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***TABLE RONDE #7 - 30 Mars 2001  
ROUND TABLE #7 - March 30<sup>th</sup> 2001***

***AGRICULTURE EN MÉDITERRANÉE  
MEDITERRANEAN AGRICULTURE***

***THE IMPACT OF EURO-MEDITERRANEAN PARTNERSHIP  
ON JORDAN AND PALESTINE'S  
AGRICULTURAL SECTORS FROM A WATER PERSPECTIVE  
(THE CASE OF HORTICULTURAL EXPORTS TO EU MARKETS)***

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**Forum Euro- Méditerranéen Des Instituts Economiques  
(F.E.M.I.S.E.)**

**The Impact of Euro-Mediterranean Partnership on Jordan and Palestine's  
Agricultural Sectors from a Water Perspective  
(The Case of Horticultural Exports to EU Markets)**

**By**

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## ABSTRACT

Western Europe is the world's largest importing region for fresh fruits and vegetables in the world. The European Union (EU) accounts for about 53 percent of world fruit and vegetable imports. The total European imports of fresh fruits and vegetables have been growing rapidly for the past two decades. This is mainly due to the rising concerns for proper nutrition and in relation to physical fitness and good health. As a result, the European market is the fastest growing of all regional markets in the world.

In addition to the EU countries, there is a huge market for Jordanian and Palestinian horticultural products in Eastern European and former Soviet Union countries. The total population of these countries is estimated around 435 millions.

The main objective of this research is to determine the impact of the Euro-Mediterranean partnership (EU-Med) on farmer's profitability, employment, water situation and national incomes in Jordan and Palestine. This research also aims at determining the main impediments and bottlenecks facing the application of EU-Med Agreement and its implications on the reinforcement of the Euro-Mediterranean interdependence system. The objectives of the research were transferred into the research questions that were answered through the course of this report to achieve the objectives.

The main findings of the analysis are grouped in three categories covering the issues of competitiveness, market windows and water. These findings were used to derive the conclusions and to recommend the needed actions to promote exports and improve the welfare of the people in Jordan and Palestine from one side and the welfare of the EU consumer from the other.

The competitiveness analysis reveals that the selected crops (strawberries, green beans and table grapes) have a positive value added at both private and social prices. The comparative advantage indicator is way below one indicating that the three crops enjoy a great advantage in both Jordan and Palestine. Table grapes are the most efficient in labor allocation followed by green beans and strawberry. However, in terms of water use efficiency, green beans ranks first followed by strawberries and then table grapes.

The market windows analysis indicates that the total profitable demand of table grapes in the UK market is estimated at 19,973 tons if exports are made via sea. However, if exports were shipped by air, the profitable demand would decrease to about 3,379 tons. The analysis also shows that the profitable demand of strawberries exported from Jordan and Palestine is estimated at 18,858 tons by air. Since it is a highly perishable crop, strawberries are always shipped by air. The profitable demand of green beans in the UK market is estimated at 12,700 tons. Green beans are also a highly perishable crop that is usually exported by air.

Water is the hottest issue in the Middle East region in terms of quantity and quality. Maintaining water quality should be a top priority to all parties in the region. Water quality deterioration adversely affects the potential yields of the selected crops especially strawberry and green beans. Two scenarios were simulated in this research to show the magnitude of impact if water quality deteriorates due to increasing in salinity. If water quality shifts from the current high quality (#1) to a lower quality (#2), this will result in a huge losses in total gained profits and in the economic value added to the economy which is estimated at JD 18,003,922. However, losses will be devastating if water quality shifts to lower qualities such as (#3 and #4).

Comparing the above mentioned results regarding profitable demand and the potential export windows with the what is stated in the EU-Med Agreement we, conclude the following: 1) the allowed exports volume of strawberry is way below the potential profitable demand that could be exported from the two countries and 2) the allowed period for table grapes is a bit shorter than it should be. This situation leads to

huge unjustified losses to producers and exporters in the two countries and penalizing the EU consumers in terms of high prices for certain horticultural products.

The researchers conclude that the agreement should allow for larger import quota into the EU for crops that prove a high efficiency in utilizing the scarce resources of water and labor and at the same time do not compete with similar crops produced in the EU countries during the identified export windows. Additional technical assistance in terms of technology transfer and vocational training from the EU side will improve the quality standards of products produced in the region and simultaneously will assure a high quality and safe produce to the EU consumers during off-season period. Since many countries in the region is in the process of joining the World Trade Organization (WTO) and the EU-Med, the researchers believe that additional research is still needed in the area of competitiveness of agricultural products to examine the impact of the agreement at the regional cooperation collectively.

## **The Impact of Euro-Mediterranean Partnership on Jordan and Palestine's Agricultural Sectors from a Water Perspective (The Case of Horticultural Exports to EU Markets)**

### **BACKGROUND**

As in many other developing countries, the major objectives of the Government of Jordan (GoJ) strategy towards developing the agricultural sector are to enhance the efficiency of utilizing the scarce natural resources mainly water, increase farmers profitability, increase income generated by agriculture and maximize exports and value added of Jordan's agribusiness sector.

The Palestinian Authority (PA) has also established similar objectives to those set by the GoJ with regards to the agricultural sector. A recently prepared draft of the agricultural Palestinian strategy stated that agricultural development efforts should be focused on those crop and livestock enterprises that will produce the greatest private and social return per unit of land and water

In this research we will examine how the Euro-Mediterranean Partnership would affect the achievement of the above-mentioned GoJ and the PA objectives. Other objectives include: 1) determining the impact of the partnership on employment in Jordan and Palestine; and 2) to determine the main impediments and bottlenecks of the Agreement and its implications on the reinforcement of the Euro-Mediterranean interdependence system.

### **THEORETICAL FRAMEWORK AND QUESTIONS**

Competitiveness, regional cooperation, efficient allocation of scarce resources and economic growth can be analyzed using different empirical methods. Enabling competitive environment, through improving legislation and developing the infrastructure and communication systems, increases trade and capital flows.

Three significant events took place in the region during the 1990s, which are expected to have serious impacts on the agricultural sectors of Jordan and Palestine. The events are the Peace Treaties signed between Jordan and the PA with Israel; joining the Euro-Mediterranean Partnership and joining the World Trade Organization (WTO).

With all of these changes taking place, Jordan and Palestine are expected to benefit from this promising position if national economic policies are adjusted to provide stability and to identify prosperous opportunities. Within the agricultural sector of Jordan and the Palestinian Authority, horticultural products occupy the top priority as a major generator of hard currencies from exporting to Gulf States and the EU countries. Hence, this research will be focused on analyzing the horticultural sub-sector of Jordan and Palestine in a regional perspective. The objective of this part of the study is to provide the needed analytical approaches to answer the following research questions of this research:

- What are the main horticultural crops that could be produced and exported from Jordan and the Palestinian Authority Territories to the EU countries without competing with EU production seasons?
- Are these crops utilizing efficiently the limited resources of Jordan and Palestine mainly water? In other words, do these crops enjoy a comparative advantage?
- What are the expected volumes of these crops, which can be exported profitably, taking into consideration the recent steps toward market liberalization?
- Specify (quantify) the size (depth) and the duration of the market windows for each selected crop?

- What are the major economic and social implications of exporting the expected volumes of the selected crops in terms of national income, investment, employment and Water?
- What are the implications of the Euro-Med Partnership on the Jordanian and Palestinian horticultural exports to the EU countries in terms of economic and trade policies.

## METHODOLOGICAL APPROACH

Two analytical methods were employed here to answer the research questions:

1. The Policy Analysis Matrix (PAM); and
2. EU Market Analysis based on the Profitable Demand concept.

Person and Monke were the first who developed the **Policy Analysis Matrix (PAM)** in 1987. They described the method in a book, which was published in 1989 (Pearson and Monke, 1989). The PAM approach serves both as a logical framework for thinking about the effects of changes in economic and agricultural policies and as an empirical analytical tool for measuring the policy impacts. Many researchers in the region and abroad used the approach to evaluate the impacts of macroeconomic and agricultural policies (Jabarin and El-Habbab, 1996). The PAM will be used here to answer the research question 1, 2 and 5.

The EU Market Analysis based on the **Profitable Demand** concept will include the analysis of seasonal supply and demand in addition to the analysis of the seasonal market competition. In 1991 the SRD Group used this approach to conduct strategic market intelligence analysis for selected horticultural products in Jordan (AMO, 1990). The approach will be used here to update the analysis, which was done about a decade ago. The research will identify the market windows, the profitable demand levels for Jordan and the Palestinian Authority in addition to the expected private profit, the needed investments, employment, water and marketing facilities for a group of horticultural products.

### The Policy Analysis Matrix (PAM)

The Policy Analysis Matrix (PAM) was used as the analytical tool. Private and social budgets were built for the selected crops in the different agro-climatic regions. Protection and comparative advantage coefficients will be used to provide policy bids and recommendations

Economic profit is the fundamental part of the Policy Analysis Matrix (PAM) analysis. Profit is defined as the difference between the value of outputs (revenues) and the costs of all inputs (costs).

The PAM model is shown in Table 1. Private profits are defined in the first row as  $(D=A-B-C)$ . The letter (A) is used to define the private revenues (the revenues at the prevailing market price). Costs are divided into two components. Costs of tradable inputs (inputs which are traded in the world markets) such as fertilizers, pesticides, and seeds, are included in the second column.

The value of tradable inputs at the prevailing market prices (private prices) are recorded in the first row, second column and denoted by the letter (B). Tradable inputs can be imported from or exported to other countries.

The third column of the matrix includes domestic factors costs of domestic factor in private prices are denoted by the letter (C). Domestic factors include land, water, labor, and capital. Domestic factors are also called non-tradable inputs because there are no international markets for these inputs.

Column four in the matrix is labeled profits. Private profits, denoted as (D) in the matrix, are included in the first row of the fourth column. Values in the fourth column are calculated by subtracting values in column two and three from the revenues in the first column. A positive difference at prevailing market prices, means an excess profit exists which encourages other firms to enter the business.

Positive profits also work as a stimulus for existing firms with positive profits to increase output to earn more profits. When more firms enter the market and existing firms expand, those two actions will induce economic growth. If either taxes or subsidies distort the market prices of inputs or outputs, then private profits could be a misleading indicator.

The second row of the PAM is used to calculate social profits,  $(E-F-G=H)$ . Social profits or ("without policy" profits) are those profits without divergences. In Table 1, the (E) portrays the revenues valued at efficiency prices (social prices) and (F) and (G) indicate the efficiency values of tradable inputs and domestic factors, respectively. Positive social profits (H) provide an incentive for expansion of these activities, and result in apparent economic growth in the national income.

The third row of the matrix shows the divergences or differences between the first row (private valuation) and second row (social valuation). If market failure does not exist in the product market, distorting policies causes all divergences between private and social prices of tradable output and inputs.

Policies, which may cause divergences, include subsidies, taxes and quantitative controls applied to domestic production or trade of the commodity. Price policies may also cause distortions.

In the third row, if the value of (I) is positive then private revenues exceed social revenues. This indicates that the government is subsidizing output prices. That is, the government is purchasing production in prices greater than international market prices. The value of the difference is a transfer from society (taxpayers) to producers of that commodity.

If the value of (I) is negative, the value of the social revenues is greater than the value of private revenues. This means that the government is taxing producers. In other words, the government is purchasing production in prices lower than those prevailing in international markets. The tax in this case is a transfer from producers to society (or to the government).

The letter (J) represents the differences between the private costs and social costs of tradable inputs. If (J) is negative, the private costs of tradable inputs are lower than the social costs. This means that the government is subsidizing one or more inputs such as fertilizer depicting the prices of these inputs lower than those in the international markets.

If (J) is positive, the private cost of inputs is greater than the social costs. This indicates that the government is taxing inputs used by farmers. The net effect is that prices paid by farmers in the region are greater than world market prices.

The letter (K) portrays the divergences in domestic factors. The government can affect the prices of domestic factors such as capital or land. It is not uncommon for governments of developing countries to provide subsidized credit to producers as incentives to use more capital-intensive inputs such as machinery and fertilizer. In which case, the private cost of a domestic factor may be less than the social costs and K will have a negative value. But, if the government taxes domestic factors, which rarely happens in developing countries, the difference will be positive.

The letter (L) denotes the net transfer of all policies affecting the studied commodity system,  $(L=I-J-K)$ . If the overall effect of all policies affecting input and output prices, and the exchange rate, is in favor of the producer (in the short run), (L) will have a positive value. Alternatively, (L) will have a negative value, if the policies work to the detriment of the producer.

**Table 1. The Policy Analysis Matrix**

Items	Costs			Profits
	Revenues	Tradable inputs	Domestic Factors	
Private Prices	A	B	C	D
Social Prices	E	F	G	H
Policy Effects	I	J	K	L

The symbols (capital letters) stand for:

- A Total Revenues in private prices (market prevailing prices-some times is called financial prices).
- B Costs of tradable inputs (such as fertilizers, seeds, plastic mulch, etc.) in private prices.
- C Costs of domestic factors (such as (labor, capital, etc.) in private prices.
- D Private profit.
- E Total Revenues in social prices (prices which are adjusted to government interventions).
- F Costs of tradable inputs (such as fertilizers, seeds, plastic mulch, etc.) in social prices.
- C Costs of domestic factors such as (labor, capital, etc.) in social prices.
- D Social profits.
- H Social Profits
- I Output Transfers
- J Input Transfers
- K Factor Transfers
- N Net Transfers

The results of the PAM approach will help in answering the first question " What are the main horticultural crops that could be produced and exported from Jordan and the Palestinian Authority Territories to the EU countries without competing with EU production seasons? The identified crops are those, which yield high economic profits to growers and exporters. Estimating the economic (social) profit per unit of land (dunum or hectare) in addition to the other technical coefficients such as the amount of required labor, capital, and water for each of the selected crops will help in identifying the expected impact at the national level on GDP, investments, employment and water usage.

### **Measures Of Protection**

Standard measures of the degree of price distortions have been estimated to compare profitability and efficiency of different crops. Ratios are an expedient approach for avoiding the problem of a common numerair for comparisons among activities, particularly when the production process and outputs are dissimilar. Ratios are estimated from values of the PAM. Ratios can be used to rank alternatives according to different policy objectives. The standard measures or ratios have been calculated in the standard PAM, that is, Nominal Protection Coefficients (NPCs) and Effective Protection Coefficients (EPC).

### ***Comparative Advantage Measure***

The Domestic Resource Coefficient (DRC) is used to determine if the production of a specific crop makes efficient use of the domestic resources. The analysis of comparative advantage utilizes the Domestic Resource Cost (DRC) concept. The same set of data used above to estimate the protection coefficients could be utilized also to estimate the comparative advantage of a specific crop in a particular region.

The DRC as a measure of efficiency, or comparative advantage is calculated by dividing the factor costs G in table 1 by the value added in social prices (E-F). A DRC value greater than one indicates that the value of domestic resources used to produce the commodity is greater than the contribution of

its value added at social prices, in other words comparative disadvantage exists. A DRC value less than one indicates that the country has a comparative advantage in producing that commodity.

### ***Potential Unmet Profitable Market Demand***

This method is used to estimate the volume of the unsatisfied demand in each of the destination markets (EU importing countries). Monthly profitable demand is used here as a measure to explore the potentiality of the selected crops for export to the EU market.

Information related to market demands is used to tell the potential Jordanian or Palestinian exporter the quantity that the EU market can absorb each month at or above the prices that will offer him a profit. In addition it shows the exporter how strongly (deep) demand would be during the “marketing window” of that market. The following part summarizes the estimation procedure of the potential unmet profitable demand.

- To estimate the Profitable Demand, the researchers starts with an estimate of the average Jordanian producer/exporter “break-even” price in each export market to be analyzed. The breakeven price is estimated by adding up the farm production costs, packaging costs, transport costs, tariffs, handling and marketing fees for supplying one kilo of fresh produce to the selected European markets. The breakeven price is expected to differ slightly in the various markets because of difference in transportation and handling costs.
- The depth or the size of the market window for Jordanian products in these markets is also estimated using the monthly wholesale price data and the monthly-marketed quantities in each market.

The results of the PAM and market analysis approaches in addition to reviewing the EU trade agreements by both countries were all used to answer the last question" What are the implications of the Euro-Med Partnership on the Jordanian and Palestinian horticultural exports to the EU countries in terms of economic and trade policies".

## **RESULTS OF THE ANALYSIS**

The analysis covered three potential horticultural crops, which are produced in both Jordan and Palestine. The main production region at the Jordanian side is the Eastern part of the Jordan Rift Valley and in Palestine is the Gaza Strip and certain parts of the Western Jordan Rift Valley. The following section contains the results of the analysis reported in the same sequences of the research questions asked. The results are grouped in three sections covering the issues of competitiveness, market windows and water as follows:

### **Competitiveness**

The first question was: What are the main horticultural crops that could be produced and exported from Jordan and the Palestinian Authority Territories to the EU countries without competing with EU production seasons? The answer of the question was obtained through reviewing the most recent work conducted in this area of study in both countries. The most recent report conducted by the UNDP/FAO (1999) revealed that strawberries, green beans, seedless table grapes, cut flowers, cherry tomatoes, cucumbers and green peppers are the main horticultural crops that can be produced and exported in Palestine especially during the winter season when the EU countries are out of production. The same crops are also considered the most potential ones for production in Jordan due to the high similarity in the growing conditions.

The second question was: Are these crops utilizing efficiently the limited resources (mainly water) of Jordan and Palestine? In other words, do these crops enjoy a comparative advantage? The answer is yes. The three selected crops in this study are strawberry, green beans and seedless table grapes. The policy

analysis matrix was used to determine if the two countries enjoy comparative advantage in production and exporting the three crops. The Domestic Resource Cost coefficient (DRC) was calculated for both countries using private and social enterprise budgets. The social prices of output were obtained through calculating the export parity prices starting at FOB prices that were obtained from exporters in the two countries. The same methodology was used to estimate the social prices from imports.

The policy analysis matrixes (PAMs) for the three selected crops in Jordan and Palestine were calculated per one unit of land (dunum=0.1 hectare). A summary of the results is included in tables 2 and 3. It is clear from the tables that both social and private profits are positive for the selected crops in both countries. Strawberry is the leading crop in terms of profits.

Tables 2 and 3 include the indicators related to issues of competitiveness, resource use efficiency, and the public policy impacts on the selected crops in Jordan and Palestine. These indicators were calculated using the crop enterprise budgets and the PAMs. It is clear from the tables that the selected crops have a positive value added at both private and social prices. The comparative advantage indicator is way below one indicating that the three crops enjoy a great advantage in Jordan and Palestine. Table grapes are the most efficient in labor allocation followed by green beans and strawberry. However, in terms of water use efficiency, green beans ranks first followed by strawberries and then table grapes.

**Table 2. Competitiveness, Efficiency and Policy Impact Indicator for the Selected Crops In Jordan.**

ITEMS	Strawberry	Green beans	Table Grapes
PRIVATE PROFIT (JD)	1552.71	69.47	890.39
SOCIAL PROFIT (JD)	1025.60	568.58	2456.32
PVA(A-B) (JD)*	2500.66	239.15	1052.89
SVA(E-F) (JD)**	2138.87	788.26	3019.51
DRC(G/E-F)***	0.52	0.28	0.19
Total Labor Requirements (Person hr/dunum)	710.00	90.00	125.00
Total Amount of Water Required (CM)	600.00	160.00	1260.00
Economic profits to labor (JD/Person hr)	1.44	6.32	19.65
Economic profits to water (JD/CM)	1.71	3.55	1.95

\* PVA = Private Value Added , \*\*SVA = Social Value Added, \*\*\* DRC = Domestic Resource Ratio

**Table 3. Competitiveness, Efficiency and Policy Impact Indicator for the Selected Crops In Palestine**

ITEMS	Strawberry	Green beans	Table Grapes
PRIVATE PROFIT (NIS)	5144.42	1124.46	2558.14
SOCIAL PROFIT (NIS)	5299.02	2232.82	15026.61
PVA(A-B) (NIS)*	12558.10	2341.50	5030.00
SVA(E-F) (NIS)**	12597.38	3418.67	17380.64
DRC(G/E-F)***	0.58	0.35	0.14
Total Labor Requirements (Person hr/dunum)	1012.00	50.00	125.00
Total Amount of Water Required (CM)	1000.00	490.00	1160.00
Economic profits to labor (NIS/Person hr)	5.24	44.66	120.21
Economic profits to water (NIS/CM)	5.30	4.56	12.95

\* PVA = Private Value Added , \*\*SVA = Social Value Added, \*\*\* DRC = Domestic Resource Ratio

### Market Windows

The third and the fourth research question are answered using the concepts of market windows and profitable demand as explained earlier in the research procedures. The concept of export market window opportunity means that the country can deliver the produce cheaper than any other competitors in these

markets. For instance, Australia and the United States produce lots of high quality strawberries, but high production and transport costs make it difficult to compete in the EU market with countries like Israel, Egypt, Palestine, Jordan and Morocco.

The Profitable Demand analysis starts with estimates of the average Jordanian and Palestinian “break-even” price in each export market analyzed. The breakeven CIF prices were estimated for the exported three crops from Jordan and Palestine to the UK market by adding up the farm production costs, packaging costs, cooling and pre-cooling costs, transport costs, and handling and marketing fees for supplying one kilo of fresh produce. Marketing costs were obtained from Jordanian and Palestinian exporters who are specialized in exportation to the EU markets. The breakeven prices of Jordanian green beans and grapes shipped by air to UK were found cheaper than the Palestinian products. This is mainly due to lower labor and water costs in Jordan compared to Palestine.

The breakeven prices for both countries were then used to determine the exporting window and the profitable demand in the UK market. The results of the analysis are portrayed in figures 1 through 3. Figure 1 indicates that the total profitable demand of table grapes in the UK market is estimated at 19,973 tons if exports are made via sea. However, if exports were shipped by air, the profitable demand would decrease to about 3,379 tons. Exports by air have an advantage over those shipped by sea in terms of prices. Shipping by air is much faster and exporters can utilize those high prices at the start of the market window when prices are at its peak.

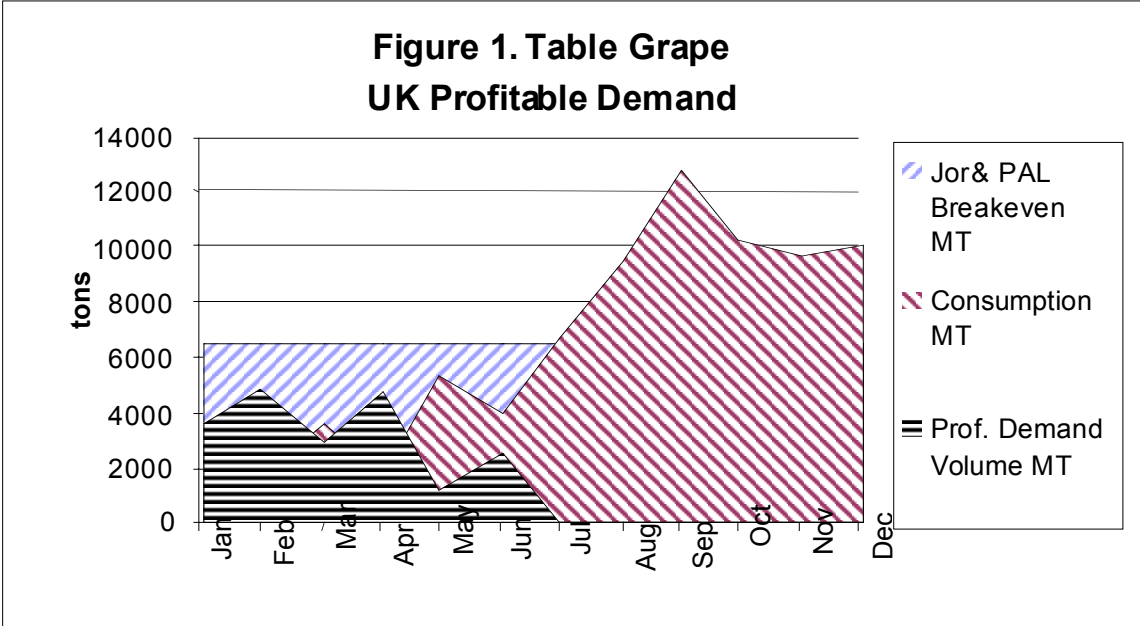


Figure 2 shows that the profitable demand of strawberries exported from Jordan and Palestine is estimated at 18,858 tons by air. Since it is a highly perishable crop, strawberries are always shipped by air.

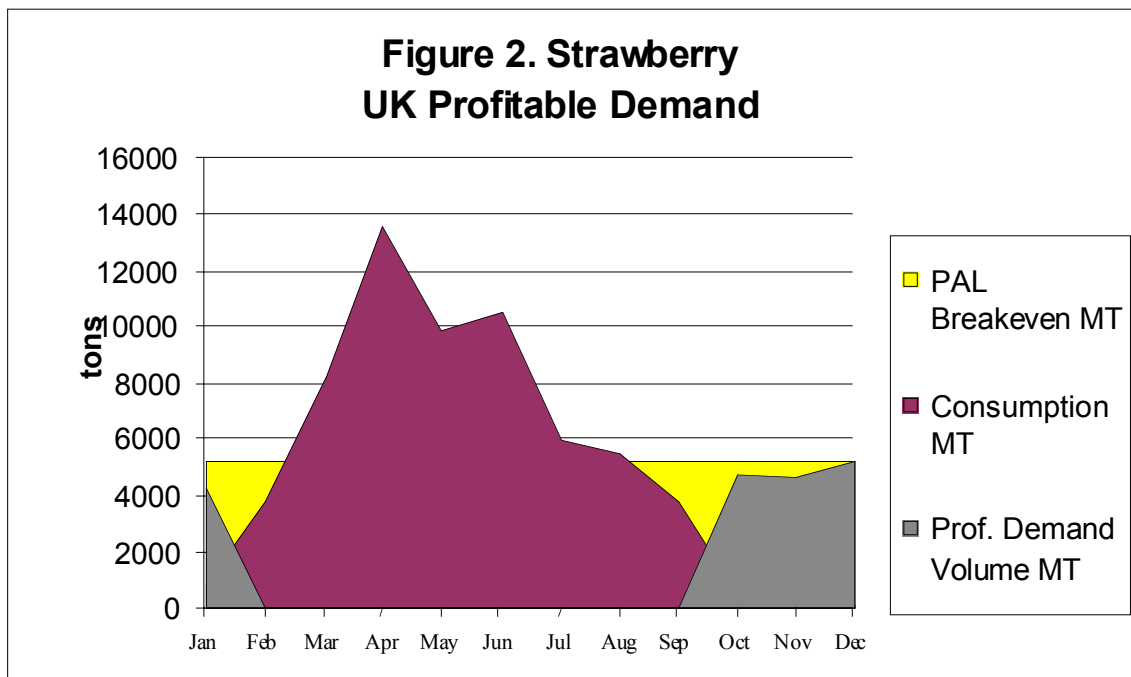
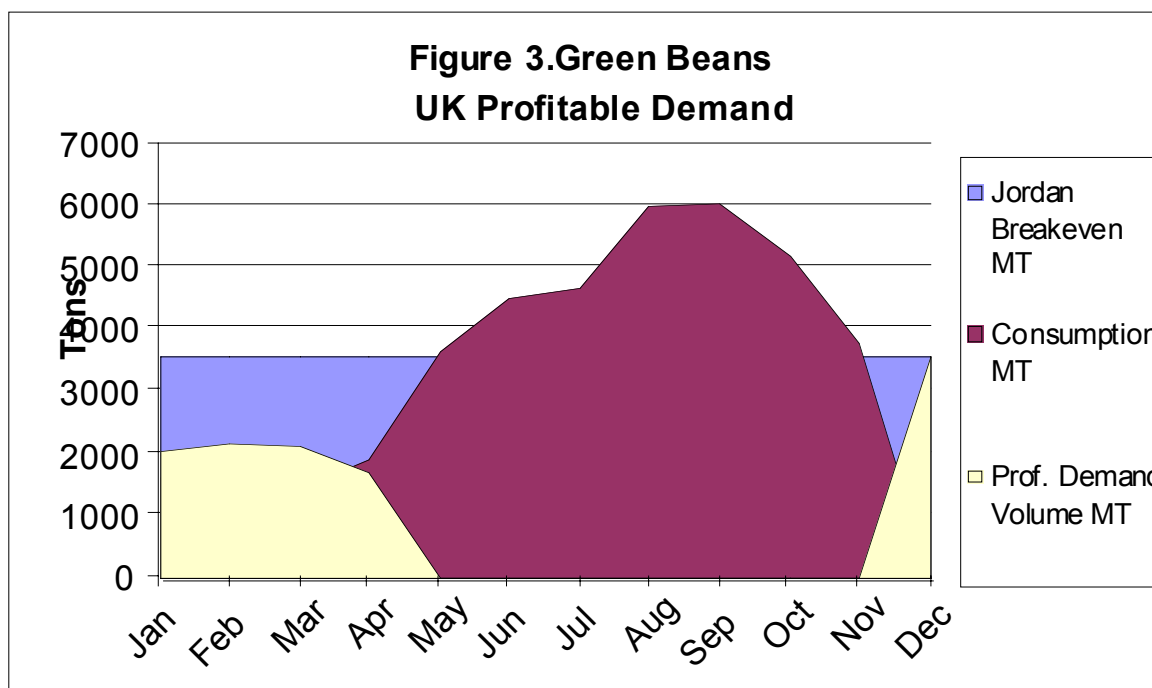


Figure 3 indicates that the profitable demand of green beans in the UK market is estimated at 12,700 tons. Green beans are also a highly perishable crop that is usually exported by air. The market windows and its sizes for each of the three-selected in the UK market are shown in table 4 below.



**Table 4. Market windows and size for each of the selected crops in the UK market**

Crop	Market Window	Prof. Demand (tons)
Green Beans	Dec-May	12,700
Strawberry	Oct-Feb	18,858
Grapes	May-July	3,370

Table 5. Summarizes the duration of exporting periods and the maximum quantity that could be exported to the EU without any taxes, as stated in the annexes of the Euro-Med Partnership agreements with Jordan and Palestine. Comparing the above mentioned results regarding profitable demand and the potential export windows shown in table 4 with the what is stated in the agreement we, conclude the following: 1) the allowed exports volume of strawberry is way below the potential profitable demand that could be exported from the two countries and 2) the allowed period for table grapes is a bit shorter than it should be. This situation leads to huge unjustified losses to producers and exporters in the two countries and penalizing the EU consumers in terms of high prices for certain horticultural products.

**Table 5. Summary Of the Allowed Exporting Period and Volumes of the Selected Crops**

Commodity	Jordan		Palestine	
	Allowed Period	Max. Allowed Qt	Allowed Period	Max. Allowed Qt
Strawberry	1/1-31/3	100	1/11-31/5	1200
Green Beans	1/11-30/5	Unlimited	Unlimited	Unlimited
Table Grapes	1/2-11/7	Unlimited	Unlimited	Unlimited

In attempting to answer the research question: What are the major economic and social implications of exporting the expected volumes of the selected crops in terms of national income (GDP), investment, employment and Water? The results of the analysis indicate that if Jordan and Palestine could meet the profitable demand in the UK market alone, the following could happen: 1) farmers and exporters could gain a sum of US\$ 26.1 million; 2) the total value added to the national economies of the two nations would reach to about US\$ 43.2 million; 3) about 2,777 new jobs will be created and 4) the needed amount of water to irrigate the required acreage would be 8.4 million cubic meters (table 6).

**Table 6. Expected Impact on Jordan and Palestine Economies as a result of Meeting the Profitable Demand at the UK Market**

ITEMS	Strawberry	Green beans	Table Grapes
Economic Profits (Dunum)	1026	569	2456
Economic Value Added (JD/Dunum)	2139	788	3020
Total Labor Requirements (Person hr/dunum)	710	90	125
Total Amount of Water Required (CM)	600	160	1260
Profitable Demand (tons)	18,858	12,700	3,370
Profitable Demand in terms of Acreage (Dunum)	7,543	12,700	1,348
Total Economic Profits	7,736,271	7,220,955	3,311,118
Economic Value Added (JD)	16,133,956	10,010,896	4,070,305
Total Labor Requirements (Person hr)	5,355,672	1,143,000	168,500
Total Amount of Water Required (CM)	4,525,920	2,032,000	1,698,480

### The Water Issue

Due to overexploitation of water resources to bridge the widening gape between water supplies and needs, deterioration has occurred in the water quality used for irrigation. Some of the major producers in the Jordan Valley already started using small units on their farms to improve the quality of water through what is called “reverse osmoses”. This action increases the cost of water used for irrigation. However, the added cost is compensated through getting high quality produce that gets high prices in export markets. Table 7 shows the possible impact of water quality deterioration on the potential exports to the UK market. Water quality deterioration adversely affects the potential yields of the selected crops especially strawberry and green beans. According to the National Center of Agricultural Research and Technology Transfer NCARTT, water quality deterioration through increasing salinity will result in adverse affects on potential yields of sensitive crops. Using the yield reduction factors estimated by NCARTT, two scenarios were simulated. If water quality shifts from the current quality (#1) to quality (#2), this will result in a huge losses in total gained profits and in the economic value added to the economy estimated at JD

18,003,922. However, losses will be devastating if water quality shifts to quality (#3) as shown in the table

**Table 7. Economic Impact of changing water quality on the selected crops**

ITEMS	Strawberry	Green beans	Table Grapes	Total
<b>Using Water Quality # 1</b>				
Total Economic Profits (JD)	7,736,271	7,220,955	3,311,118	<b>18,268,344</b>
Economic Value Added (JD)	16,133,956	10,010,896	4,070,305	<b>30,215,157</b>
<b>Using Water Quality # 2</b>				
Total Economic Profits (JD)	6,271,640-	3,734,084	2,801,978	<b>264,422</b>
Economic Value Added (JD)	2,126,045	6,524,024	3,561,166	<b>12,211,235</b>
<b>Using Water Quality # 3</b>				
Total Economic Profits (JD)	14,106,573-	1,990,648	2,377,695	<b>9,738,230-</b>
Economic Value Added (JD)	5,708,888-	4,780,589	3,136,883	<b>2,208,583</b>

## CONCLUSIONS AND RECOMMENDATIONS

In summary, the following conclusions were derived by the researchers based on the results of above analysis in Jordan and Palestine:

- 1) The agreement will have a positive economic impact on horticultural exports and in turn on employment and national economy of Jordan and Palestine
- 2) Achieving the expected profitable demands requires huge investments in terms of technology transfer and managerial training;
- 3) The improvement in production and handling technology for export purpose will have an indirect benefits in terms of improving the quality of produce sold at domestic markets;
- 4) Production of the newly introduced high value crops for export to the EU markets will force growers to comply with environmental regulations and standards in the EU which in turn will push Jordanian and Palestinian growers to reduce the usage of chemical. This will definitely have a positive impact on the surrounding environment except for the additional amounts of plastic which will be used in expanding the plastic houses needed to fulfill the prospect demands. Many farmers especially in the Jordan Valley region have already started using the Integrated Pest Management (IPM) technique to produce exportable qualities, which implies further reduction in the usage of agricultural chemical.
- 5) Intensive production techniques using plastic houses utilize also the advanced techniques of irrigation. Drip irrigation technique, which is used in plastic houses, is so efficient in terms of volume and distribution of irrigation waters and in turn increased the economic returns per cubic meter of water compared to surface or sprinkler irrigation.
- 6) Small farmers could also benefit from expanding production of these crops. Production of such crops could be achieved through what is called “satellite farming system” which utilize the capabilities of small farms and in turn improve their incomes and reduce poverty level in rural areas; and
- 7) In the long run, the agreement creates good opportunities for regional cooperation in terms of technology transfer and utilizing the supporting systems.

The researchers believe the following recommendations are needed to promote exports and improve the welfare of the people in Jordan and Palestine, were:

- 1) The export-windows and the maximum amount of allowed export quota should be renegotiated. For instant, Jordan is allowed to export only 100 metric tons of strawberry while the profitable demand without competing with any other EU producers is estimated at about 18,858 mt.
- 2) Additional technical assistant is needed in terms of technology transfer and vocational training to comply with the technicalities required by the EU. Such training at both local

and regional level will improve the efficiency of utilizing the scarce resources such as water.

- 3) Additional research is still needed especially at the regional level. Egypt and Syria will join the partnership agreement some day in the future. We believe that it so crucial to examine the impact of the agreement on the regional cooperation collectively.

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