INTERNATIONAL COMPETITIVENESS OF TURKISH AGRICULTURE: A CASE FOR HORTICULTURAL PRODUCTS*

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Paper prepared for presentation at the 98th EAAE Seminar 'Marketing Dynamics within the Global Trading System: New Perspectives', Chania, Crete, Greece as in: 29 June – 2 July, 2006

* This work was supported by the MEDFROL Project funded by the EU 6th FP Contract No:502459

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1.INTRODUCTION

Competitiveness has become key issue in international markets since it can be considered as the major source of export development. A Country that best utilises its given resources within its agricultural sector may enjoy a significant comparative advantage in international agricultural markets. Due to growing World demand for horticultural products it is crucial to be competitive on World market to reap the potential gains of increased demand.

So, the purpose of the paper is to review and evaluate, briefly, the consequences of International trade and competitiveness of Turkish agriculture with special reference to horticultural products. The objectives of this paper are going to be translated into the two questions that are being answered through applying a quantitative methodologies and utilizing secondary data sets. The questions to be answered, are 1) what are the main horticultural crops that could be produced and exported? and 2) are these crops utilizing efficiently the limited resources?. In other words, do these crops enjoy a comparative advantage? The question was tried to answer by calculating the DRC ratios to determine whether selected crops enjoy a comparative advantage.

Turkey is an important actor in the World market for some horticultural products. As expected, fruits and vegetables have significant shares in Turkish total agricultural exports. Indeed, the share of Turkey in World export is about 4% for vegetables, 6% for fruits and 5% for olive oil and The EU accounts for more than half of Turkey's fruits and vegetables exports (Isıklı and Yercan, 2005).

There are two main factors underlying international competitiveness. The ability to compete in international markets depends on price competitiveness or on product quality. In the former case, long run competitive advantage depends on securing a lower comparative cost structure (Gorton and Davidova, 2001, p.187).

Among the measures of international competitiveness, Domestic Resource Cost ratios (DRCs) have been widely used. The DRC compares the social opportunity costs of domestic production to the value added it generates in international prices.

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In Turkey, a new and an important reform program was started to apply in 2000(and implemented during 2001). The date of 2000 is the milestone for Turkish agriculture. The new policy framework that emerged in Turkey after this reform and the ongoing reform of the CAP are encouraging for the future accession negotiations. Producer price subsidies through state procurement are replaced with direct income transfer programme within a limited time frame. The major aims of the reform are to decrease the distortions and financial burden of support. Removal of the input(especially fertiliser and credit) subsidies, decrease the state procurement activities together with the privatisation of the related state economic enterprises and restructuring of the sales cooperatives, summarise the major parts of the programme (Çakmak, 2004).

So, the implementation and the developments of this new reform programme are going to give us the results of the new policies for the international competitiveness in Turkish agriculture.

The structure of the paper is covering, brief overview of international trade of Turkish Agriculture, measuring of international competitiveness, methodology for DRC calculations and DRC values for some horticultural products, then, conclusion.

2. INTERNATIONAL TRADE OF TURKISH AGRICULTURE

Total and agricultural foreign trade situation, structure of exports and imports are summarized in the following tables. The import compensation rate of exports varied between 53.2% and 64.7% from 1996 to 2004. So, Turkey is the country which has generally the trade deficit, but has the reverse features for the agricultural sector.

Tablo 1: Exports of Turkey

Years	**Tot.Exp. ($ mil.)(1)**	**Tot.Imp. ($ mil.)(2)**	**Exp.of Agr. Pro.($ mil.)(3)**	**Imp.of Agr. Pro.($ mil.)(4)**	**1/2*100 (%)**	**3/1*100 (%)**	**4/2*100 (%)**	**3/4*100 (%)**	**Share of fru. &veg. In Agr. Exp.(%)**
1996	23224	43627	4949	4866	53.2	21.3	11.2	101.7	47.1
1997	26261	48559	5470	4926	54.1	20.8	10.1	111.0	47.4
1998	26974	45921	5053	4321	58.7	18.7	9.4	116.9	49.0
1999	26587	40671	4442	3398	65.3	16.7	8.4	130.7	50.7
2000	27775	54503	3855	4156	50.9	13.9	7.6	92.8	50.2
2001	31334	41399	4349	3079	75.6	13.9	7.4	141.2	52.3
2002	36059	51554	4052	3995	69.9	11.2	7.7	101.4	55.5
2003	47253	69340	5257	5265	68.1	11.1	7.6	99.8	52.8
2004	63121	97540	6501	6059	64.7	10.3	6.2	107.3	57.2

Source: www.tarim.gov.tr

Export of agricultural products was bigger than the imported agricultural products. But, the ratio of agricultural export in the total export value was slope down, while total export and export for agricultural products values were increasing to 63121 and 6501 million $ in 2004, respectively. Consequently, agricultural foreign trade has a surplus but its rate in total

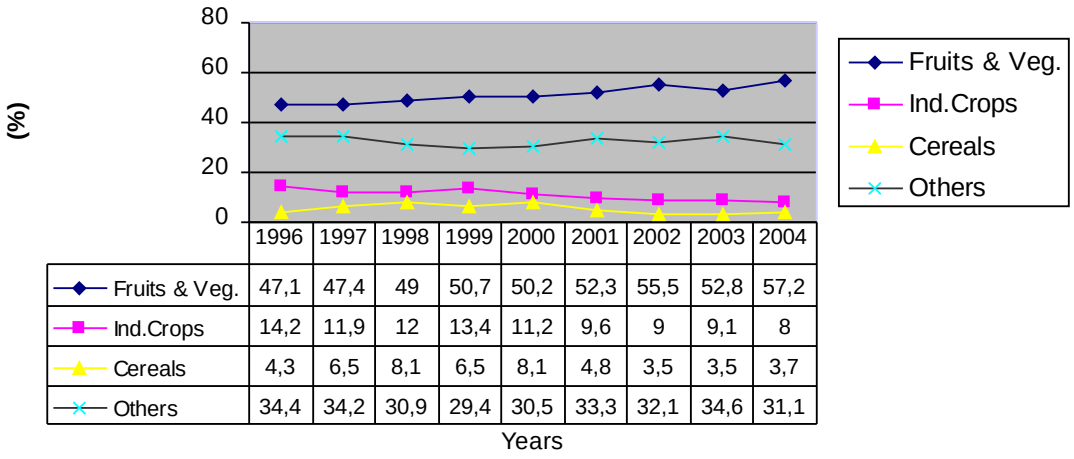
export is falling. Due to implementation of liberalization process since the 1980, foreign trade has grown rapidly and important changes of exports composition have taken places.

Agricultural exports are mainly concentrated on certain products and markets. The share of fruits and vegetables in total agricultural export of the Turkey remained consistently around 55- 60% during the considered period (Figure 1).

Turkey is the top ten exporter country for fruits and vegetables products which has the rate of 4% in the total world export. Turkey is the country which has the highest trade surplus (€ 2.1 billion) in average of 2001 and 2002 with EU (Commission of the EU, 2004).

As for general trade, Turkey's major trade partner of agricultural products is EU15 with 43% of export of which more than 1/3 is exported to Germany. Italy, UK, Netherlands and France are also relevant export destinations (EU. 2003, p.18).

Figure 1:Turkish Agricultural Exports by Sectors



	1996	1997	1998	1999	2000	2001	2002	2003	2004
Fruits & Veg.	47,1	47,4	49	50,7	50,2	52,3	55,5	52,8	57,2
Ind.Crops	14,2	11,9	12	13,4	11,2	9,6	9	9,1	8
Cereals	4,3	6,5	8,1	6,5	8,1	4,8	3,5	3,5	3,7
Others	34,4	34,2	30,9	29,4	30,5	33,3	32,1	34,6	31,1

Years

Source: www.fao.org

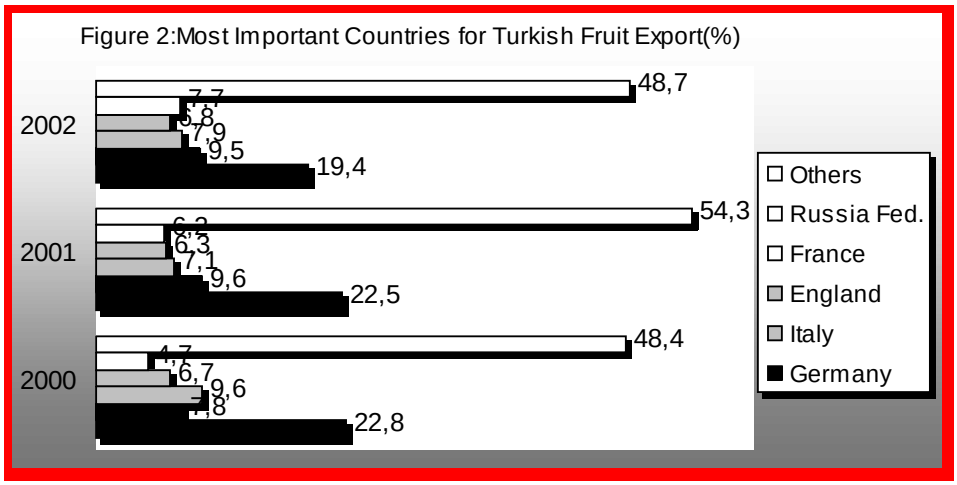
Main fruits and vegetable exports products of Turkey are represented in Table 2. Among the fruits and vegetables; hazelnut and citrus fruits and Tomato, cucumber and carrot, watermelon are the first rank, respectively.

Table 2: Main Fruits and Vegetable Products for Export

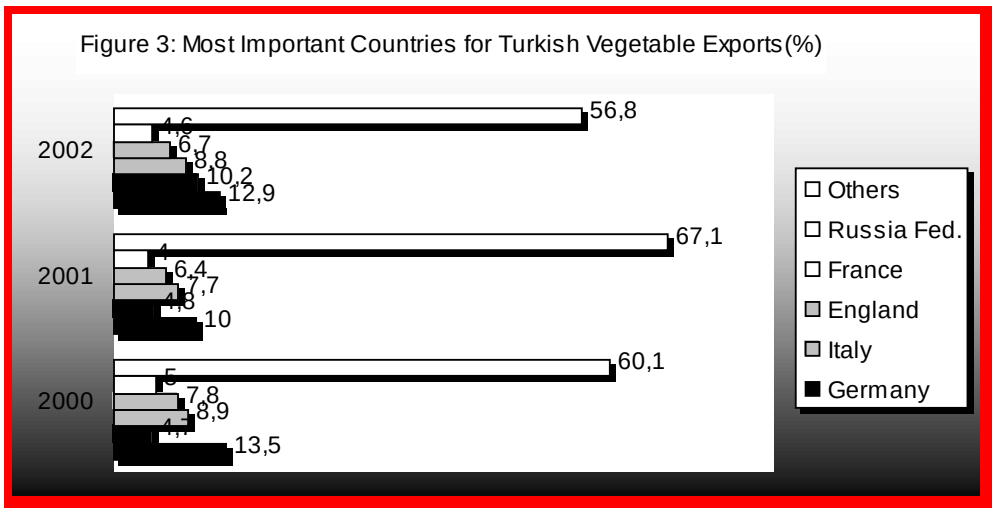
FRUITS					VEGETABLES				
2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Hazelnut	Hazelnut	Hazelnut	Hazelnut	Hazelnut	Tomato	Tomato	Tomato	Tomato	Tomato
Lemon	Lemon	Lemon	Tangerine	Cherry	Cucumber	Cucumber	Cucumber	Cucumber	Cucumber
Tangerine	Tangerine	Tangerine	Cherry	Lemon	Carrot	Carrot	Carrot	Carrot	Carrot
Orange	Cherry	Cherry	Lemon	Tangerine	Eggplant	Eggplant	Eggplant	Watermelon	Watermelon
Grape	Orange	Orange	Orange	Grape	Watermelon	Watermelon	watermelon	Eggplant	Eggplant

Source: www.fao.org

Germany is the biggest importer country for Fruits and vegetables from Turkey. Germany, Italy, England and France accounts for more than 30% and 40% of Turkey's fruit and vegetable export (Figure 2- 3 and Table 3- 4).



Source: SIS, The Report for Foreign Trade Statistics and Indexes, Various Years, Ankara.



Source: :SIS, The Report for Foreign Trade Statistics and Indexes, Various Years, Ankara.

Table 3: Fruit Importer Countries from Turkey

Countries	**($)**					
	2000	**(%)**	**2001**	**(%)**	**2002**	**(%)**
Germany	234313443	22,8	269717593	22,5	231657199	19,4
Italy	80833945	7,8	115015788	9,6	113201429	9,5
England	98425152	9,6	85820506	7,1	94377301	7,9
France	69205680	6,7	75719474	6,3	81175895	6,8
Russian Fed.	48537837	4,7	74609526	6,2	91699311	7,7
Saudi Arabia	33400678	3,2	40611542	3,4	43644883	3,7
USA	40800324	4,0	34571333	2,9	41246559	3,5
Belgium	43322120	4,2	60342908	5,0	40197904	3,4
Ukraine	28398183	2,8	33225654	2,8	34407840	2,9
Sweden	34745995	3,4	39027487	3,2	33262120	2,8
Total	1029915061	100,0	1201056139	100,0	1192851770	100,0

Source: SIS, The Report for Foreign Trade Statistics and Indexes,Various Years,Ankara.

Tablo 4: Vegetable Importer Countries from Turkey

Countries	($)					
	2000	(%)	2001	(%)	2002	(%)
Germany	35619720	13,5	37636671	10,0	41437133	12,9
Italy	12513196	4,7	18140359	4,8	32701714	10,2
England	23385693	8,9	28830941	7,7	28454187	8,8
France	20701642	7,8	23949178	6,4	21534089	6,7
Russian Fed.	13065932	5,0	14835659	4,0	14663672	4,6
Saudi Arabia	7483127	2,8	9218566	2,5	13672196	4,2
USA	9310982	3,5	11644752	3,1	12378310	3,8
Belgium	7055864	2,7	7109314	1,9	10296267	3,2
Ukraine	8168977	3,1	10262518	2,7	10085820	3,1
Sweden	6066684	2,3	12082350	3,2	9627440	3,0
Total	263859557	100,0	375229297	100,0	321776045	100,0

Source: SIS, The Report for Foreign Trade Statistics and Indexes,Various Years,Ankara.

3. MEASURING OF INTERNATIONAL COMPETITIVENESS

Competitiveness is a word which can be relating with the firms, sectors, industries, regions and states. There is no single definition of competitiveness universally accepted. *Murphy* stated that competitiveness focuses on the sustained increase in productivity in the sector as the result of better business strategies and improved micro- economic and macro- economic conditions. Theoretically, Competitiveness usually refers to characteristics that permit a firm to complete effectively with other firms due to nations, instead of firms, the word has a mercantilist connotation (Int.Economics Glossary- www-perdonal.umich.edu/ ~ alandear/glossary/c.html).

Measures of competitiveness include either a technical component (productivity or efficiency) or a relative price component (prices of inputs and outputs or private versus social prices) or both (Zawalinska, 2000).

Vlachos (2001) stated that international competitiveness as the ability of a country to produce goods and services that meet the demand of international markets, and simultaneously maintain and expand the real incomes of its citizens.

Gorton and Davidova (2001) explained the competitiveness by using the European Commissions' definition that competitiveness as the ability of a country to increase its share of domestic and export markets where a country has a comparative advantage in a product when it can produce at a lower opportunity cost than other countries. There are two main factors underlying international competitiveness. The ability to compete in international markets depends on price competitiveness or on product quality.

A country is said to have a comparative advantage in the production of tradable good if that country's production is efficient; if not, then it has a comparative disadvantage. The concept of comparative advantage has two

meaning; efficiency of production is being compared among two or more trading nations, where nations with the lowest opportunity costs are relatively more efficient and have a comparative advantage. The other meaning of comparative advantage is referred to the efficiency of different kinds of production within the domestic economy, which are compared in terms of earnings or savings a unit of foreign exchange.

Generally, two approaches are used to measure comparative advantage. These are; (i) the Ricardian (classical) approach, and (ii) the revealed comparative advantage approach developed by Balassa. The classical approach is based on the concepts of profitability, specialisation, factor endowment and technology. The analysis uses mainly variables such as domestic and foreign prices of output, unit costs of factors of production and indicators of the level of technology employed. Balassa's approach is based on the assumption that the pattern of trade reflects relative costs as well as the differences in non-price factors. This approach is based on trade shares and their change over time (Zawalinska, 2000).

Balassa's method of revealed comparative advantage indicates "ex-post competitiveness", so competitiveness is revealed in the export performance of the country. Therefore, the main policy recommendation from this kind of approach is to develop the country's export potential in goods for which it already has a high export specialisation.

A large set of measures can be given for calculating the revealed comparative advantage. These are; **Revealed Comparative Advantage (RCA) index, Trade Coverage(TC) indicators, Relative Revealed Comparative Export Advantage Index(XRCA), Relative Import Penetration Index(MRCA), Relative Trade Advantage Index(RTA), Revealed Comparative Advantage Export Indicator(XCA), Import Penetration Index(MP) and the Competitive Position Indicator(Ct), The Intra-Industry Trade Index(IIT), The Price Ratio Algorithm** (Zawalinska, 2000), **Lafay's Index(Lf)**(Arcangelis et al, 2001).

Among the Ricardian approach (ex-ante) measures of comparative advantage, **Domestic Resource Cost ratios (DRCs)** have been widely used. For a more detailed discussion about this measure and its sensitivity to assumption made about shadow prices and exchange rates (Zawalinska, 2000).

The **DRC** compares the social opportunity costs of domestic production to the value added it generates in international prices. The numerator includes domestic resources and non-traded inputs valued at opportunity costs or shadow prices, and the denominator includes the net foreign exchange earned or saved by producing the good domestically when output and tradable inputs are valued in economic (border) prices that are adjusted back to the farm level (Zawalinska, 2000).

Other measures of comparative advantage can be used which were derived from the DRCs. They include **Rates of Bilateral Competitiveness (RBC), Net Economic Benefit (NEB), Social Cost Benefit (SCB), Competitiveness Coefficient (CC)** (Zawalinska, 2000).

4. MEDHODOLGY FOR DRC CALCULATION

The Domestic Resource Cost (DRC) approach was developed by Michael Bruno in the 1960s. It compares the domestic social costs of export production to foreign exchange earned. DRC analysis measures the economic resource costs of production based on "social prices", i.e. prices of goods that reflect the true economic value absent of price distortions from taxes, subsidies, price controls, import tariffs, or other government policies (www.cipma.cl/hyperforum/atools.html).

Gorton and Davidova (2001) stated that The DRC compares the opportunity costs of domestic production to the value- added it generates. The numerator is the sum of the costs of using domestic primary resources- land, labour and capital (non- internationally traded inputs) valued in terms of shadow prices. The denominator is the value- added (value of output minus tradable input costs per unit of output) in border prices. The DRC for the production of commodity *i* can, therefore, be defined as;

$$DRC_i = \frac{\sum_{j=k+1}^{n} a_{ij} V_J}{P^{r}_{i} - \sum_{j=1}^{k} a_{ij} P^{r}_{j}}$$

Where a_{ij},j=k+1 to n, are the technical coefficients for domestic resources and non- tradable inputs and Vj are the shadow prices of domestic resources and non- tradable inputs, necessary to estimate the opportunity costs of domestic production. P^{r}_{i} are the border/reference prices of traded output, a_{ij} , j=1 to *k*, are the technical coefficients for traded inputs and P^{r}_{j} are the border/reference prices of traded inputs (Gorton and Davidova, 2001).

When the DRC is smaller than 1, domestic production is efficient and internationally competitive, because the opportunity cost of spent domestic resources is smaller than the net foreign exchange it gains in export or saves by substituting for imports. The opposite is true when the DRC is larger than 1. The balanced case is when DRC equals 1. Then the economy neither gains, nor saves foreign exchange through domestic production. DRCs are widely used in policy analysis and advice. They identify efficient and inefficient production and suggest where policies should be targeted and which areas productivity should be improved (Gorton et al, 2000).

In All these calculation of DRC ratio estimates, social prices and shadow prices are used as it is mentioned above definitions. Social prices are relating with the outputs and tradable inputs as border prices (export/import parity prices) and most adjust these prices to the farm level. For products for which the country in question was a net exporter during the analysed period, an average FOB

export parity price is usually taken the unadjusted reference price. (Gorton and Davidova, 2001).

The social cost of labour should be measured in terms of its opportunity cost. The opportunity cost of labour can be taken the cost of labour in manufacturing industry or construction sector as a proxy for this. The social price of land is typically measured as its rental value in the most profitable alternative use in agriculture (Gorton and Davidova, 2001).

The process for the calculation of DRC ratio is given in following steps;

$$DRC = \frac{V_{NS}}{V_{AS}} = \frac{\text{Social Value of non-tradable inputs (land, labour, capital)}}{\text{Social Value Added of tradable inputs (chemicals, fertilizer, seed, etc)}}$$

$V_{NS;}$ is the social value or shadow prices for each item of non-tradable inputs
$V_{AS;}$ is the social value added of tradable inputs
$V_{As} = Ps - Es$
Ps=Adjusted border price (Export parity price) of output
$E_{S=}$Social Value of tradable inputs
E_S= Private cost of inputs – subsidies

However, DRC methodology to individual countries has a number of requirements. These are;

*Finding of technical coefficients for domestic resources and non-tradable inputs, tradable inputs. The amount of inputs needed in produce for one unit of output differs between different farm sizes and technology applied.
*Calculation of social value of tradable inputs, if there is direct payments or supports for products (non-price assistance).
*Finding the reliable farm gate prices

Therefore, it should be noted that reliable DRC estimation is directly related with the reliability of these requirements and data. Otherwise, the findings would, possibly, be misleading.

5. PREVIOUS STUDIES AND THEIR FINDINGS OF INTERNATIONAL COMPETITIVENESS OF AGRICULTURAL SECTOR

Through different measures, Comparative advantage has been used to assess the competitiveness of agricultural sectors for the different countries and Turkey.

Inocencio and David (1995) were analysed the international competitiveness of Philippine Rice Production in the period from 1966 to 1990. They said that neither the irrigated nor rainfed areas showed any comparative advantage in 1966 as evidenced by their DRCs that are greater than the shadow exchange rate.

Gorton et al (2000) were considered the competitiveness of agricultural production in Bulgaria and Czech Republic compared to international markets and EU by using the revealed comparative advantage (RCA) and domestic resource cost (DRC). They said that DRC estimations indicate that Czech and Bulgaria cereal producers were competitive at world market prices as well as at the EU prices. However, they did not show RCA in trade with EU.

Gorton and Davidova (2001) was examined the competitiveness of Central and East European Countries by using the different sources. They stated from the results of nine studies of agricultural competitiveness in the countries, which have applied the DRC methodology, it appears that, in general, countries's crop production is more internationally competitive than livestock production.

Gorton et al (2001) was analysed the international competitiveness of Polish Agriculture by using the DRC on the base of three farm sizes and eight commodities. They stated that for the period 1996 to 1998 Polish crop production was more internationally competitive than livestock farming. They found the inverse relationship between the DRCs and farm size.

Fertö and Hubbard (2003) were examined the revealed comparative advantage and competitiveness in Hungarian Agri-food sectors. They used the four indices that Hungary has revealed comparative advantages for eleven of 22 aggregated products which are live animals, meat, cereals, vegetables and fruits, sugar, beverages, oilseeds, etc.

Lindberg and Surry (2005) discussed the trade performance of Mediterranean Countries for fruits and vegetables. They used the Revealed Comparative Advantage and Constant Market Share Analysis. It is stated that Morocco, Tunisia, Turkey and Spain have the highest Revealed comparative advantage for fruit. Spain, Turkey and Greece are the countries with the largest export contributions on the world market.

Huang et al were discussed the competitiveness of sweet potato as animal feed in China. Their estimates of effective protection rate suggest that sweet potato would gain more in value-added than maize if all distortion policies were removed. In terms of comparative advantage in crop production, the estimated values of domestic resource cost illustrate that both crops are very similar within the provinces.

Muaz etal (2004) were tested the impact of the Euro-Mediterranean Partnership on the Agricultural Sectors of five south Mediterranean countries: Jordan, Palestine, Syria, Lebanon and Egypt. Two quantitative tools were employed in this research. The Policy Analysis Matrix and Market Analysis. The analysis showed that, for almost all of the selected crops (Green beans, Tomato, Strawberry, sweet melon, Sweet pepper, Thyme, Roses, carnation, Grapes), the five countries enjoy a comparative advantage in production and exporting these crops.

Turkekul and Abay (2000) calculated the Revealed Comparative Advantage for tomato paste industry of Turkey. They were stated that Portugal, Italy and Greece have a more competitive advantage than Turkey in this sector.

Akgüngör etal (2001) evaluated the competitiveness of Turkish Fruit and Vegetable processing sector through the Revealed Comparative Advantage and Comparative Export Performance Indices. It is determined that Grapes and Citrus processing industry was more competitive comparing with the other competitor countries, such as Spain, Greece and Portugal. But, this is not true for the tomato industry.

Cagatay and Guzel (2003) were evaluated Turkish export and import sectors by the Lafay Index. Their findings show that Turkey has a comparative advantage for fruits and vegetables, but doesn't have comparative advantage cereals, beverages and tobacco. So, highlighting de- specialisation and the comparative disadvantage of Turkey in international markets. They used the inter- industry index for Turkey's agro- food trade, too. Findings show that results indicate that agricultural trade between Turkey and EU is characterised by a high and increasing level of product overlay, particularly for those categories of goods subject to processing before they reach the final customer *(in Çakmak, 2004).*

Ferman etal (2004) discussed the sustainable competitive power of Turkey by using the Export Similarity Index. This research revealed that except against Chania and India, Turkey's international competitiveness is limited to resource based and labour intensive products. It is explained that the low value added products and production of the raw materials have high competitive advantage.

Kutlu (2004) researched the Competitiveness Power of Turkey against the European Countries. Export Share index, Revealed Comparative Index and Net Export Index was used. It is stated that Turkey has comparative advantage for the sectors of fruits and vegetables processing industry, Starches products and cereal industry and Confectionery. But, has not got for the sector of live animal and fodder.

6. COMPARATIVE ADVANTAGE ANALYSIS FOR TURKISH HORTICULTURAL PRODUCTS

In assessing the competitiveness of Turkish horticultural products, four main commodities are considered for five years. These products were chosen due to their relative importance among the fruits and vegetables. These products are tomato, melon, watermelon and tangerine which are more different products covered in MEDFROL Project.

For the estimation of DRCs a number of data set, from the various sources; Such as, Regional Directory of Agricultural Ministry, The research Institute of Agricultural Economics, Aegean Exporters' Association, were used.

The social price of the tradable inputs which are fertilizers, chemicals and seeds, were taken in the consideration without subsidy. In the year of 2000,

there was subsidy policy in Turkey for fertilizer, chemicals and seeds. But, after that time, this policy was shifted to no subsidy implementation. So, private cost and social cost of these inputs are the same.

The social price of non-tradable inputs which are cost of labour, land, interest and depreciation for long-term products, were taken as their social price is said to be its value in a realistic alternative use (i.e. the social price of labour in agriculture is taken to be the average wage in manufacturing industry).

For products for which Turkey is a net exporter, an average f.o.b export parity price was taken as the reference price.

Private input prices and quantities together with information on yields were taken from the Ministry of Agriculture and Rural Affairs and some research findings. For the yearly crops; the opportunity cost of capital is based on the average interest rate for lending capital in agriculture. This is taken only for the working (current) capital. The social price of land should be measured as its rental value. Another cost item is the depreciation of the long-term inventory. For the long term plantation; the land value was evaluated by the 5% of the initial value of land.

It is clear from the table 5 that four crops (tomato, melon, watermelon, tangerine) have comparative advantages as concluded from the DRC values. Crops which have a competitive advantage, have a DRC value smaller than 1 which means that these crops allocate scarce domestic resource efficiency.

The process and estimations of DRCs and some other protection coefficient such as Nominal Protection Coefficient (NPC) and Effective Protection Coefficient (EPC) for four crops in Turkey are, also, shown in Table 5, 6 and on the following figures. Overall, crops were competitive at world market prices for the period 2000 to 2004 (DRC<1).

In addition, regarding the products which have covered in the MEDFROL project, Tomato, Orange and olive-oil, the estimated DRC ratios were following;

DRC, Orange= 0.62 (for the year of 2000)
DRC, Olive-oil= 0.57 (for the year of av.2002-2003) (Isıklı and Yercan, 2005).

The results highlight that the most internationally competitive crop of those analysed was tomato for 2004. And, Tangerine was found most profitable crop for both private and social value added. Figures show that tomato and tangerine became more and more competitive during the studied years when compared with the initial year. Melon and Watermelon had saved their competitiveness what they had in the initial year.

The degree of protection was greatest for Tangerine and Tomato. The differences between farmgate prices and border prices were effected decreasing tendency of protection for these crops.

These results were supported by the international trade statistics by products. In the analysed period, the export quantity of the four crops increased continuously. This can be an indicator for the crops which are the internationally competitive.

Table 5: Data for Comparative Advantage of Some Selected Crops

Indicators	TOMATO*					WATER MELON					MELON				
	2000 (1)	2001 (2)	2002 **	2003 (5)	2004 (6)	2000 (1)	2001 (3)	2002 (3)	2003 (3)	2004 (3)	2000 (1)	2001 (3)	2002 (3)	2003 (3)	2004 (3)
1)Yields(kg/ha)	200000	152000		118480	101300	22300	40000	37000	37000	37000	22020	23000	21000	22000	22000
2)Farm gate price($/ton) **(Pf)**	292	300		496	374	72	82	80	100	140	62	142	149	200	225
3)Export parity price ($/ton) (4) **(Ps)**	313	370		590	950	220	150	170	240	190	370	280	290	400	520
4)Private Value of Trad.Inp.($/ton) **(Ef)**	118	114		107	37	8	16	23	27	32	10	26	39	51	54
5)Private Value of Non-Trad. Inp. ($/ton) **(VNf)**	154	78		…	80	24	32	29	40	46	26	40	41	59	50
6)Social Value of Trad.Inp.($/ton) **(Es)**	118	114		107	37	8	16	23	27	32	10	26	39	51	54
7)Social Value of Non-Trad.Inp.($/ton) **(VNs)**	150	121		153	139	49	31	32	42	46	54	51	55	68	75
	TANGERINE														
	2000 (1)	2001 (3)	2002 (3)	2003 (3)	2004 (3)										
1)Yields(kg/ha)	20700	20400	20000	17900	17900										
2)Farm gate price($/ton)(**Pf)**	332	286	332	469	492										
3)Export parity price($/ton) (4) **(Ps)**	380	310	350	530	510										
4)Private Value of Trad.Inp.($/ton) **(Ef)**	26	38	43	56	76										
5)Private Value of Non-Trad. Inp. ($/ton) **(VNf)**	219	183	163	226	262										
6)Social Value of Trad.Inp.($/ton) **(Es)**	26	38	43	56	76										
7)Social Value of Non-Trad.Inp. **(VNs)**	282	201	197	284	330										

*Greenhouse production, ** No reliable data for this year

Sources: (1) Anonymous, 2001, Input Use and Production Cost of Some Important Products in Turkey, Agr.Econ.Res.Inst., Ankara.(In Turkish).

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(4) Aegean Exporters' Association (www.aegeanexportes.org).
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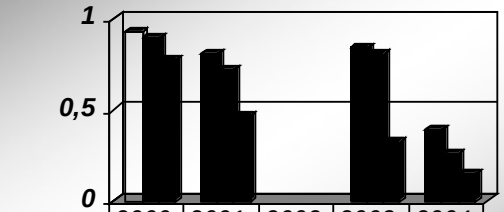
Table 6: Economic and Financial Analysis and Protection Coefficient

	TOMATO					WATERMELON					MELON				
	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
1)Private Value Added($/ton) **(VAf=Pf- Ef)**	174	186		389	389	64	66	57	73	108	52	116	110	149	174
2)Social Value Added($/ton) **(VAs=Ps- Es)**	195	256		483	913	212	134	147	213	158	360	254	251	350	467
3)Nominal Protection Coefficient on Product **(NPC=Pf/Ps)**	0.93	0.81		0.84	0,39	0.32	0.55	0.47	0.42	0.74	0.17	0.51	0.51	0.50	0.43
4)Effective Protection Coefficient **(EPC=VAf/VAs)**	0.89	0.72		0.80	0,26	0.30	0.49	0.39	0.34	0.68	0.14	0.46	0.44	0.43	0.37
6)Domestic Resourse Cost **(DRC=VNs/Vas)**	**0.77**	**0.47**		**0.32**	**0,15**	**0.23**	**0.23**	**0.22**	**0.19**	**0.29**	**0.15**	**0.19**	**0.22**	**0.19**	**0.16**
	TANGERINE														
	2000	2001	2002	2003	2004										
1)Private Value Added($/ton) **(VAf=Pf- Ef)**	354	248	289	413	416										
2)Social Value Added($/ton) **(VAs=Ps- Es)**	354	272	307	474	501										
3)Nominal Protection Coefficient on Product **(NPC=Pf/Ps)**	0.87	0.92	0.95	0.88	0.96										
4)Effective Protection Coefficient **(EPC=VAf/VAs)**	1.00	0.91	0.94	0.87	0.83										
6)Domestic Resource Cost **(DRC=VNs/Vas)**	**0.80**	**0.74**	**0.64**	**0.60**	**0.66**										

Source: Table 5

Figure 4: DRC and Protection Coefficients for Tomato

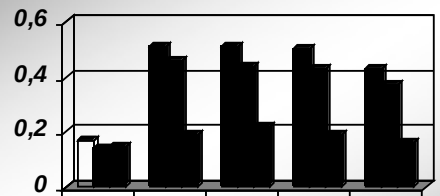


	2000	2001	2002	2003	2004
NPC	0,93	0,81		0,84	0,39
EPC	0,89	0,72		0,8	0,26
DRC	0,77	0,47		0,32	0,15

Figure 5: DRC and Protection Coefficients for Watermelon

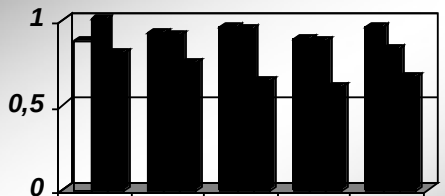
	2000	2001	2002	2003	2004
NPC	0,32	0,55	0,47	0,42	0,74
EPC	0,3	0,49	0,39	0,34	0,68
DRC	0,23	0,23	0,22	0,19	0,29

Figure 6:DRC and Protection Coefficients for Melon



	2000	2001	2002	2003	2004
NPC	0,17	0,51	0,51	0,5	0,43
EPC	0,14	0,46	0,44	0,43	0,37
DRC	0,15	0,19	0,22	0,19	0,16

Figure 7. DRC and Protection Coefficients for Tangerine



	2000	2001	2002	2003	2004
NPC	0,87	0,92	0,95	0,88	0,96
EPC	1	0,91	0,94	0,87	0,83
DRC	0,8	0,74	0,64	0,6	0,66

7. CONCLUSION

International Competition of agricultural products is rather important for Turkish Agriculture. This paper has presented a comparative analysis of competitiveness for some selected horticultural crops of Turkey.

The results highlight that Turkish horticultural sector has international competitive advantage. The most internationally competitive crops were tomato, then melon, watermelon and tangerine comes behind them for the year of 2004. These findings are also supported by the foreign trade statistics on the base of quantity and earnings (See appendix Table 1). This can be interpreted as the comparative advantage which enjoys favourable climatic conditions, competitive cost of production, especially labour and closeness to the EU markets.

Competitive advantage of Turkey for horticultural products can be sustained and enhanced by taking care of the environmental and food safety standards. Through high quality products, eliminating border and non- tariff barriers to trade in horticulture would allow to better exploiting its comparative advantage.

Appendix

Table 1: Export Data for Crops

Crops	2000		2001		2002		2003		2004	
	Q(MT)	V(000 $)	Q(MT)	V(000 $)	Q(MT)	V(000 $)	Q(MT)	V(000 $)	Q(MT)	V(000 $)
Tomato	119899	37502	190768	48914	244038	67836	227400	88110	235364	109563
W.Melon	10904	1351	10859	1614	11350	1821	27902	7000	17378	4239
Melon										
Tangerine	141475	49634	215023	71652	193244	61804	198711	85703	216102	95559

Source:www.fao.org

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