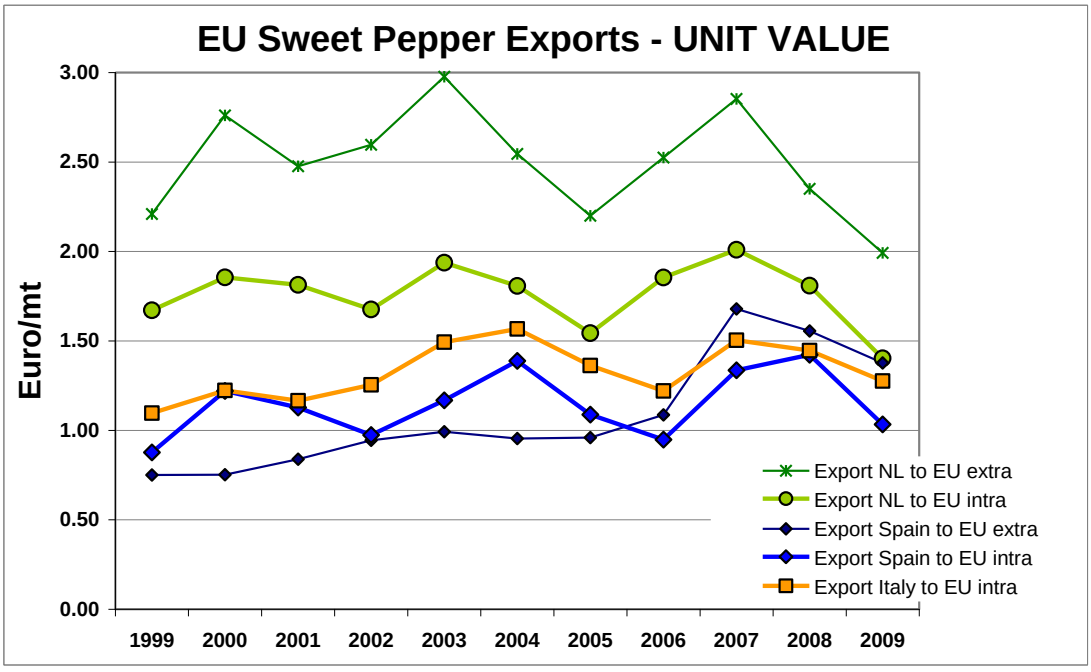
Most of the last decade, import unit values for Israeli pepper were higher than UVs for other Extra-EU suppliers but in the last two years Israeli UVs declined and were similar to average UVs for EU imports from Morocco and Egypt (see Graph above). Average UVs for imports from Turkey and Jordan are substantially lower, probably because of lower quality.

EU sweet pepper exports increased in the last decade. Netherlands and Spain supply 80-85% of EU exports. Dutch exports increased while Spanish imports are more or less stagnant, despite the higher price of Dutch pepper. Exports to third countries are very small, main markets are Russia, Switzerland and the US.

We consider Spanish pepper the most likely source of pepper supply from the EU to Israel. An alternative supply source may be Turkey but we presume that Turkish peppers are of substantial lower quality.

Import prices for PAM (average export unit values for Spanish pepper exports to other EU markets 2007-09): **1.246 €/kg** + marketing costs to Israel





New Potatoes (EU Imports)

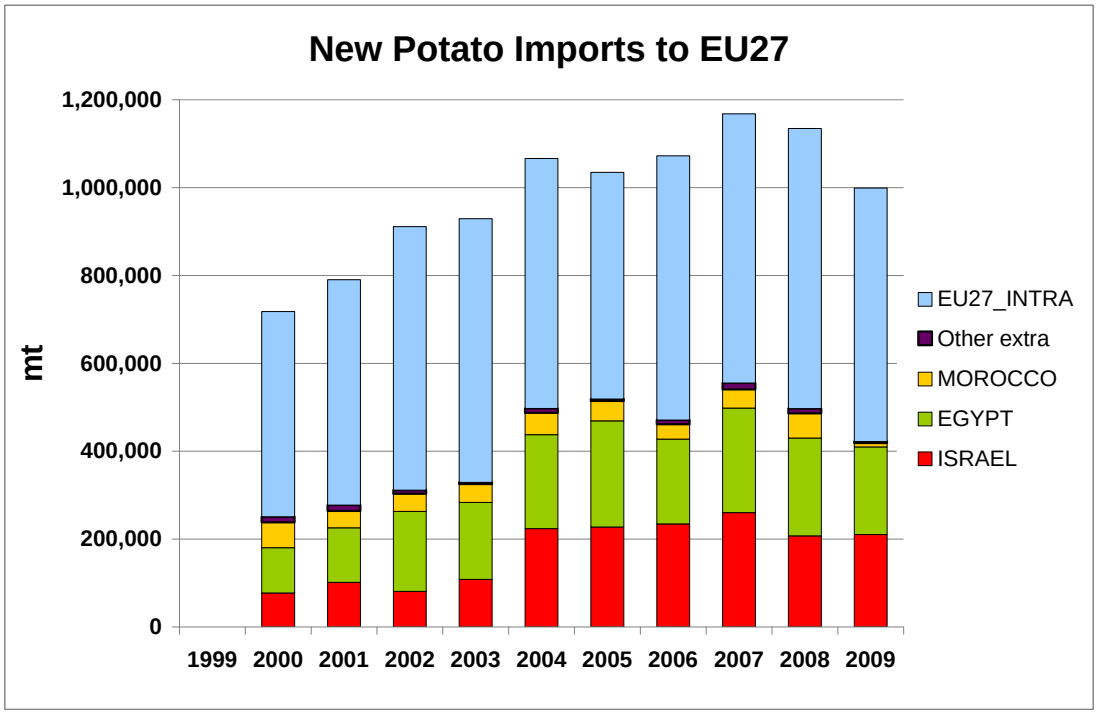
According to the EU custom tariff, new potatoes are traded only in the months January till June. EU countries imported one million mt of new potatoes in 2009, about 40% from outside the EU. Imports increased substantially until 2007 but declined in the last two years. Main import markets for new potatoes are Italy and the UK (see tables and graphs).

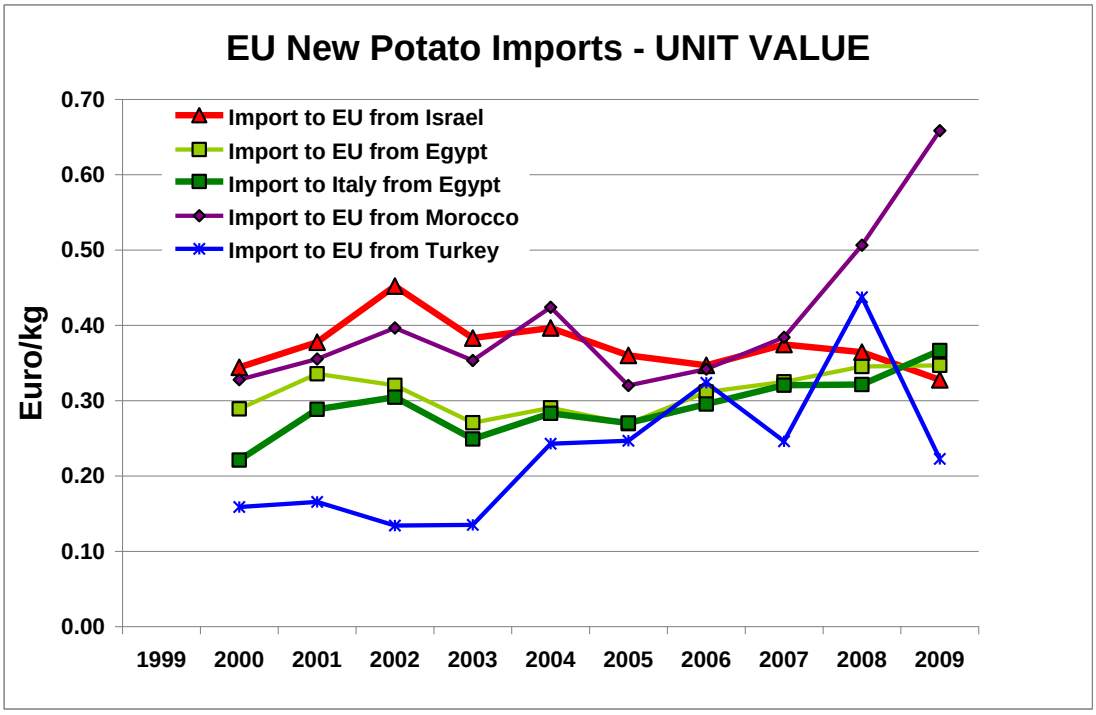
EU EXPORT 2009	1000 mt			Euro/kg		Main Markets
SUPPLIERS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27	**489**	**25**	**464**	**0.30**	**0.38**	**Ger. 174, NL 43, Belgium 36**
Italy	118	2	116	0.33	0.40	Germany 83, Poland 7, NL 4
Spain	114	6	107	0.23	0.39	Germany 38, NL 17, UK 12
Cyprus	69	3	67	0.39	0.47	Greece 16, Germany 11, UK 10
Netherlands	54	7	48	0.27	0.24	Germany 16, Belgium 13
France	34	1	33	0.39	0.44	Germany 12, Belgium 8
Other	100	6	94			

EU IMPORT 2009	1000 mt			Euro/kg		Main Extra-EU Suppliers
MARKETS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27	**999**	**422**	**577**	**0.34**	**0.27**	**Isr. 211, Egypt 199, Morocco 9**
Italy	148	113	35	0.37	0.17	Egypt 92, Israel 19
UK	121	82	39	0.36	0.39	
Greece	80	70	10	0.29	0.27	
Belgium	80	62	18	0.32	0.50	
Netherlands	59	39	21	0.31	0.17	Israel 25, Egypt 11, Morocco 2
France	26	21	5	0.43	0.47	Israel 15, Morocco 6.5
Other	485	36	449			

Main third country suppliers of new potatoes to the EU are Israel and Egypt. Morocco, Tunisia and Turkey supply additional, much smaller quantities of new potatoes. Imports of new potatoes from Israel increased until 2007 but somewhat declined in the last two years to about 210,000 mt per year. Import quantities from Egypt developed in a similar pattern. In the past, average EU import UVs of Egyptian new potatoes were lower compared to UVs of Israeli new potatoes but in recent years UVs are similar.

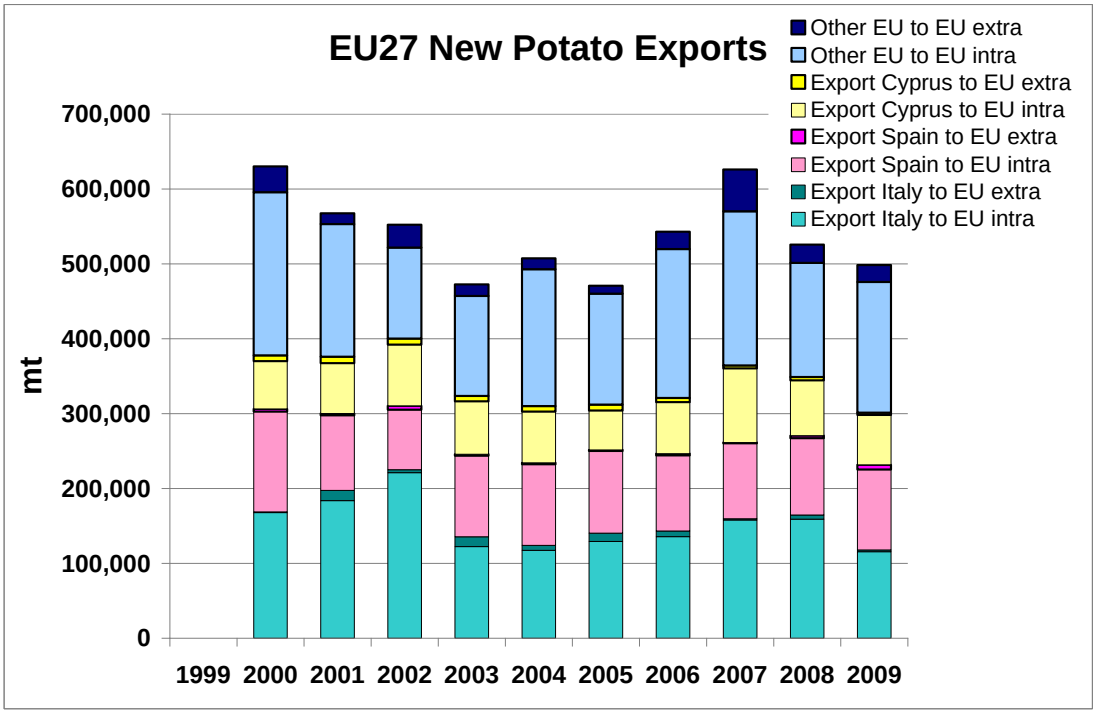
SUPPLIERS to EU	1000 mt			Euro/kg		
	2007	2008	2009	2007	2008	2009
Imports to EU27 (extra+intra)	**1,168**	**1,134**	**999**			
EU27_EXTRA	**555**	**497**	**422**	**0.35**	**0.37**	**0.34**
ISRAEL	260	207	211	0.37	0.36	0.33
EGYPT	238	223	199	0.33	0.35	0.35
MOROCCO	42	56	9	0.38	0.51	0.66
TUNISIA	8	9	3	0.39	0.39	0.41
TURKEY	6	1	0	0.25	0.44	0.22
Other extra	1	1	0			
EU27_INTRA	**613**	**637**	**577**	**0.37**	**0.30**	**0.27**
Imports to ITALY (extra+intra)	0	0	0			
EU27_EXTRA	**111**	**117**	**113**	**0.32**	**0.32**	**0.37**
EGYPT	107	109	92	0.32	0.32	0.37
ISRAEL	3	4	19	0.45	0.32	0.38
TUNISIA	1	3	1	0.39	0.40	0.41
Other extra	0	1	0			
EU27_INTRA	**37**	**32**	**35**	**0.30**	**0.21**	**0.17**

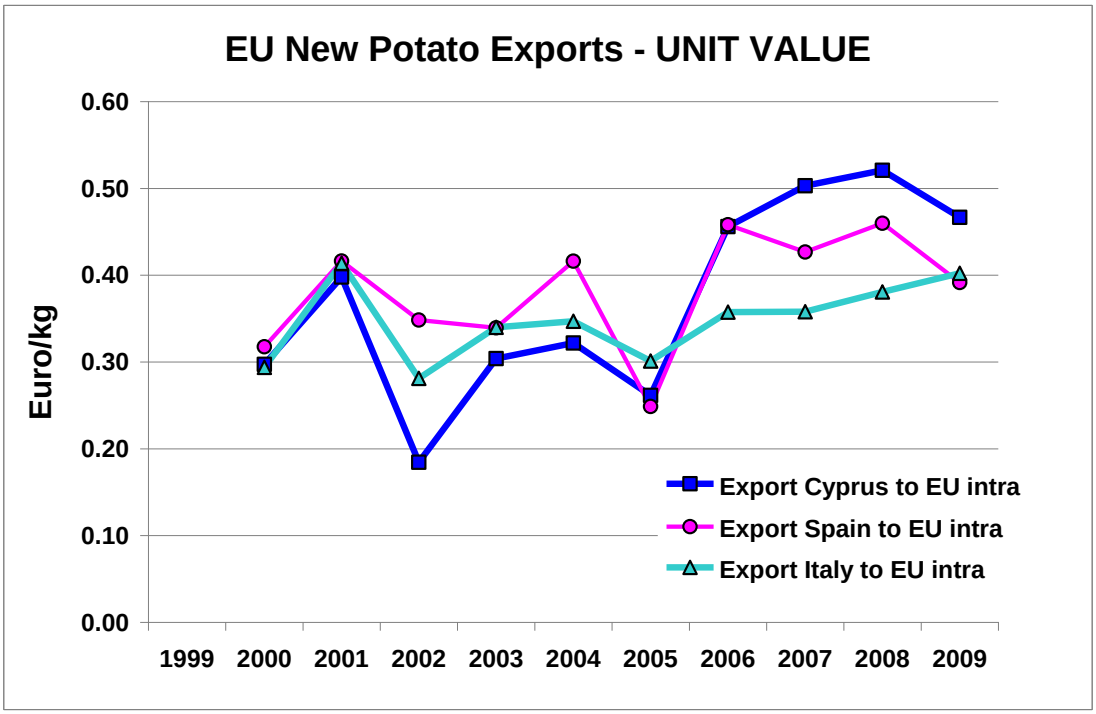




Main suppliers of new tomatoes in the EU are Italy, Spain and Cyprus. Most exports are supplied to other EU countries, and exports to third countries are very small. Export UVs of main EU suppliers of new potatoes are higher than import UVs for Israeli new potatoes, hence supplies from these countries to the Israeli market are unlikely to be competitive (see graphs on next page). A relevant supplier of new potatoes to the Israeli market might be Egypt.

Import price for PAM: 0.336 Euro/kg (Import UV of Egyptian new potatoes in Italy, avg. 2007-09) **minus** price difference transportation to Israel


EU27 New Potato Exports
Other EU to EU extra
Other EU to EU intra
Export Cyprus to EU extra
Export Cyprus to EU intra
Export Spain to EU extra
Export Spain to EU intra
Export Italy to EU extra
Export Italy to EU intra
mt
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009


EU New Potato Exports - UNIT VALUE
Euro/kg
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009
Export Cyprus to EU intra
Export Spain to EU intra
Export Italy to EU intra

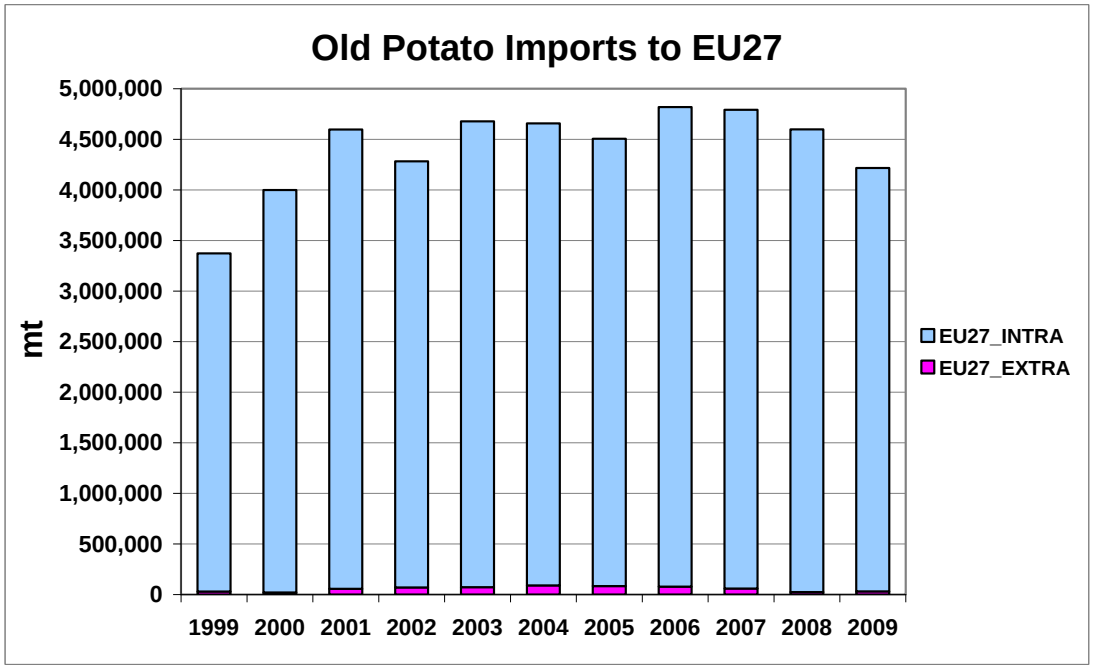
Old Potatoes *(EU Exports and Imports)*

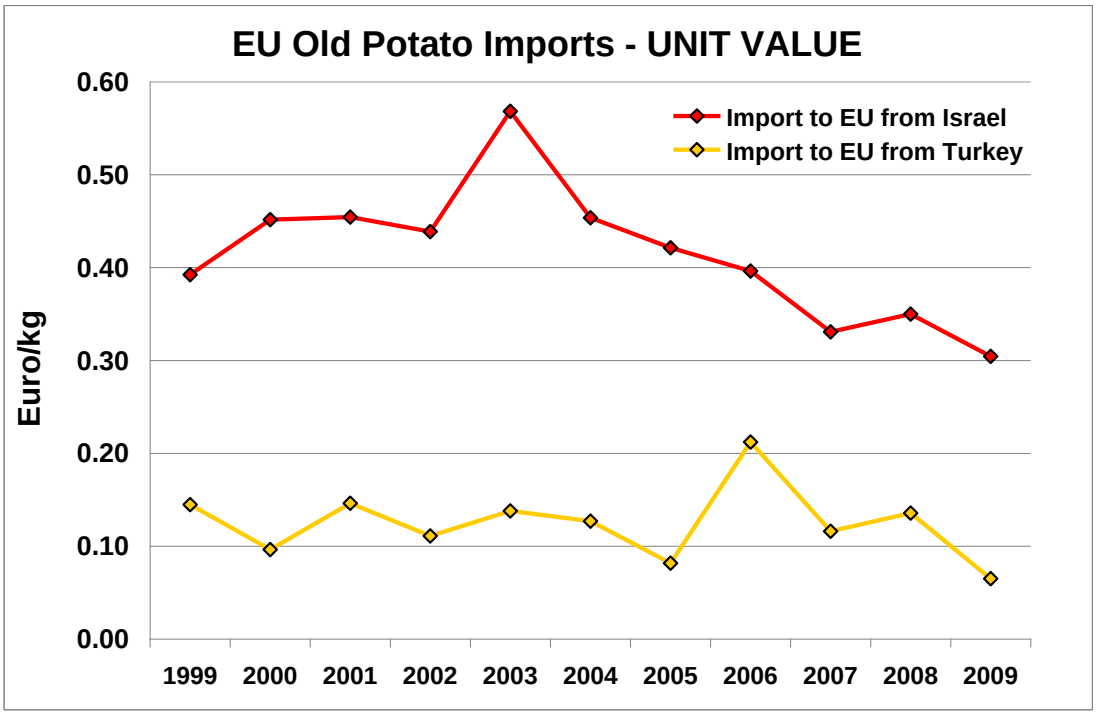
EU "old potato" trade includes the trade of fresh and chilled potatoes, excluding new potatoes, seed potatoes and potatoes for manufacture of starch. EU countries import about 4.5 million mt of old potatoes per year, nearly all of them from other EU countries.

EU EXPORT 2009	1000 mt			Euro/kg		Main Markets
SUPPLIERS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27	**5,190**	**549**	**4,641**	**0.18**	**0.15**	**NL 1122, Spain 702, Belgium 594**
France	1,804	18	1,786	0.35	0.15	Spain 622, Italy 314, Belgium 251
Germany	1,231	33	1,198	0.17	0.12	
Netherlands	893	402	491	0.17	0.17	Belgium 199, Ger. 153, Russia 110
Belgium	627	15	612	0.21	0.11	
Spain	159	9	150	0.26	0.22	Portugal 99, Germany 21
UK	126	6	120	0.47	0.33	
Other	350	66	284			

EU IMPORT 2009	1000 mt			Euro/kg		Main Extra-EU Suppliers
MARKETS	Total	EXTRA	INTRA	EXTRA	INTRA	
EU27	**4,209**	**30.4**	**4,178**	**0.23**	**0.19**	**Israel 20, Turkey 9.5**
UK	143	17.0	126	0.30	0.32	
Bulgaria	17	9.3	8	0.06	0.16	
Belgium	1,179	1.5	1,177	0.30	0.12	
Italy	369	0.8	369	0.47	0.16	
Spain	455	0.6	454	0.25	0.36	
Other	2,046	1.1	2,045			

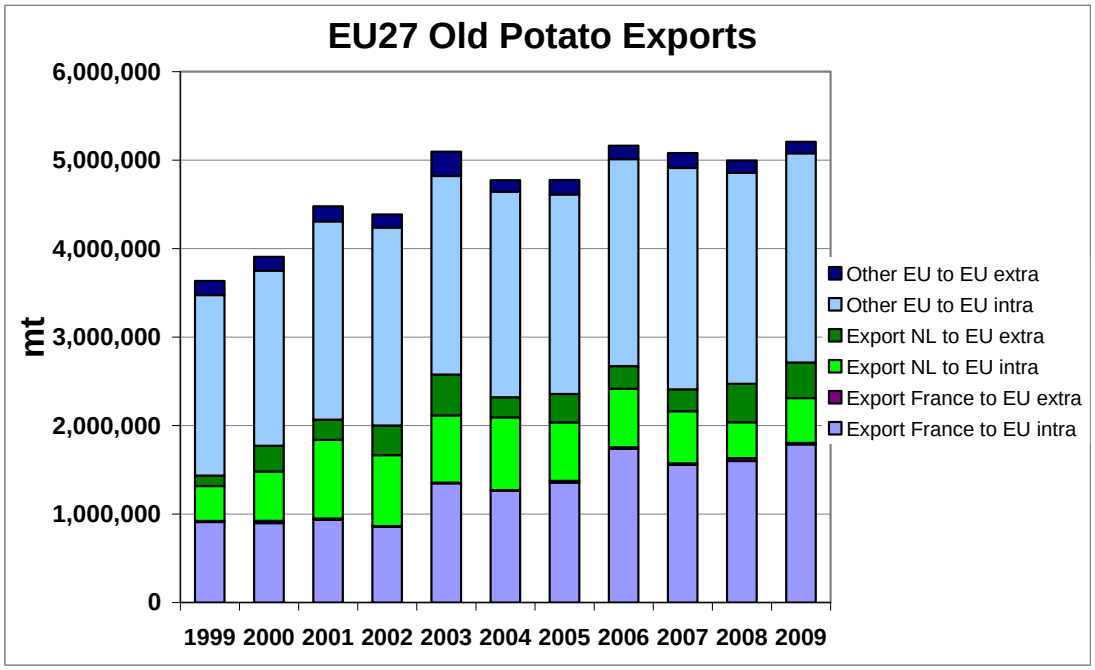
Imports of old potatoes from third countries varied between 20,000 – 90,000 mt per year and account for about 1% of total imports. In the last three years, most third country imports of old potatoes were supplied by Israel and Turkey. The main market for imports from Israel is the UK, while old potatoes from Turkey are mainly imported by Bulgaria. Import values for Turkish potatoes are very low (0.10 – 0.14 €/kg) compared to Israeli supplies and also considerably lower than export UVs of EU supplies. Probably Turkish supplies are of inferior quality and do not present an alternative to domestically produced potatoes.

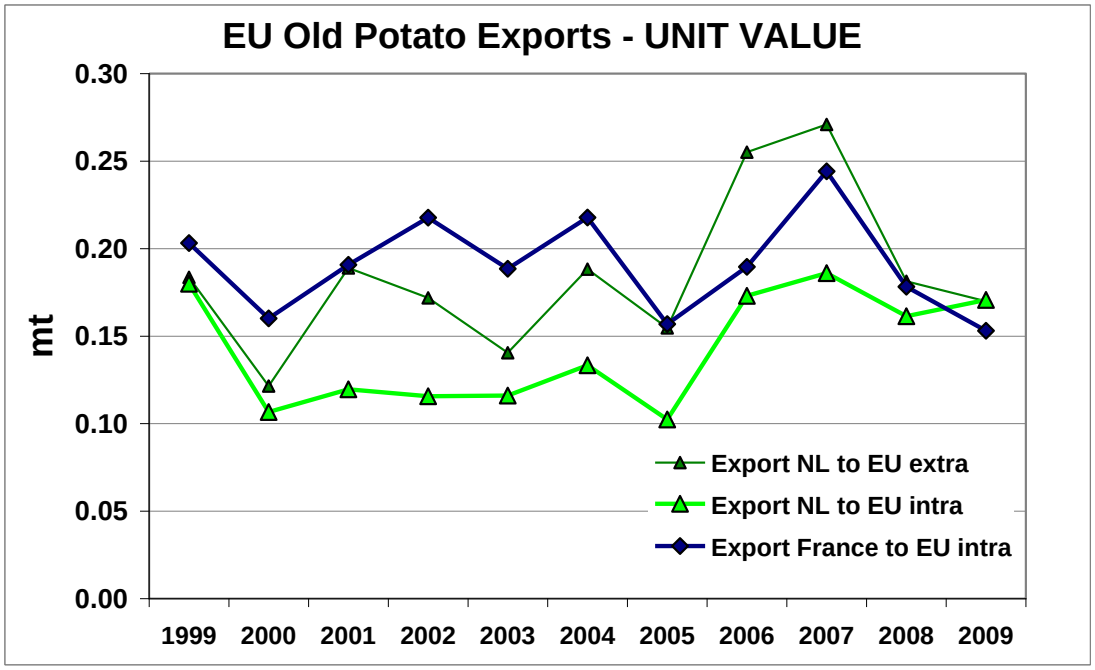




Main EU suppliers of old potatoes are France, Germany and the Netherlands. The graphs on the next page present the development of French and Dutch exports (quantities and UVs). French exports increased substantially, despite higher UVs compared to Dutch potatoes in most of the years. In the last two years French and Dutch unit values are very similar, after exceptionally high unit values for French potatoes in 2007. Our approximation of the import price for old potatoes to Israel is based on the French UV in the last two years.

Import price for PAM: 0.166 Euro/kg (Export UV of French potatoes to other EU countries, avg. 2008-09) + marketing cost to Israel


EU27 Old Potato Exports
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
mt
1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009
Other EU to EU extra
Other EU to EU intra
Export NL to EU extra
Export NL to EU intra
Export France to EU extra
Export France to EU intra


EU Old Potato Exports - UNIT VALUE
0.30
0.25
0.20
0.15
0.10
0.05
0.00
mt
1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009
Export NL to EU extra
Export NL to EU intra
Export France to EU intra

Sensitivity Analysis – Reference Prices

The following section examines two implicit assumptions of our analysis:

(a) We use as reference prices for fruit and vegetables the **annual average price** at which produce can be imported to Israel. Because of the seasonal nature of fruit and vegetable supplies it may be that reference prices in certain months are lower. In this section we look at the seasonal pattern of selected reference prices and investigate if reference prices are higher than domestic prices also in low-price periods.

(b) We did not consider **produce from the Palestinian territories** as an alternative source of supply because reliable price statistics are not available. In this section we will compare Palestinian farmers' prices for four products grown in the Westbank (tomatoes, potatoes, grapes, dates) with prices obtained by Israeli farmers. Prices for Palestinian farmers are average prices in 2007 and 2008 (Source: Presentation El-Jafari, April 2010).

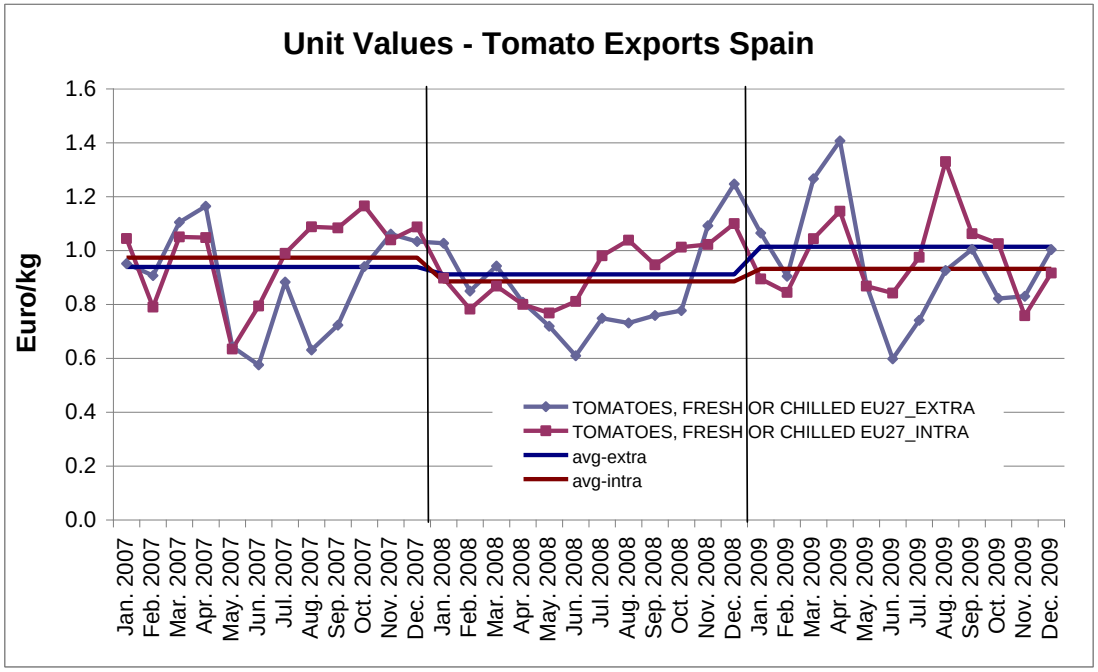
(a) Seasonal pattern of reference prices

We look at monthly unit values for tomatoes, pepper and strawberries exported from Spain and for grapes exported from Italy (Graphs 1 – 4). Monthly prices for all four crops are quite variable and show a seasonal pattern. Tomato prices are lower in summer; pepper prices are relatively low in August – October; strawberries are scarce in winter and obtain high prices in December – February; and prices for grapes from Italy are relatively low in autumn when supply is high. Prices in specific months can be considerably lower than the average annual price.

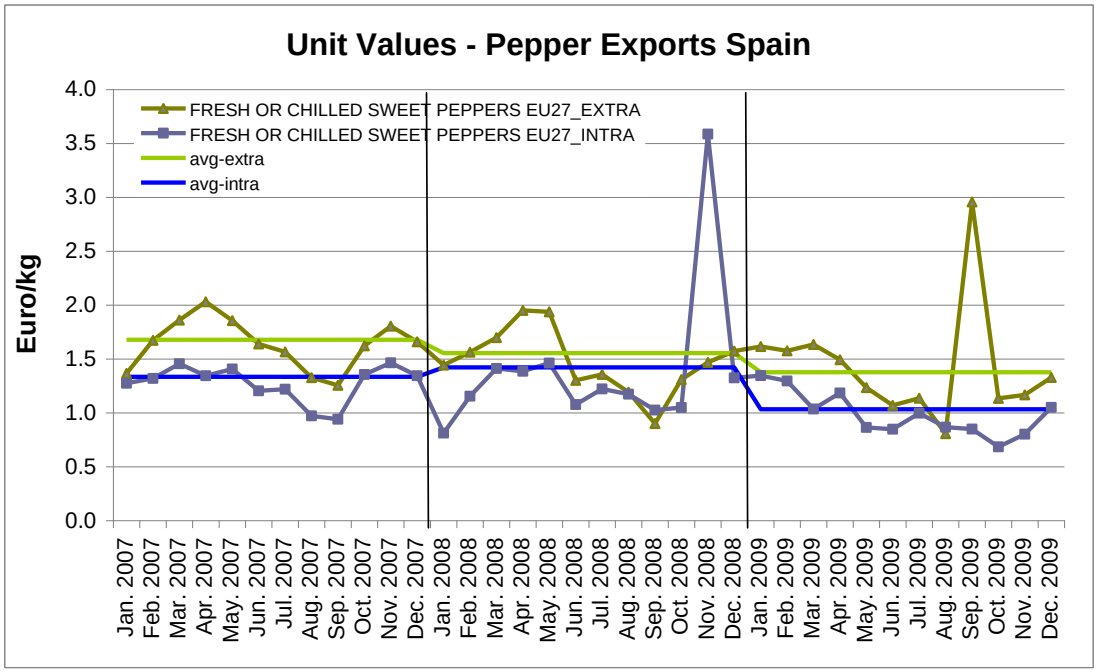
Table 1 presents reference import prices based on average unit values compared to those based on months with especially low prices. Market price differentials (domestic price – reference import price) were calculated based on two different sources for domestic grower prices (Extension Service, CBS). Prices from both sources are similar for tomatoes and pepper, while Extension Service prices are lower for grapes and strawberries. Qualitative results for CBS data do not change when calculations are based on low unit values: domestic grape and strawberry prices are higher than alternative prices for imports (custom duties are effective), while domestic prices are lower for tomatoes and peppers. For extension service data, the table grape reference price based on low unit values is similar to the price for the higher priced Thompson grape variety but higher than the price for the variety Redglobe. Domestic prices are lower for the three additional crops, indicating that custom duties are redundant.

Results indicate that during periods with low prices abroad grape imports to Israel are feasible and, in the absence of barriers to import, can compete successfully with Israeli grapes.

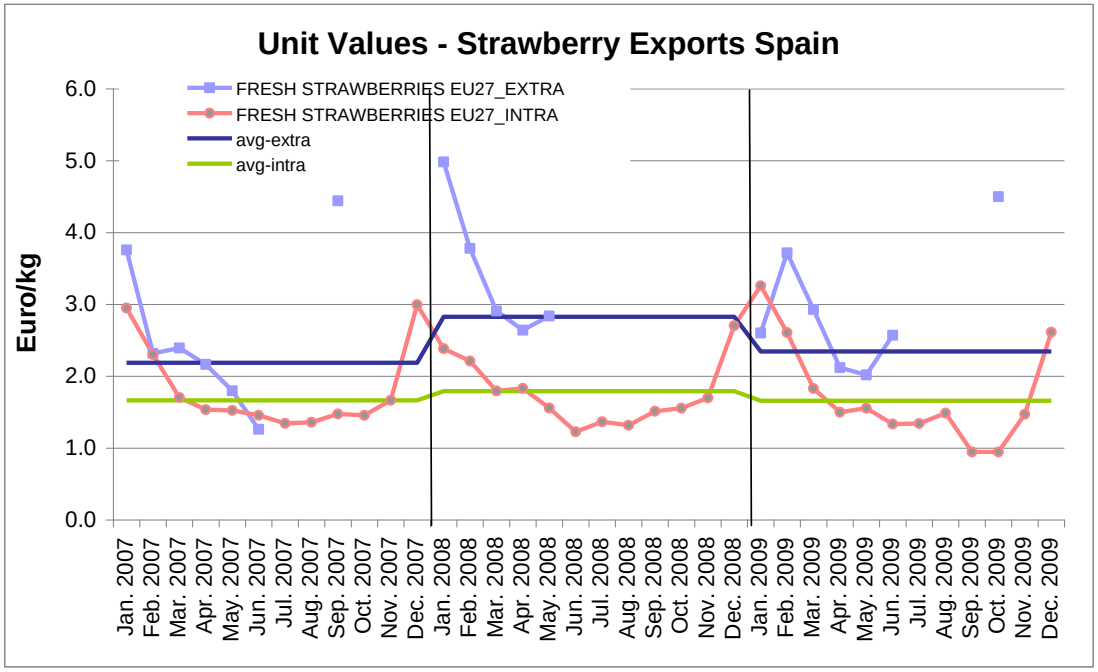
Graph 1



Graph 2



Graph 3



Graph 4

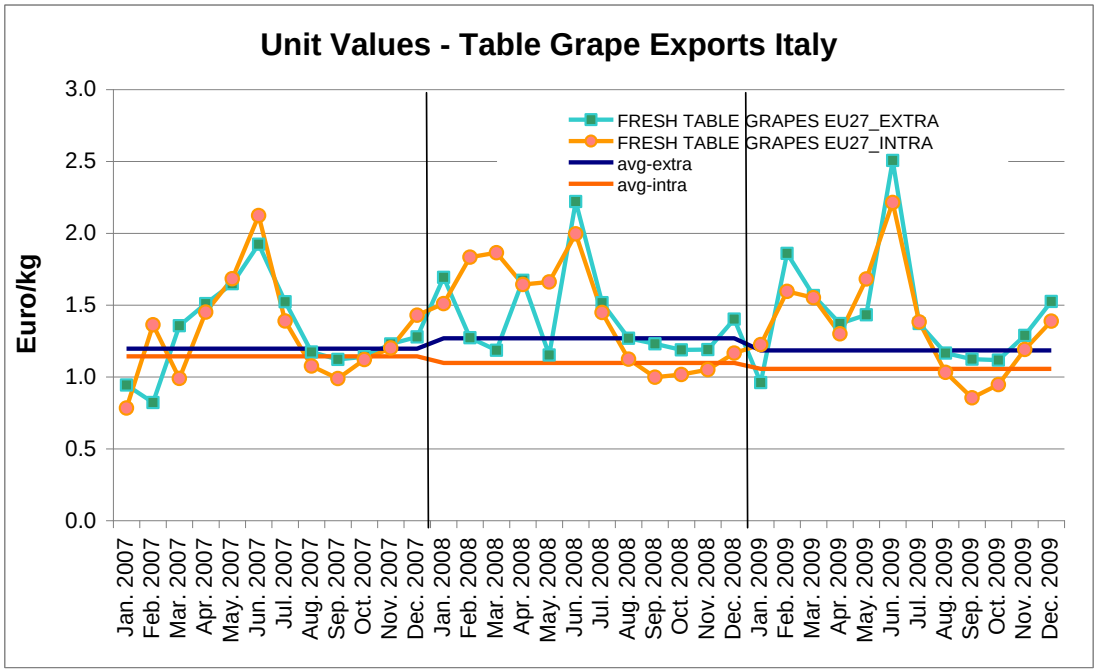


Table 1: Reference Import Prices based on Average and Low Unit Values

	Desription of selected UV	UV in Euro/mt	Ref. price grower's level	Price domestic market (1)	Price domestic market (2)	MPD (1) (acc. to higher p)	MPD (2)
Average Unit Values (2007-09)							
Table grapes	Export UV Italy (all exports)	1,115	6,518	5,000 / 3,500	7,181	**-1,518**	**663**
Tomatoes	Import UV for Turkey in Bulgaria	780	5,193	3,000 / 2,600	2,694	**-2,193**	**-2,499**
Sweet pepper	Export UV Spain (intra exports)	1,246	8,575	4,500 / 4,000	4,021	**-4,075**	**-4,554**
Strawberries	Export UV Spain (all exports)	1,722	14,730	6,754	18,817	**-7,976**	**4,087**
Low Unit Values							
Table grapes	Export UV Italy	850	4,993	5,000 / 3,500	7,181	**7**	**2,188**
Tomatoes	Export UV Spain	600	4,158	3,000 / 2,600	2,694	**-1,158**	**-1,464**
Sweet pepper	Export UV Spain	700	5,433	4,500 / 4,000	4,021	**-933**	**-1,412**
Strawberries	Export UV Spain	1,000	10,781	6,754	18,817	**-4,027**	**8,036**

Remarks:
Price domestic market (1): Grower prices - Source: Extension Service, Ministry of Agriculture
Price domestic market (2): Grower prices at the entrance of the wholesale market, Source: CBS

MPD (1): Difference domestic price (Extension Service) and reference price at grower's level. For crops with several grower prices (for different varieties or growing methods) the calculation is based on the higher price.

MPD (2): Difference domestic price (CBS) and reference price at grower's level.

(b) Supply of fruit and vegetables from the Westbank

To establish a reference price for imports from the Westbank we added marketing costs to prices received by Westbank farmers in 2007-08[4]. Prices presented in Table 2 indicate that Westbank farmers could supply tomatoes, potatoes, grapes and dates to the Israeli market at competitive prices. Current trade and mobility barriers probably add to marketing costs and protect Israeli farmers from low-cost Palestinian produce. In addition, quality differences may account for part of the price difference.

Table 2: Market Price Differential for Imports from the Westbank

	Grower price - Westbank (Avg. 2007-08)	Transport + additional costs	Reference price grower's level	**Price domestic market (1)**	**Price domestic market (2)**	**MPD (1)** (acc. to lower p)	**MPD (2)**
Tomatoes	2,185	200	2,385	3,000 / 2,600	2,694	215	309
Potatoes	1,231	200	1,431	2,200	2,466	769	1,035
Grapes	2,711	200	2,911	5,000 / 3,500	7,181	589	4,270
Dates	3,430	200	3,630	9,500	9,277	5,870	5,647

Remarks:
Price domestic market (1): Grower prices - Source: Extension Service, Ministry of Agriculture
Price domestic market (2): Grower prices at the entrance of the wholesale market, Source: CBS

To conclude:

Average annual unit values employed for calculating import reference prices may overestimate the competitiveness of domestic production compared to imports. Nevertheless, an investigation of seasonal price patterns for tomatoes, peppers, grapes and strawberries indicates that prices in the Israeli domestic market tend to be lower than reference prices for imports even in months with high supply and relatively low prices.

On the other hand, a decline in transaction costs for exports from the Westbank to Israel is expected to increase the supply of some fruit and vegetables to Israel and will probably cause a decrease in domestic prices. In addition, also Egypt and Jordan can most likely supply some fruit and vegetables at competitive prices to Israel if restrictions to trade are dismantled. Judging from the dramatic growth of grape exports from Egypt to Europe it looks like Egypt could also be a promising supplier of grapes to the Israeli market.

We hope to obtain reliable prices and estimates for transportation and other marketing costs to Israel from the Palestinian, Egyptian and Jordanian partners in the regional DANIDA project to update social prices employed in the PAM calculations for Israel and investigate the prospect for regional trade.

[4] Source grower prices: Eljafari (2010) – Presentation.
Transport costs are about 100 NIS per ton. We added another 100 NIS to account for additional marketing expenses.

Appendix 2

Detailed PAM computations for scenario1 (base-case assumptions)

In our detailed analysis we denote alternatives with relevance to domestic consumption and varieties with relevance to exports with √ and €, respectively.

Cherry Tomatoes						***עגבניות שרי***	
	√	€			€		
		Cherry clusters greenhouse				Cherry tomatoes open field	
	Divergence	Social prices	Private prices		Divergence	Social prices	Private prices
Revenues	0	87,500	87,500		0	51,750	51,750
Tradable Inputs							
Land prep and machinery	0	2,585	2,585		0	838	838
Seedlings	0	2,000	2,000		0	780	780
Fertilizers	0	5,190	5,190		0	5,283	5,283
Pest control	0	4,105	4,105		0	2,078	2,078
Materials in harvest	0	10,675	10,675		0	9,000	9,000
Overall tradable inputs	0	24,556	24,556		0	17,979	17,979
Domestic Factors							
Irrigation	-2,640	4,125	1,485		-2,640	4,125	1,485
Hired labor	-8,051	50,432	42,381		-6,616	41,444	34,828
Self employment	0	7,830	7,830		0	3,132	3,132
Insurance	-72	207	134		-66	188	122
Financing and other exp	0	1,841	1,841		0	1,782	1,782
	-1,475	7,375	5,900		-357	1,787	1,430
Overall domestic factors	-12,238	71,810	59,572		-9,679	52,459	42,779
Overall Expenses	-12,238	96,365	84,127		-9,679	70,438	60,759
Profits	12,238	-8,865	3,373		9,679	-18,688	-9,009

Tomatoes							***עגבניות***
			€				√
	Tomatoes clusters greenhouse					Tomatoes greenhouse	
	Divergence	Social prices	Private prices		Divergence	Social prices	Private prices
Revenues	0	63,900	63,900		0	65,000	65,000
Tradable Inputs							
Land prep and machinery	0	3,330	3,330		0	3,330	3,330
Seedlings	0	1,600	1,600		0	1,600	1,600
Fertilizers	0	4,930	4,930		0	5,040	5,040
Pest control	0	3,562	3,562		0	3,713	3,713
Materials in harvest	0	8,829	8,829		0	5,250	5,250
Overall tradeable inputs	0	22,251	22,251		0	18,933	18,933
Domestic Factors							
Irrigation	-2,880	4,500	1,620		-2,640	4,125	1,485
Hired labor	-5,598	35,069	29,470		-6,255	39,182	32,927
Self employment	0	3,915	3,915		0	3,915	3,915
Insurance	-18	50	33		-18	50	33
Financing and other exp	0	2,280	2,280		0	2,289	2,289
	-1,108	5,541	4,433		-1,108	5,541	4,433
Overall domestic factors	-6,724	46,855	40,131		-7,381	50,977	43,596
Overall Expenses	-6,724	69,106	62,382		-7,381	69,910	62,529
Profits	6,724	-5,206	1,518		7,381	-4,910	2,471

Cucumbers							***מלפפון***
		€	**₪**				**₪**
	Cucumbers 3 cycles				Cucumbers 2 cycles		
	Divergence	Social prices	Private prices		Divergence	Social prices	Private prices
Revenues	0	56,000	56,000		0	46,000	46,000
Tradable Inputs							
Land prep and machinery	0	2,487	2,487		0	2,183	2,183
Seedlings	0	5,400	5,400		0	3,600	3,600
Fertilizers	0	2,452	2,452		0	1,510	1,510
Pest control	0	3,089	3,089		0	2,014	2,014
Materials in harvest	0	2,800	2,800		0	2,300	2,300
Overall tradable inputs	0	16,228	16,228		0	11,607	11,607
Domestic Factors							
Irrigation	-2,880	4,500	1,620		-2,880	4,500	1,620
Labor in	-3,180	19,920	16,740		-2,226	13,944	11,718
Labor in harvest	-4,099	25,679	21,579		-3,372	21,125	17,752
Hired labor	-7,279	45,599	38,319		-5,598	35,069	29,470
Self employment	0	3,915	3,915		0	3,915	3,915
Insurance	-69	198	129		-192	548	356
Financing and other exp	0	1,510	1,510		0	1,078	1,078
	-1,312	6,561	5,248		-1,312	6,561	5,248
Overall domestic factors	-11,541	62,283	50,742		-9,982	51,670	41,688
Overall Expenses	-11,541	78,510	66,970		-9,982	63,277	53,295
Profits	11,541	-22,510	-10,970		9,982	-17,277	-7,295

Potatoes							***תפוחי אדמה***
		€				**€**	**₪**
	Potatoes Spring				Potatoes Fall		
	Divergence	Social prices	Private prices		Divergence	Social prices	Private prices
Revenues	2,500	8,500	11,000		350	5,950	6,300
Tradable Inputs							
Land prep and machinery	0	440	440		0	440	440
Seedlings	0	756	756		0	720	720
Fertilizers	0	1,018	1,018		0	1,018	1,018
Pest control	0	848	848		0	746	746
Materials in harvest	0	1,835	1,835		0	760	760
Overall tradable inputs	0	4,897	4,897		0	3,684	3,684
Domestic Factors							
Irrigation	-1,440	2,250	810		-1,080	1,688	608
Hired labor	-124	777	653		-93	585	491
Self employment	0	157	157		0	157	157
Insurance	-33	95	62		-44	124	81
Financing and other exp	0	210	210		0	192	192
	-73	364	291		-33	164	131
Overall domestic factors	-1,670	3,853	2,183		-1,250	2,910	1,660
Overall Expenses	-1,670	8,750	7,080		-1,250	6,594	5,344
Profits	-4,170	-250	3,920		1,600	-644	956

Melon							***מלון***
			€				₪
	Melon Charentais, Spring				Melon Galia, trellising, Nov-Jan		
	Divergence	Social prices	Private prices		Divergence	Social prices	Private prices
Revenues	0	27,125	27,125		0	32,400	32,400
Tradable Inputs							
Land prep and machinery	0	2,180	2,180		0	2,464	2,464
Seedlings	0	1,500	1,500		0	900	900
Fertilizers	0	2,070	2,070		0	1,674	1,674
Pest control	0	1,372	1,372		0	1,989	1,989
Materials in harvest	0	3,707	3,707		0	4,385	4,385
Overall tradable inputs	0	10,829	10,829		0	11,411	11,411
Domestic Factors							
Irrigation	-1,680	2,625	945		-2,400	3,750	1,350
Labor in	-1,484	9,296	7,812		-1,325	8,300	6,975
Labor in harvest	-1,055	6,611	5,555		-1,337	8,373	7,037
Hired labor	-2,539	15,907	13,367		-2,662	16,673	14,012
Self employment	0	3,915	3,915		0	3,132	3,132
Insurance	-10	27	18		-15	43	28
Financing and other exp	0	760	760		0	741	741
	-619	3,096	2,477		-563	2,813	2,251
Overall domestic factors	-4,848	26,330	21,482		-5,639	27,152	21,513
Overall Expenses	-4,848	37,159	32,311		-5,639	38,564	32,924
Profits	-6,528	-10,034	-5,186		-8,039	-6,164	-524

Melon (cont)			*מלון*
			€
	Melon Galia, open field, July-Sep		
	Divergence	Social prices	Private prices
Revenues	0	11,000	11,000
Tradable Inputs			
Land prep and machinery	0	692	692
Seedlings	0	1,260	1,260
Fertilizers	0	732	732
Pest control	0	1,196	1,196
Materials in harvest	0	2,172	2,172
Overall tradeable inputs	0	6,052	6,052
Domestic Factors			
Irrigation	-1,080	1,688	608
Labor in	-292	1,826	1,535
Labor in harvest	-563	3,526	2,963
Hired labor	-854	5,352	4,497
Self employment	0	783	783
Insurance	-4	12	8
Financing and other exp	0	303	303
	-44	222	178
Overall domestic factors	-1,983	8,359	6,376
Overall Expenses	-1,983	14,411	12,428
Profits	-3,063	-3,411	-1,428

Strawberries			***תות שדה***
		€	**₪**
	Divergence	Social prices	Private prices
Revenues	0	58,556	58,556
Tradable Inputs			
Land prep and machinery	0	2,135	2,135
Seedlings	0	2,132	2,132
Fertilizers	0	796	796
Pest control	0	2,382	2,382
Materials in harvest	0	8,512	8,512
Overall tradable inputs	0	15,957	15,957
Domestic Factors			
Irrigation	-2,400	3,750	1,350
Hired labor	-8,356	52,344	43,988
Self employment	0	2,376	2,376
Insurance	-302	863	561
Financing and other exp	0	1,365	1,365
	-332	1,660	1,328
Overall domestic factors	-11,390	62,358	50,968
Overall Expenses	-11,390	78,315	66,925
Profits	11,390	-19,759	-8,369

Sweet Pepper							***פלפל***
		€					**€**
	Pepper, Dutch trellising, greenhouse, Apr				Pepper, Spanish trellising, greenhouse, Aug		
	Divergence	Social prices	Private prices		Divergence	Social prices	Private prices
Revenues	0	54,000	54,000		0	46,800	46,800
Tradable Inputs							
Land prep and machinery	0	2,728	2,728		0	2,613	2,613
Seedlings	0	4,290	4,290		0	4,550	4,550
Fertilizers	0	3,574	3,574		0	4,628	4,628
Pest control	0	1,749	1,749		0	1,417	1,417
Materials in harvest	0	2,400	2,400		0	3,816	3,816
Energy	0	0	0		0	100	100
Overall tradable inputs	0	14,741	14,741		0	17,125	17,125
Domestic Factors							
Irrigation	-2,880	4,500	1,620		-3,600	5,625	2,025
Hired labor	-4,587	28,734	24,147		-2,933	18,372	15,439
Self employment	0	3,915	3,915		0	3,915	3,915
Insurance	-192	550	357		-75	215	140
Financing and other exp	0	1,453	1,453		0	1,626	1,626
	-1,050	5,248	4,199		-1,683	8,416	6,733
Overall domestic factors	-8,709	44,400	35,691		-8,291	38,169	29,878
Overall Expenses	-8,709	59,141	50,432		-8,291	55,293	47,002
Profits	8,709	-5,141	3,568		8,291	-8,493	-202

Sweet Pepper (cond)							***פלפל***
		€€					**₪**
	Pepper, Dutch trellising, greenhouse, warm & cool, July				Pepper, Spanish trellising, greenhouse, Apr		
	Divergence	Social prices	Private prices		Divergence	Social prices	Private prices
Revenues	0	121,000	121,000		0	54,000	54,000
Tradable Inputs							
Land prep and machinery	0	3,003	3,003		0	2,593	2,593
Seedlings	0	4,550	4,550		0	4,550	4,550
Fertilizers	0	6,788	6,788		0	3,574	3,574
Pest control	0	2,337	2,337		0	1,765	1,765
Materials in harvest	0	8,096	8,096		0	2,400	2,400
Energy	0	44,000	44,000		0	0	0
Overall tradable inputs	0	68,774	68,774		0	14,882	14,882
Domestic Factors							
Irrigation	-7,200	11,250	4,050		-2,880	4,500	1,620
Hired labor	-6,829	42,778	35,949		-3,527	22,094	18,567
Self employment	0	3,915	3,915		0	3,915	3,915
Insurance	-138	393	255		-192	550	357
Financing and other exp	0	4,253	4,253		0	1,222	1,222
	-2,931	14,656	11,725		-1,050	5,248	4,199
Overall domestic factors	-23,927	120,023	96,096		-7,649	37,529	29,880
Overall Expenses	-23,927	188,797	164,871		-7,649	52,411	44,762
Profits	23,927	-67,797	-43,871		7,649	1,589	9,238

Medjool			
	Divergence	Social prices	Private prices
Revenues	1,069	10,041	11,110
Tradable Inputs			
Land prep and machinery	-337	1,687	1,349
Seedlings		216	216
Fertilizers		637	637
Pest control		291	291
Materials in harvest			
Overall tradable inputs	-337	2,831	2,493
Domestic Factors			
Irrigation	-2,804	4,382	1,578
Hired labor	-618	3,869	3,251
Self employment		525	525
Insurance	-47	136	88
Financing and other exp		434	434
Overall domestic factors	-3,470	9,345	5,876
Overall Expenses	-3,807	12,176	8,369
Profits	4,876	-2,135	2,741

Table grapes			
Red globe			
	Divergence	Social prices	Private prices
Revenues		10,532	10,532
Tradable Inputs			
Land prep and machinery	-175	877	702
Seedlings		152	152
Fertilizers		536	536
Pest control		460	460
Materials in harvest		963	963
Overall tradable inputs	-175	2,989	2,813
Domestic Factors			
Irrigation	-720	1,125	405
Hired Labor	-887	5,556	4,669
Self employment		371	371
Insurance	-278	793	515
Financing and other exp		468	468
Overall domestic factors	-1,884	8,312	6,428
Overall Expenses	-2,060	11,301	9,241
Profits	2,060	-769	1,291

Table grapes			
Thompson			
	Divergence	Social prices	Private prices
Revenues		13,165	13,165
Tradable Inputs			
Land prep and machinery	-169	846	677
Seedlings		152	152
Fertilizers		536	536
Pest control		460	460
Materials in harvest		843	843
Overall tradable inputs	-169	1,994	1,825
Domestic Factors			
Irrigation	-720	1,125	405
Hired Labor	-1,565	9,802	8,237
Self employment		371	371
Insurance	-278	793	515
Financing and other exp		654	654
Overall domestic factors	-2,562	12,744	10,182
Overall Expenses	-2,731	14,739	12,007
Profits	2,731	-1,574	1,157

Appendix 3

Estimation of Support to Agriculture: Comparison OECD - PAM

In 2010, Israel joined the OECD. Prior to accession, the OECD calculated support for agriculture in Israel based on its standardized methodology. Total support for the agricultural sector is expressed as Producer Support Estimate (PSE), defined as "the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm gate level, arising from policy measures that support agriculture, regardless of their nature, objectives or impacts on farm production or income. It includes market price support, budgetary payments and budget revenue foregone, i.e. gross transfers from consumers and taxpayers to agricultural producers arising from policy measures based on: current output, input use, area planted/animal numbers/receipts/incomes (current, non-current), and non-commodity criteria." (OECD, 2010).

OECD estimates of total support for the agricultural sector in Israel are 4.0 billion NIS in 2006 and 2.9 billion NIS in 2007, accounting for 18 and 12 percent of the value of production. Preliminary data for 2008 indicate an increase in support to 5.4 billion NIS (21% of the value of production). Single Commodity Transfers account for close to 90% of the PSE. Single commodity transfers arise from policies linked to the production of a single commodity such that the producer must produce the designated commodity in order to receive the payment. According to OECD estimates for Israel, the dominant form of support to agriculture is Market Price Support (MPS), arising from policy measures that create a gap between domestic market prices and border prices of a specific agricultural commodity. MPS accounts for close to 80% of the PSE. Most of the support is enjoyed by the livestock sector (poultry, beef, sheep, milk), while support estimated for plant production and specifically fruit and vegetables is relatively minor.

OECD calculations include 9 fruit and vegetables, 4 of them are also included in PAM calculations (tomatoes, pepper, potatoes and grapes). Similar to our estimation of "social prices", the OECD establishes "reference prices" which are compared to prices received by farmers. If producer prices are higher than reference prices (positive Market Price Differential (MPD)) custom duties or other restrictions to imports are effective in protecting the agricultural sector. A negative Market Price Differential may indicate that the agricultural sector is taxed.

Our methodology for establishing reference prices and calculating MPDs is somewhat different to the methodology employed by the OECD. Table 1 summarizes the differences.

Table 1: Methodology for Calculating Market Price Differentials: Comparison OECD - PAM

	OECD	Our calculation
Quality	Homogenous	Exports are of higher quality
Producer price	Average price for all uses	Price domestic market
Reference price	Based on export unit values for products exported by Israel	Based on EU unit values
Tomatoes	Cherry tomatoes are included with regular tomatoes	Separate calculations for regular tomatoes and cherry tomatoes

The main difference of our approach is the assumption that exported fruit and vegetables are characterized by higher quality compared to the average quality marketed on the domestic market. This assumption is supported by the fact that prices for exports are substantially higher than prices for produce marketed domestically for most fruit and vegetables included in our study. Fruit and vegetables from Israel are characterized by relatively high production costs compared to suppliers of similar products like Egypt and Morocco; therefore they compete in export markets based on high quality. In this case, it is not appropriate to use Israeli export unit values as reference prices. In its place, we base reference prices on EU unit values. In addition, we compare reference prices to grower prices for the domestic market only, contrary to the OECD which uses average grower prices for all destinations.

OECD data are available until 2008. Table 2 compares the MPD calculated by the OECD and our calculations (based on CBS prices obtained in the domestic market) for the years 2007 and 2008.

Table 2: Methodology for Calculating Market Price Differentials: Comparison OECD - PAM

	Tomatoes		Pepper		Potatoes		Grapes	
	2007	2008	2007	2008	2007	2008	2007	2008
OECD								
Producer price	3,631	3,562	6,375	4,858	1,684	2,021	6,753	7,320
Reference price	8,190	7,106	6,835	6,054	1,180	1,615	9,436	6,627
Market price differential	**-4,559**	**-3,544**	**-459**	**-1,196**	**504**	**406**	**-2,683**	**693**
Our Calculation for PAM								
Producer price	2,532	2,688	3,587	3,879	2,254	2,520	6,279	7,441
Reference price	3,928	3,566	7,022	6,952	1,495	1,347	5,617	4,879
Market price differential	**-1,397**	**-878**	**-3,435**	**-3,073**	**759**	**1,174**	**662**	**2,562**

Producer and reference prices used by the OECD are higher for tomatoes, pepper and grapes and lower for potatoes. MPD's calculated by the OECD are negative for tomatoes and peppers and positive for potatoes. For grapes, MPD's are negative most of the years but positive in 2008. Despite substantial differences in the numbers, qualitative results for MPD's are similar for OECD and PAM calculations. According to OECD methodology, price gaps were set to zero for eight out of nine fruit and vegetables included in the PSE

calculations (the exception are bananas) because these products are exported by Israel, and no export subsidies or other market price policies either supporting or taxing producers have been identified. As a result, the "Producer Single Commodity Transfer"[5] for these products is zero.

On-farm budgetary support which is not commodity specific (e.g. the support of production factors) enters PSE calculations but is not allocated to specific crops. This support totaled 650 million NIS in 2007 and 619 million NIS in 2008 (mainly water, insurance and investment support). For simplification, we apportion on-farm budgetary support according to the share of crops included in PAM calculations in the total production value of agriculture (about 20%). According to this calculation, total support for PAM crops amounts to 134 million NIS in 2007 and 113 million NIS in 2008 (2.8% and 2.5% respectively of their value of production). This is much lower than support calculated in the framework of the PAM analysis. OECD calculations do not quantify support provided to the agricultural sector through the supply of foreign labor which accounts for a substantial share of the PAM support estimate.

[5] The annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm gate level, arising from policies linked to the production of a single commodity such that the producer must produce the designated commodity in order to receive the payment.

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