

Market and Trade Policies for Mediterranean Agriculture: The case of fruit/vegetable and olive oil

MEDFROL PROJECT



Agricultural Situation Report – GREECE

Konstantinos Galanopoulos¹, Konstadinos Mattas² and George Baourakis³

¹Democritus University of
Thrace
Department of Agricultural
Development
e-mail:
kgalanop@agro.duth.gr
Tel: +30-25520 411114

²Aristotle University of
Thessaloniki
Department of Agriculture
e-mail: mattas@auth.gr
Tel: +30-2310 998807

³Mediterranean Agronomic
Institute of Chania
Dept. of Business Economics
and Management
e-mail: baouraki@maich.gr
Tel: +30-28210 35020

JUNE 2006

Views expressed in this paper are those of the authors and do not necessarily reflect those of the institutions of affiliation, the MEDFROL project or the EU. Any errors in the present report are the responsibility of the authors.

SIXTH FRAMEWORK PROGRAMME PRIORITY 8.1 Policy-oriented research Integrating and Strengthening the European Research Area Call identifier: FP6-2002-SSP-1. Proposal/Contract no.: 502459

Contents

Contents	i
List of Tables	ii
List of Graphs and Figures	ii
1 - Introduction	1
2 - Natural conditions and land use	3
2.1 - Land resource potential and constraints	3
2.2 – Water resource constraints	4
2.3 – Land and water use	5
3 – Performance of the agricultural sector	6
3.1 - Introduction	6
3.2 - Products	6
3.3 - Intermediate inputs	8
3.4 - Machinery and equipment	9
3.5 - Water use	9
3.6 - Labour force and employment in agriculture	10
3.7 - Price and incomes	11
4 - Upstream and downstream sectors	13
4.1 - Upstream sectors	13
4.2 - Food processing sectors	13
4.2.1 – Fruit and vegetables	14
4.2.2 – Olives and olive oil	17
5 - Food consumption	19
6 – Trade in agri-food products	21
6.1 – Structure of trade in agri-food products	21
6.2 – Trade performance of agri-food products	23
6.3 – Trade performance: Fruits, vegetable and olive oil	24
7 – International Competitiveness of the Mediterranean fruits, vegetables & olive oil sector	26
8 – Medium-term outlook	27
9 – Conclusion	29
References	31
Appendix	32

List of Tables

Table 1 – Gross Value Added of agriculture to the GDP, 1998-2003 (million €)	32
Table 2 – Employment in agriculture and in the other economic sectors ('000)*	32
Table 3 – Total cultivated areas (annual crops and permanent plantations) and total agricultural land, 1999-2002 (1000 ha)	32
Table 4 – Areas & production volumes of major agricultural products	33
Table 5 – Index value of agricultural output (Base 1999-2001)	34
Table 6 - Fertilisers and pesticides consumption	35
Table 7 – Employment (in thousands) in agriculture and in the other economic sectors	35
Table 8 – Breakdown of employment according to occupational status*	35
Table 9 - Average Monthly labour cost by activity sector & sex (€)*	35
Table 10 – Agricultural income (million €) and Annual Working Units	36
Table 11 - Producer price indices in real terms (excluding VAT) (1995=100)	36
Table 11a - Producer prices of selected products (1995 = 100)*	36
Table 12 – Average indices of agricultural input prices, 1996-2001 (1995=100)	37
Table 13 – Average indices of agricultural output prices*, 1996-2001 (1995=100)	37
Table 14 – Food and drinks sector, 2001	37
Table 15 - Final consumption expenditure ¹ by purpose, Greece	38
Table 16 - Monthly average expenditures of food groups	38
Table 17 - Expenditure of households (purchases and benefits in kind), in the whole country on the nine basic groups of goods and services, of certain household categories, as a percentage of overall expenditures, 1999	39
Table 18 - Monthly average purchases and receipts in the kind of households, classified by areas, 1999	40
Table 19 - Monthly average of quantities of certain items consumed by households, classified by areas	41
Table 20 – Self-sufficiency in certain agricultural products (%)	42
Table 21 - External trade of Greece (1000\$)	43
Table 22 - Imports and exports of selected agricultural products (US\$ '000)	44
Table 23 - RCA for Greece	46
Table 24 – Exports of major fruit and vegetables (000\$)	46
Table 25 – Trade Performance Indices for fruit, vegetables and olive oil	47
Table 26 – Summary of DRC ratios for the four commodities	48
Table 27 – DRC calculations for tomatoes	49
Table 28 – DRC calculations for asparagus	50
Table 29 – DRC calculations for oranges	51
Table 30 – DRC calculations for olive oil	52

List of Graphs and Figures

Figure 1 - Gross Added Value of agriculture and other sectors, 1995-2004	1
Figure 2 – National Map of Potential Desertification Risk	3
Figure 3 - Geographical distribution of agricultural land	5
Figure 4 - Number of holdings according to class size (ha) (1999-2001 average)	6
Figure 5 - Value of Agricultural Production, 1993-2001 (million €)	7
Figure 6 - Breakdown of irrigated land according to the method of irrigation	9
Figure 7 - Breakdown of employment in agriculture according to occupational status (2003)	10
Figure 8 - Evolution of input and output price indices in agriculture (1996-2003)	12
Figure 9 - Monthly average expenditures of households, classified by areas	19
Figure 10 - Trade balance of agricultural products, 1980-2003	21

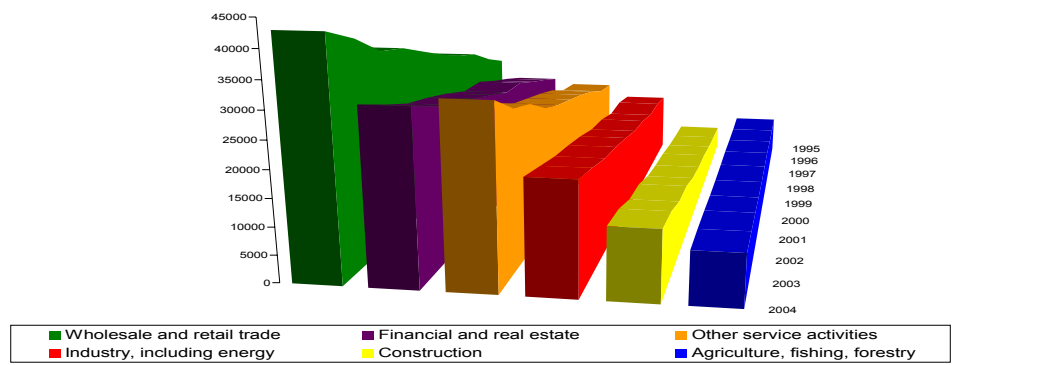
1 - Introduction

The purpose of this chapter is to provide the main agricultural data of Greece and the sector's contribution to the major economic indications, thereby placing Greek agriculture within the broad national macroeconomic context. Greece is a typical Mediterranean country, and as such climatic conditions are generally favourable for agricultural practices, especially plant cultivations. The climate is temperate and mild, with wet winters and hot summers, but on the other hand, the hilly and mountainous terrain, along with the insufficient water resources pose a serious burden for domestic agriculture in terms of production costs and overall efficiency.

The primary sector in Greece is an important industry for the national economy, not only because of its contribution to macroeconomic indices, but also as a key element for the maintenance of social and economic cohesion in rural and remote areas, in which it amounts to as much as 50% of local GDP and employment.

Although the contribution of agriculture to the country's main macroeconomic indicators has been constantly declining during the last decades, it still plays a vital role for the Greek economy, accounting for roughly one fourth of all exports, 16% of the working population and around 6-6.5% of the GDP (Table 1). It is worth noting that, until the 1970s, agriculture was the largest domestic productive sector, but today its contribution to the GDP is the lowest among all major industries, namely wholesale and retail trade (26-28%), financial and real estate activities (20-22%), other service activities (20%), manufacture including energy (13-15%) and construction (8-10%) (Figure 1, National Statistical Service of Greece).

Figure 1 - Gross Added Value of agriculture and other sectors, 1995-2004



In current prices

Source: National Statistical Service of Greece, NSSG

As far as employment is concerned, around 676,000 persons were employed in the aggregate agricultural sector (including agriculture, livestock, forestry and fishery) in 2003, i.e. 16.6% of total employment in Greece (Table 2).

The processing industry of agricultural products (food and drinks) is a vital component of the Greek economy and the largest processing sub-sector, representing around 27% of the national industrial output and the total number of manufactures and more than 20% of industrial employment (Galanopoulos 2003).

Agriculture in Greece is predominantly crop-oriented, as livestock production accounts for less than a third of the total value of agricultural output. Fruit and vegetables and olive oil are among the most important crops of Greek agriculture, along with cotton, wheat and tobacco. The importance of the fruit and vegetables sector for the domestic agricultural economy is demonstrated by the fact that the sector accounts for 20% of the cultivated area and more than a third of the irrigated area in Greece, as well as nearly 7% of total exports and 30% of agricultural exports. On the other hand, around 130 million olive trees constitute 75% of the area given over to regular plantations and 60% of the number of cultivated trees. Olive oil exports represent a little more than 10% of national food exports (NSSG).

2 - Natural conditions and land use

2.1 - Land resource potential and constraints

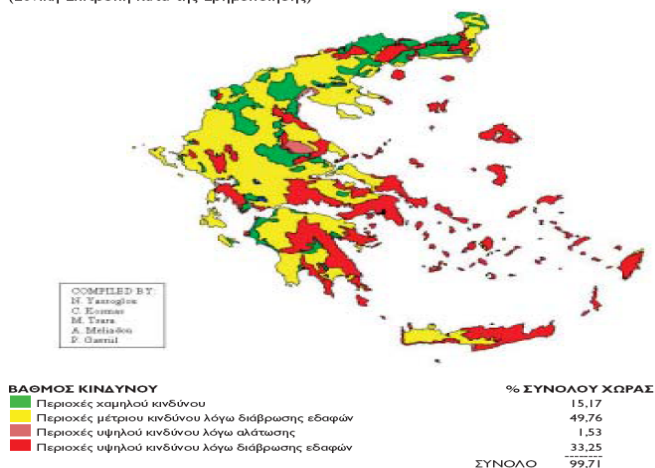
Greece's terrain is in general hilly and mountainous, with flat land generally restricted to many small coastal plains. With the exception of two regions, namely Central Macedonia and Thessaly where there are large plains, the terrain in the remaining regions is to a great extent semi-mountainous and mountainous. In fact, eighty percent of the country (105,000 square km) is steeplands, of which 36% is land with very steep slopes (more than 30%) and 44% land with a slope between 8-30% (FAO).

According to FAO estimates, around 45% of the Greek territory (60,000 square km) are areas with soils without major constraints. This is a percentage considerably higher than the world average and even the European one. However, land erosion hazards are apparent for two thirds of the country (86,000 square km), and shallowness for 27% (36,000 square km). Both are more or less three times large the corresponding European averages. On the other hand, salinity and sodicity are not a major problem in Greece, as they are evident for only 2% and 1% of the land respectively.

Nevertheless, it should be noted that according to a national survey conducted for the 'Counter-desertification National Plan of Action', and based on the National Map of Potential Desertification Risk, only 15.2% of the country is identified as low risk areas, facing no immediate danger of desertification. Nearly 50% is facing small scale problems due to land erosion (medium risk) and may be facing indirect effects, whereas 35% are identified as high risk areas (1.6% due to saltening of freshwaters and 33.3% due to land erosion). The most critical regions are the eastern parts of Peloponnese, Sterea Ellada and Thessaly (in central and south Greece), the central parts and south parts of Macedonia (in northern Greece), areas in Crete and the Aegean islands (Figure 2).

Figure 2 – National Map of Potential Desertification Risk

ΧΑΡΤΗΣ ΔΥΝΗΤΙΚΟΥ ΚΙΝΔΥΝΟΥ ΕΡΗΜΟΠΟΙΗΣΗΣ ΤΗΣ ΕΛΛΑΔΑΣ
(Εθνική Επιτροπή κατά της Ερημοποίησης)



Source: National Counter-Desertification Committee

Green is low risk areas; **Yellow** is medium risk areas due to land erosion; **Purple** is high risk areas due to saltening; **Red** is high risk areas due to land erosion

In Greece there are no deserts, but still drylands are 33,000 square km. On the other hand, the existing 381 wetlands comprise only 2012 square km, out of which 11 (1074 square km) are Ramsar sites. The desertification risk (25%) is similar to the European average (29%), but considerably lower than that of other Mediterranean countries, as well as of the world average (56%).

Land degradation is another serious resource constraint in Greece. It is worth noting that there are no areas free from any degradation problems, not even any with light degradation hazards. Fortunately though, only a fragment of the land (1%) is faced with very severe hazards. However, 52% of the land experiences moderate and the remaining 47% severe degradation hazards. Greece has a very high population density figure in the areas with very severe problems: 79 inhabitants/square km, which is well above the world average. In the moderate-degradation areas density figures are 94 inhabitants/square km and in the severe-degradation areas 45.

The main types of land degradation in Greece are water erosion and chemical deterioration of the soil. Deforestation and agricultural activities are considered the main sources of degradation, with the latter being responsible for severe degradation to around 3,000 square km. No extensive degradation (i.e. very severe) is caused by agriculture, but still, certain problems are emerging at a local level and in particular in the region of Thessaly, in Central Greece; the intensive cultivation of cotton in this regions has led to serious problems regarding soil erosion, degradation and water resources abuse.

Attempting to identify the major constraints regarding land resources in Greece, one should mention low fertility, erosion and early desertification/degradation especially in depopulated, mountainous and remote areas of Greece. Accute problems are caused primarily by fires and by soil erosion. It is estimated that each year around 86 million cubic meters of topsoil are lost which is the equivalent of 3,000 ha of cultivable land. (Ministry of Agriculture).

Finally, apart from the scarcity of useful agricultural land, the situation is worsened by the lack of a national cadastre and a regulatory framework of land use in Greece, which has led to a sharp increase in the value of land – even in contrast to its productive value – ultimately resulting as a counterincentive for farm expansion (Louloudis and Beopoulos 2001).

2.2 – Water resource constraints

The climate in Greece is in general temperate and mild, with wet winters and hot, dry summers. Generally, the climatic conditions are suitable for agriculture and may even favour low-input agricultural practices. Nevertheless, the insufficient water resources, combined with the dry climate pose a serious burden for domestic agriculture. Few rivers exist in Greece (mainly in the northern part) and most of them dry up at summer. The small size and seasonal character of most rivers is the prime reason for the limited use of irrigation (Tsiourtis 2002).

The natural water resources are comprised of internal water resources (resulting from the precipitation) and the external water resources. The former represent approximately 78% of natural resources and the latter 22%. Average precipitation in Greece is at a moderate rate, typical of a Mediterranean country. In the period 1961-1990 it was 652 mm per annum or 86.08 square km per annum, but it should be borne in mind that nearly half is lost to evaporation. It is worth noting also, that in the last fifty years precipitation in certain parts of the country has fallen by as much as 30%.

Total renewable resources is a major problem, as only 74.25 square km per annum are being produced, the vast majority of which being surface water (55.5 square km per annum), since groundwater is a lot fewer (10.3 square km per annum). The total renewable water produced annually results to 6998 cubic metres/capita/year. Hence, the dependency ratio is low (22%), as the annual exploitable water resources are 29 cubic metres. Similar to the rest of Europe, faced with no immediate water constraints, Greece does not apply desalination or reusing of treated wastewater (FAO Aquastat). The most important (though not severe) water quality problems include

eutrophication of lakes, high nutrient concentrations in water bodies and saltwater intrusion in groundwater (WWF 2003)

2.3 – Land and water use

Out of the total area of Greece that is 13.2 million hectares, agricultural area is around 3.9 million ha (Table 3). Another 5.2 million ha is pastureland, while 0.5 million ha are left fallow each year. 56% of the cultivable land is located in areas of plain, while the remainder is in mountainous or semi-mountainous districts. According to FAO, the potential arable land in Greece is 6.5 million ha, which implies that only 56% of the land resources are utilised.

Figure 3 - Geographical distribution of agricultural land



Source: NSSG

The geographical distribution of agricultural land across Greece in 2002, shows that Macedonia accounts for around 30% of the cultivated land, followed by Peloponissos (16%), Rest of Central Greece and Evia (15%) and Thessaly (14%) (Figure 3). More analytically, 40% of the total arable land is in Macedonia and another 18% in Thessaly, while 24% of vegetables land is in Macedonia and 23% in Rest of Central Greece and Evia. Regarding orchards and other tree plantations, Peloponissos accounts for 29% of total area, followed by Crete (19%). Finally, vineyards, grapes and raisins are also mainly grown in Peloponissos (37%) and Crete (21%).

Agriculture absorbs the vast majority of water usage in Greece. Each year around 7.76 cubic km of water is used, 81% of which is absorbed by agriculture (6.25 cubic km/year). In contrast, domestic water use accounts for 16% and industrial water use for a mere 3% (FAO Aquastat data).

In the last two decades there has been a sharp increase in irrigated lands. It is indicative that in 1961 irrigation represented 13% of the utilised agricultural area, whereas today it exceeds 40% (as illustrated in Table 3). This increase was due to the introduction of irrigation even to extensive arable cultivations, mainly cotton and maize (Pezaros 2004). Today, practically all vegetable land is irrigated (more than 95%), whereas fruit-bearing trees (including fruits, vegetables etc) are irrigated at a 35% and arable crops at more than 40%.

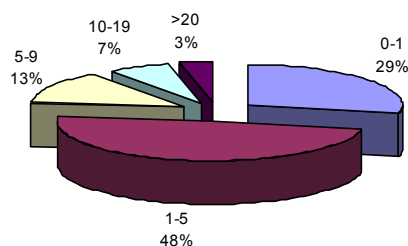
3 – Performance of the agricultural sector

3.1 - Introduction

The number of agricultural holdings in Greece is around 820.000, while the average size is quite small, about four times less than the EU-15 average. More than 25% of the farms have an average size of less than 0,9 ha accounting for less than 3% of total agricultural land. A further 33.5% of the farms have a size between 1-2.9 ha representing 14% of the land. Hence, only the remaining 340,000 farms (41.5%, covering 83% of the land) are considered economically efficient (Maravegias *et al* 2003).

Figure 4 shows that 77% of the agricultural holdings have a size of less than 5 ha, whereas no more than 3% (around 28,000) have a size of more than 20 ha. Nevertheless, it should be stressed that in the recent decades the number of large farms has been increasing at the expense of smaller ones. It is indicative, that compared to 1981, the 2001 data show an overall 23.6% reduction in the total number of agricultural holdings. Farms with a size of less than 1 ha are down by 7%, those with a size of 1-5 ha are down by 40%, and those with a size of 5-9 ha are down by 38%. On the other hand, the number of larger farms has increased impressively, ie. farms with a size of 10-19 ha by 11% and those with a size of more than 20 ha by 51% (NSSG).

Figure 4 - Number of holdings according to class size (ha) (1999-2001 average)



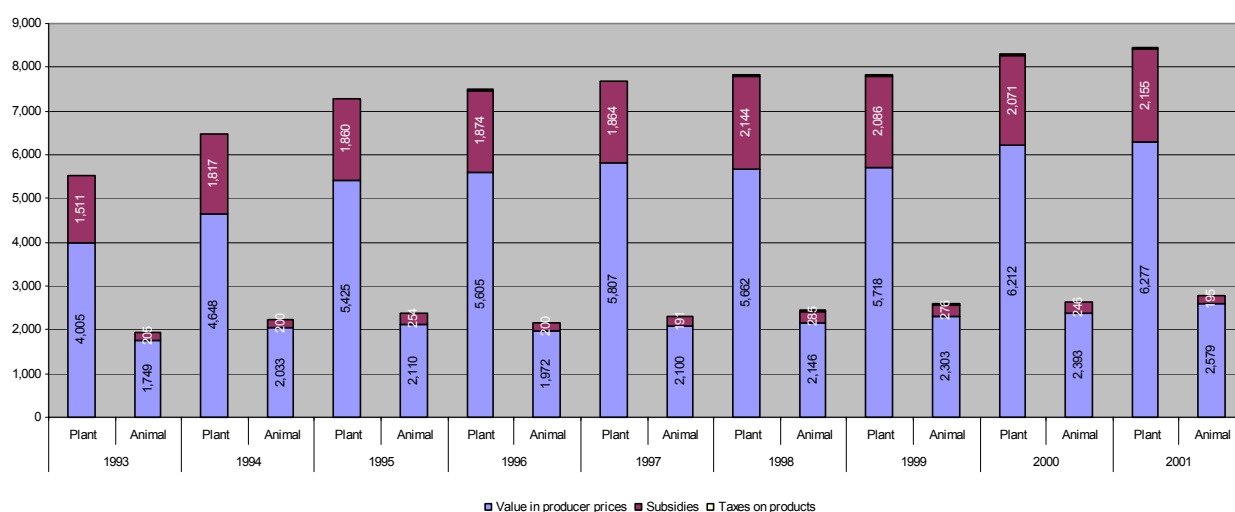
Source: NSSG

Regarding the farmers' cooperative movement, it should be noted that there are around 7,200 cooperatives functioning in Greece, with 114 Unions and 19 Central Unions of Cooperatives. The syndicalism movement comprises 6,500 agricultural associations, 80 leagues and 2 confederations (Ministry of Agriculture). Generally speaking, the cooperative movement in Greece, although large, has not been very successful: Hindered by poor management, financial scandals and large debts, most cooperatives are facing severe financial problems and consequently their share in the marketing of agricultural produce has dropped dramatically.

3.2 - Products

Agriculture in Greece is predominantly crop production, as livestock production accounts for less than a fourth of the total value of agricultural output (Figure 5). In fact, the percentage of livestock production has been declining over the last decade, from 24.8% in 1990 to 20.4% in 2003. The value of agricultural output in 2002 was 5,255 million international dollars and that of livestock production 1,364 million (FAO database).

Figure 5 - Value of Agricultural Production, 1993-2001 (million €)



Source: NSSG

The most important agricultural products in terms of cultivated area are wheat, olives, cotton and tobacco. Durum wheat accounts for roughly 17% of the cultivated area and all cereals for 32%, cotton for around 11%, fruits for 9%, and vegetables for 3.5%. In terms of output, the prevailing crops are wheat, sugar beets, olives, cotton and fruit and vegetables (Table 4).

Grains (mainly wheat and maize) account for 9.8% of the value of agricultural production. Vegetables represent 10% of the value of agricultural output, with the most important crops being tomatoes, potatoes and asparagus. Olives represent 18.4% and fruits a little over 20%, with the most important crops being grapes, peaches and nectarines, oranges, apples and watermelons. Finally, cotton accounts for 8% and tobacco 3.5%.

The value of agricultural output in the period 2001-2003 exhibits a steady downward trend when compared to the three year average 1999-2001, as depicted in Table 5. This is mainly due to a sharp decline in the value of crop production, as livestock production has remained more stable over the same period. Nevertheless, it is important to stress that livestock production has declined considerably when compared to the early 90s, whereas crop production has increased.

Vegetable output has dropped significantly in the last two years under study (2002 and 2003) amounting to around 90% of the base period. The main reason for this should be the adverse weather conditions that prevailed in these two years, while the largest drop is noticed in tomatoes production which in 2002 accounted only 79% of the value of the base period. Fruit production on the other hand has remained more stable, with the exemption of 2001. The value of olive cultivation has increased at an average rate of around 10% in the last two years compared to the base period and at a much higher rate compared to the early 90s.

Table 4 shows that in the last four years (2000-2003), cultivated area for fruits (excluding citrus) has increased slightly, but production declined by 1.8% and yield by 2%. Citrus fruits on the other hand, show a sharp increase of both production volumes and yield by more than 10%. For vegetables, a sharp decline in all relevant figures is evident: Areas dropped by more than 5%, output by 9% and yields by 4%. Oilcrops show a sharp decline in cultivated areas by almost 6%, but production increased sharply by 4.3% and consequently, yields by more than 10%.

Vegetables production is primarily located in plain areas: 76% of total output is produced in plain areas, 18% in semi-mountainous and 6% in mountainous areas. The same principle applies also for

citrus fruits, as the corresponding figures are 78%, 17% and 5% respectively. Stone fruits (i.e. apples, pears, peaches, apricots, cherries) on the other hand, are more extensively cultivated in mountainous areas, given that 21% is produced in mountainous areas and 17% in semi-mountainous areas, while the remainder 62% is in plains.

The most important vegetable producing regions are Macedonia (23.5% of total area), Sterea Ellada (23.2%), Peloponnese (21.3%) and Crete (7.4%). The latter, despite its relative small size, also accounts for 44% of total vegetable greenhouses areas. Macedonia (36.1%), Peloponnese (25.9%) and Thessaly (11.5%) are the major fruit producing areas.

Olive is a traditional cultivation in Greece that goes back aeons. Use is made of the less fertile, stony ground, even in places where no other crop could thrive. The demands for the olive tree for water are modest and it constitutes the only source of income in many communities in less favoured areas (Ministry of Agriculture). Unlike fruit and vegetables production that is mainly located in plain areas, the dispersion of olive cultivation is more balanced between plain and semi- or mountainous areas: Regarding table olives, 47% of the production is produced in plain areas, 41% in semi-mountainous areas and 12% in mountainous areas. The latter, account for an even larger share (26%) when it comes to olive oil, while the rest is produced in semi-mountainous (30%) and plain areas (44%). Olives are cultivated primarily in southern Greece, mainly in two regions, Peloponnese (30% of total areas) and Crete (22%). Today, there are 23 olive oil areas that have received EU protection, namely 13 a Protected Designation of Origin (PDO) and 10 a Protected Geographical Indication (PGI) (Ministry of Agriculture).

3.3 - Intermediate inputs

The agricultural model applied in Greece differs significantly from the European one, in the sense that it is less intensive in intermediate inputs usage. The value of intermediate inputs in agriculture accounts for roughly one fourth of the sector's Gross Value Added (GVA), compared to more than 40% of the EU-15 average. Animal feedingstuffs constitute around 40% of all inputs used, followed by energy consumption (20%). This figure is around three times larger than the EU average indicating an increased production cost.

Fertilisers consumption represent another 8% of the intermediate inputs. It should be mentioned though, that during the last decade there is an apparent trend of reducing fertilisers compared to the previous decades. The use of fertilisers is excessive in plain areas with intensive cultivation and perhaps less than adequate in semi- and mountainous areas. A number of studies in Greece (e.g. Papanagiotou 1998) have found that agricultural activity (especially excessive nitrogen fertiliser applied to crops) is responsible for about 45% of the nitrate eutrophism and the increased levels of nitrate in underground water recorded in various regions of the country.

Seed and plants constitute 8% of intermediate input consumption and agricultural medicines and plant protection inputs represent another 6-7% (with an average use of around 2.5 kg per hectare of UAA). Agricultural tools and supplies represent 4% of total consumption, maintenance and repairs 3%, veterinary inputs 2-3% and other inputs 4-5% (Pezaros 2004).

On a national level, in 2002 around 400,000 MT of fertilisers were used (i.e. more than 11 t/ha), depicting a steady drop of fertilisers use since 1998 by around 70,000 t, or more than 16,000 annually (Table 6). Fungicides and bactericides consumption is around 4800 MT in total (or 140 kg/ha) and herbicides consumption is 2650 MT (76.5 kg/ha), similar to that of insecticides (76.2 kg/ha).

3.4 - Machinery and equipment

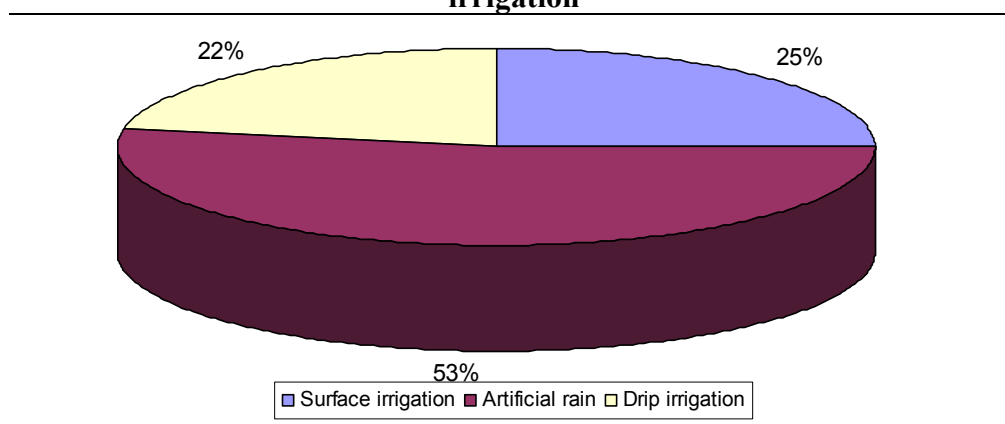
It was mentioned in the previous section that energy consumption is an important element of the agricultural cost of production. This is due to the sharp increase in the number of agricultural machineries in the last 20 years and in particularly of tractors. Their number has increased by 25% and account today for a little less than one tractor per ten hectares of UAA. There are around 250,000 tractors in use (or 0.7 per ha), 5500 harvesters-thresholders (or 0.01 per ha) and 13,900 milking machines (0.04 per ha), 10,000 simple hay rakes (0.03 per ha), 3200 cotton harvesters (0.03 per ha) - doubled since 1985 - 110,000 petroleum pumps (0.30 per ha), 67,000 gasoline pumps (0.19 per ha), 145,000 electric pumps (0.40 per ha) - which have increased at the expense of gasoline pumps - 181,000 sprinklers (0.51 per ha), 63,000 seeders (0.18 per ha) and 120,000 installations for rain drop irrigation (0.32 per ha) - as opposed to merely 20,000 in 1985 and 50,000 in 1990 (Pezaros 2004).

Regarding investment on agriculture, it should be noted that the agricultural sector in Greece is characterised by extensive disinvestment since 1980. Especially regarding *private* investment, their long-run trend is declining with an annual rate of 2.5-3%. As far as *public* investment is concerned, the bulk of allocated funds - especially in the decade 1980-90 - was directed towards irrigation constructions, in order to overcome one of the major structural problems of the sector, namely the low ratio of irrigated to total cultivated land (Kaldis & Galanopoulos 2002). In the last years however, under the 3rd Community Support Framework (CSF), several farmers, cooperatives, producer organisation and industries have launched business plans to renew their equipment and machinery.

3.5 - Water use

As mentioned earlier, irrigated lands have increased considerably over the last twenty years. This however, did not come at any cost. In an attempt to increase agricultural productivity, water shortage problems during the irrigation season were alleviated by attempting to increase water availability through large scale exploitation of groundwater and building of storage and river diversion infrastructures. Only recently it was realised that this approach has high environmental costs and is not delivering sustainable solutions (WWF 2003).

Figure 6 - Breakdown of irrigated land according to the method of irrigation



Source: NSSG

Acknowledging that water resources management is a high priority for the country (given that water demands cannot often be covered by local water resources) the Greek authorities are today attempting to improve the management of water resources, in accordance with EU regulations (i.e.

EU Water Framework Directive). Action programmes have been implemented in order to monitor the quality of inland waters through the development of a national network for surface, underground and coastal waters. In addition, the Ministry of Agriculture is attempting to ensure the reasonable management and the sustainability of natural resources in agriculture. The Joint Ministerial Decision ‘Terms and measures for the protection of waters from nitrogen pollution caused by agriculture’ attempts to reduce the intensive use of fertilisers and pesticides that resulted in the deterioration of water resources in certain areas of the country (mainly Thessaly).

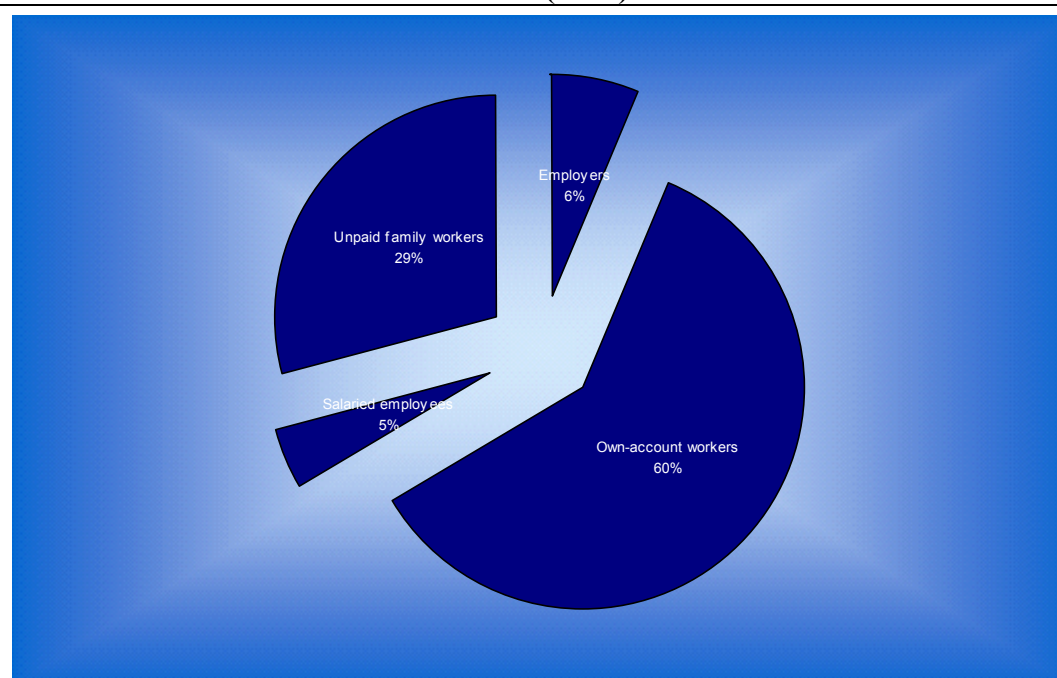
Within this context, drip irrigation is gradually being adopted in Greek agriculture. Today in certain regions such as Thessaly, it accounts for approximately 50% of the cotton cultivated areas. Nevertheless, because of the high installation costs and its relatively short life-span, it is currently being introduced primarily in areas that combine intense water shortage problems and lack of irrigation networks with high crop yielding capacity. Altogether, the most commonly used method of irrigation is artificial rain, as more than 50% of irrigated land is applying this method, followed by surface irrigation and drip irrigation (Figure 6).

3.6 - Labour force and employment in agriculture

Agricultural employment in Greece has been reduced dramatically during the previous decades (almost half since the early 80s) but is still almost four times higher than the EU-15 average. Around 676,000 persons were employed in the aggregate agricultural sector (including agriculture, livestock, forestry and fishery) in 2003, i.e. 16.6% of total employment in Greece (Table 7).

Employment in agriculture has an exceptional pattern, not directly comparable with the other economic activity sectors: The highest percentage (60%) are actually farm owners who manage the farm by themselves (own-account workers) and another 30% are unpaid family members, whereas only 4.6% are salaried employees. By contrast, in the aggregate economy, salaried employees represent around 60% of total employment and own-account workers stand for less than 25% (Table 8).

Figure 7 - Breakdown of employment in agriculture according to occupational status (2003)



Source: NSSG

Another feature that differentiates agricultural employment from the other sectors is the level of salaries. The monthly labour cost in agriculture is 1019 €, which represents only 75% of the national average (1361 €). Female labour is paid less than male labour, and this variation is larger than the average in all sectors: in agriculture, female wages represent 79.3% of male wages, whereas they account for 84.5% in all economic sectors (Table 9).

People employed in the agricultural sector are old, considerably above the EU average: 6.9% is less than 25 years old, 31% is between 25-44, 52.6% is between 45-64 and 9.4% is over 65 (Kaldis & Galanopoulos 2002).

3.7 - Price and incomes

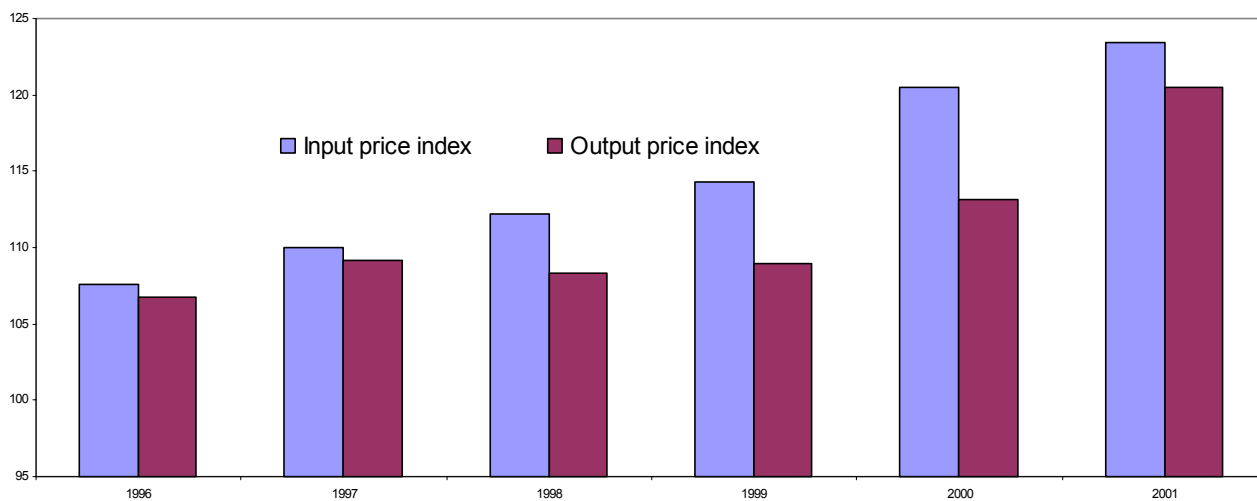
Greek agriculture relies heavily on EU subsidies (around 40% of agricultural income is comprised of direct or indirect payments), hence their reduction in the previous decade had a significant impact on Greek farmers' incomes. In the period 1998-2003, agricultural income (calculated as GVA minus depreciations and taxes, plus subsidies) in current prices has increased at an annual rate of nearly 2% (i.e. below inflation rate), but at the same time the annual working units fell by 2.2% per annum. Consequently, the agricultural income in Greece per AWU has increased by 4.7% and is approximately 74-77% of the EU-15 average (Table 10).

FADN data may provide an indicative illustration of agricultural incomes in Greece according to particular farming types: Specialised olive groves earn an income of 5,075 € per family worker, whereas the average for all types of farming is 5,699. The average income for fruits and other perennial crops is 5,596 €, while for horticultural farms it exceeds the agricultural average, reaching 7,558 €. It is indicative that no other plant products exceeds this figure, although livestock farms have on average a greater income (e.g. pigs and poultry 9,036 €, cow's milk 6,920 and mixed farming and animal husbandry 6,489 €) (EU-DGA 2003).

Producer prices (in real terms) have dropped considerably during the last decade. In 2001, crop as well as livestock prices were down approximately 10% compared to 1995, but in 2002, unlike livestock production prices that continued to decline, crop prices increased by almost 5%. In general, during the period 1999-2002, crop production prices increased by 6.5%, whereas livestock prices were relatively stable (-0.1%). At the same period, the overall index increased by 5% but was still nearly 6% down compared to 1995 (Table 11). Regarding olive oil producer prices, it should be mentioned that they fell from 2,414 €/t in the beginning of the 90s to 1,905 €/t towards the end, i.e. by 21%, a percentage similar to the overall trend in EU-producer countries (Spain -26%, Italy -15%). These prices refer to extra virgin olive oil prices, while producer prices for lampante olive oil are around 30% less (EU-DGA 2003).

A crude indication of the profitability and the attractiveness of the agricultural sector can be drawn by comparing the evolution of input and output prices: On one hand, input prices have grown significantly, resulting to an increased cost of production for the Greek farmer. During the period 1996-2001 there is a 2% annual increase of the input price index (around 15% in total), as all sub-indices (consumables, fixed assets) exhibit an increasing trend. Still, interest payments for agricultural loans have dropped dramatically at almost half compared to 1995, due to the declining rate of inflation and the consequent cut-back of interest rates (Table 12).

Figure 8 - Evolution of input and output price indices in agriculture (1996-2003)



1995=100

Source: NSSG

On the other hand, output prices do not exhibit such a steady upward trend and the overall increase in the period 1996-2001 is considerably lower (6.5%). Crop output prices exhibit on average a small increase, as there are even products with a negative trend (i.e. olive oil and olives, industrial plants) whereas livestock output prices have increased more uniformly (Table 13). The overall output price index is each year below the input price index (i.e. 120.5 and 123.4 in 2001). Only vegetables, fruits and citrus regarding crop production and milk, eggs and other products regarding livestock production exhibit a higher output price index.

4 - Upstream and downstream sectors

4.1 - Upstream sectors

The market of input supplies is of considerable size, amounting to around 440 million €. In 2003 more than 110 million € were spent for pesticides alone (32 million € in cotton production, 19 in vegetables, 18 in vineyards, 16 in orchards, 14 in olives, and 12 for cereals).

Hence, the upstream sector that supplies inputs to agriculture is a considerable actor in the relevant supply chain of agriculture. The market is controlled by 50 large and small firms, especially regarding propagation material, pesticides, fertilisers and feedingstuffs, but is dominated by only a handful in each category. The fertilisers market is exceptionally concentrated, as one firm (V.F.L.) holds a 78% market share, followed by Sulphur Hellas SA with another 8%. The pesticides market is less oligopolistic, given that the two major firms, namely Bayer and Sygenta jointly hold a 39% share (22 and 17% respectively). Similarly in the feedingstuffs market, Myloi Sogias have a 16% and Dimitriaki another 14% share of the market.

The oligopolistic structure of the agricultural inputs market along with the fact that the bulk of agricultural inputs (i.e. machinery, fertilisers, seeds etc) is imported, may explain to a certain degree the high prices paid for most inputs in Greece. In the period 1995-2002 price indices for feedingstuffs increased in Greece by 16%, whereas the EU average index rose a mere 1%. For fertilisers and soil improvements the respective change was 30.6% and only 5.9% in the EU.

At the retail stage, a very large number of private (usually small) retail outlets, located throughout the rural areas of the country, is present. Still, the most influential actor in this stage is unambiguously the cooperative associations. Scattered throughout the country (there are 114 Agricultural Cooperative Unions) most act as intermediaries, gathering agricultural inputs from domestic industries, importers or wholesalers and distribute them to their members. Indeed only recently, at the end of 2004, the Panhellenic Association of Agricultural Cooperative Unions (PASEGES) formed a company that aims to undertake all supplies for the farmers, undertaking all negotiations with major producing firms. This development could significantly alter the bargaining power within the supply chain and may even be expected to reduce costs for farmers.

Based on the FADN data (1999/2000), a typical Greek farm spends for fertilisers 900€, for seeds 700€, for plant protection and pesticides 700€ and for fuel 760€. An olive farm spends for fertilisers 450€, for seeds 170€, for plant protection and pesticides 250€ and for fuel 350€, while for a fruit farm the corresponding figures are 450€, 250€, 450€ and 350€. A vegetable farm (including greenhouses) exhibits considerably higher expenses, so that fertilisers costs are 1350€, seed costs are 1850€, plant protection and pesticides costs are 1700€ and fuel costs are 1000€.

4.2 - Food processing sectors¹

The food processing industry is a vital component to Greek economy and the largest processing sub-sector, accounting for nearly 30% of the national industrial output, and 6.5% of the national output. More than 130,000 people are employed in the food and beverages sector, a figure that represents around 22% of employment in the manufacturing sector and 3.5% of total employment. Wages per person employed in the food and beverages industry are more or less similar to the manufacturing and overall average, but output per person employed is impressively higher in the

¹ A detailed analysis of the supply chains for fruits, vegetables and olive oil is included in this section in order to respond to the plan of collaboration between the two projects MEDFROL and EU-MED AGPOI agreed in the Brussels meeting.

sub-sector (91,390 €) than the corresponding manufacturing figure (64,830 €) and the overall average (47,830 €) (Kaldis & Galanopoulos 2002).

Typically, the industry is characterised by small sized firms (with less than 10 employees), notwithstanding that there are also large companies which have expanded by building plantations in other countries, mainly in the Balkans. In 2001, out of the fifty largest Greek companies ranked according to profits, eleven were operating in the food processing industry. Twelve were in the fifty largest companies ranked according to sales and fifteen in the fifty largest ranked according to the number of employees.

The large number of – typically small or medium sized – food and drinks companies operating in Greece along with the wide number of sub-sectors included in the food and drinks industries and agricultural product's processing industries (according to NACE classification there are eight food sub-sectors and one drink sub-sector) does not enable a detailed presentation of the sector's performance. Overall, the food and drinks sector is characterised by low-tension of capital and high-tension of inputs, as input costs represent almost half of total costs.

Large firms active in the sector – unlike the smaller ones - rarely specialise in the production of a single product, but tend to integrate and differentiate. Vertical integration is attempted both downstream (i.e. own-produce as in meat, fish and wine sector, or contracts with farms as in dairy, tomato and sugar sector) and upstream (i.e. building solid supply chains to distribute the final product). Differentiation is established by producing different products (i.e. all dairy products as well as juices etc). Large companies dominate particularly the dairy industry (4 firms), the tomato industry (5-6), the confectionery industry (2), the bread products industry (2), the pasta industry (6-7), the brewery industry (2) and the beverages industry (2) (Baltas 2001).

Table 14 provides an insight on the food and drinks sector in Greece. With the exception primarily of the edible fish sub-sector and secondly of the animal feedingstuffs one, all other sub-sectors are characterised by the large number of operating firms, particularly other foodstuffs (i.e. bread, biscuits and chocolates, pasta, etc), fruit and vegetables and dairy products. A quarter of the sector's turnover is generated by the dairy sub-sector, followed by other foodstuffs (19.5%), fruit and vegetables (15.6%) and beverages (13.6%) (Galanopoulos 2003).

4.2.1 – Fruit and vegetables

Given the diversity and complexity of the fruit and vegetables sector, that includes a large number of products destined to various outlets, it is essential prior to the characterisation of a typical supply chain, to identify the major uses of these commodities: For fruits in the period 1999-2002, 28% of domestic produce is comprised of raw sales (i.e. no standardisation) and withdrawals, 20% of sales of standardised fresh produce, 23% is exported, 23% is destined to industrial outlets (although mainly citrus and peaches; for the rest fruits industrial usage is very small) and another 6% is self-consumption. For vegetables, the share of raw, un-standardised produce is notably larger (40%), whereas exports are only a fraction (2%) referring mainly to asparagus. Domestic consumption of standardised produce represents 18% and industrial usage another 30% (tomatoes and potatoes). Finally, self-consumption of vegetables is around 10% (ICAP 2004).

Standardisation and packaging of the produce destined to the domestic market is on average quite low, although figures differ according to particular commodities: Around 70% of apples and pears production is standardised/packaged, whereas the respective percentages for table grapes is 50-60%, 50% oranges, kiwis 40-50% and negligible for melons and watermelons. Still, all exported fruit quantities are standardised. For vegetables, all asparagus production is standardised (since 90% is exported), followed by potatoes and tomatoes (ICAP 2004).

A further distinction that needs to be made in describing the supply chain for fruit and vegetables is that among i) standardisation/packaging facilities of fresh produce, ii) the processing units and iii) the fruit juices units.

For the former, the major products being handled are tomatoes (industrial and fresh), cucumbers, watermelons, citrus, stone fruits, table grapes and nuts. There is a large number of operating firms, of various legal entities (e.g. SA, Ltd, personal, cooperatives, POs) and sizes (mainly though small firms), located throughout the country (primarily in Central Macedonia, Peloponnese and Crete). According to the NSSG, in 2001 there were 2084 wholesaler firms and another 3277 retailer firms active in the marketing of fruit and vegetables, with a total turnover of 1415 and 235 million € respectively. At the wholesaler level, 65% are personal firms representing 30% of total turnover, whereas 8.4% are joint-stock companies (SA and Ltd) accounting for 37% of the turnover.

Out of the total domestic produce, around 25-30% is directed to the processing industry (including juices). The main products which are processed are tomatoes, peaches, citrus fruits and raisins. Jams and preserved fruits in sugar syrup are produced in small quantities. In the case of peach, 40 industrial units (located almost exclusively in Central Macedonia) process around 30,000 t of fresh fruit and produce around 7-8000 t of peach juice, placing Greece as the second largest producing country and the first exporting one worldwide. The tomato industry processes around 1,200,000 t of fresh product in 52 processing units (mainly located in Northern Greece), the greater part of which is exported. There are 12 large raisin factories and about 50 small units that produce around 70-90,000 t of raisins which are nearly all exported (Ministry of Agriculture). About 15% of total fruit and vegetables production is exported fresh, while 20% is processed and then exported.

The units for juices (mainly oranges and to a lesser extent, peaches and apples) are located primarily in Peloponnese (12 units of citrus that produce around 15,000t of concentrated orange juice and 1600 t of lemon). Nationwide, there are 28 units that utilise around 320,000 t of fresh fruit.

Accounting for a draft delimitation of the existing distribution channels for fruit and vegetables one can identify four major elements (ICAP 2004):

- a) Central Fruit and Vegetables Markets (CFVMs): There are two such markets, in Athens and in Thessaloniki. The first includes 550 wholesalers and distributes around 550,000 t of fruit and vegetables. The second includes 280 wholesalers, distributing nearly 280,000 t. The market share of CFVMs is estimated to around 20-25%.
- b) Wholesalers outside CFVMs: Such businesses purchase directly from local producers and standardising facilities or import from third countries and sell to specialised retailer outlets and supermarkets, accounting for 35-40% of the market.
- c) Supermarket chains: They purchase either standardised quantities from relevant facilities, wholesalers, or import from other countries. Lately, they are also purchasing directly fresh produce from growers and standardise these quantities at their own facilities. Their share is constantly increasing (at the expense of wholesalers as well as specialised, small retail outlets) and is estimated to around 20%.
- d) Direct sales in street-markets: Street markets have a long tradition in Greece. Fresh fruit and vegetables are sold in such places directly from the producers, with a total share of around 10-15%.

The total number of standardising/packaging facilities is estimated in the neighbourhood of 2000, with only half of them active today. 57% is involved in the standardising/packaging of fruits, 31% in vegetables and the remaining 12% in both groups. Specialisation is notable, as 44% is handling

only one commodity and another 20% is handling just two commodities. Firms that handle more than five products represent less than 8%. In total, around 60% is involved in the standardising/packaging of six products, namely 20% is involved in citrus, 18% in grapes, 9% in kiwis, 6-8% in potatoes, peaches and apples. ICAP (2004) has estimated an average 15% gross profit margin for a selected group of such firms, along with a -0.75% operating profit margin, a -0.36% net profit margin and a 14.3% return on own-capital for the period 1999-2003.

A key actor in the supply chain of fruit and vegetables are cooperatives and Producer Organisations (POs). In Greece, POs production represented in 2000 around 18.5% of total domestic production, whereas in 2002 it fell to a mere 11%, considerably lower than the EU-average which exhibits an opposite trend (i.e. PO share increased from 34% to 37.9%). The mean value of Marketed Production (VMP) through POs in the period 2000-2002 ranges between 2.9 and 3.9 million €, which is again, lower than the EU average (9.8-10.8 million €). In 2002 there were 117 active POs with a total number of members reaching 100,000, while no Association of Producer Organisations (APO) had yet been established. In the same period, the percentage of POs that set up Operational Funds (OFs) rose from 41% to 46% of the total PO number – still however lower than the EU-15 average which was 74%. Still, the total amount of OFs (i.e. Community aid and members' contribution) almost doubled, from 5.3 to 10.6 million € which accounted for 5.4% of their respective VMP (Commission of the EC 2004).

In the subsequent paragraphs, some further key elements of the supply chain of fruit and vegetables are provided, separated according to major sub-groups:

Fresh vegetables: The basic distribution channels for fresh vegetables are the following (Papavassiliou 1991): i) Athens-Thessaloniki: Almost all produce is distributed via the CFVMs. ii) Large towns located near Athens and Thessaloniki: Most of the produce is distributed via the two CFVMs. iii) Cities far from Athens and Thessaloniki: Most is distributed by local agents/wholesalers iv) Small rural areas: by local retailer or a wholesaler at a nearby larger city.

Two major actors can be identified in this section, namely wholesalers and retailers. The former capitalising on their strategic positioning within the CFVMs often dictate their rules to the retailers. Standardisation is limited, as is advertising.

Processed vegetables: The last few years a shift in consumer preferences is noticed, favouring frozen vegetables over the tinned ones. Frozen vegetables have the largest share in the processed market of vegetables. One company only (Barba-Stathis) with a wide range of products (mainly frozen vegetables and potatoes) holds more than 70% of the market. Lever has a share of 12% and Canakis another 8-9%. Another 5% is owned by private labels. Nevertheless, the power in this market is constantly shifting towards the large retailers who as they gradually gain increased market shares of retail vegetables sales, are able to dictate rules to the industry.

Regarding the canned vegetables sector, it should be stressed that tomato products (especially tomato concentrates) are highly export-oriented, as around 70% of domestic production is directed abroad and mainly to the EU. Apart from tomato products, the processing of other vegetables is low, and only a few quantities are exported. Even in the domestic market, their consumption is relatively low, mainly due to consumers' preference for fresh or frozen products.

Fresh fruit: Around 50% of the wholesalers are located in the CFVMs in Athens and Thessaloniki. The rest 50% (typically very small family enterprises) is located throughout the country, often acting also as retailers. Probably the most critical issue hindering the chain's performance (as is the case for fresh vegetables too) is the lack of organised central markets: the two existing ones are neither sufficient nor properly equipped (i.e. lack of new and advanced machinery and storing

facilities etc). Consequently, each year large quantities are distributed outside the CFVMs, whereas in the previous decades the bulk of the produce was distributed through them. This had an adverse effect on regulating and monitoring the market and it is suspected that a considerable portion of the produce is distributed via unregistered channels.

Similarly to the case for vegetables, the most important event is the introduction in the market of large retail chains: their share in the market has rocketed from 1% in 1991 to 6% in 1998 and is now well over 15%, at the expense of traditional specialised outlets.

Processed fruits - Juices: Long-life fruit juices represent around 76% of the market with the remainder being short-life products. Natural fruit juices (100% fruit) account for 52% of the market, fruit nectars (more than 50% fruit) for 33% and fruit drinks (20-35% fruit) for 15%. It is essential to note, that despite the fact that there is a large number of firms active in the market, the market has strong oligopolistic characteristics as it is dominated by two major brands: 3E accounts for 56-57% of the market, DELTA for 15-15%. Another three brands (Florina, EVGA and PEPSICO-HBH) hold shares ranging from 4-8% (Baltas 2001).

The distribution is mainly done via super markets, liqueur stores and restaurants. The large firms have established well organised distribution networks, based on local agents and wholesalers. Smaller firms rely on direct sales. Advertising is very tense.

Canned Fruits: This sector is a market where competition prevails: A large number of firms are operating and none controls more than 10% of the produce and 15% of domestic consumption market. Another fact that characterises this sector is its intense export-orientation (more than 70% of the produce is actually exported), probably due to the Greek consumers' preference towards fresh fruits. Peaches are the main product (80-90%) being processed, followed by apricots (4-8%) and some few quantities of pears, strawberries and cherries are also canned. PKT has the highest share (9-10.5%), followed by Cronos (8.5-9.5), DEL MONTE (7.5-8.5), and others with shares around 5-7%.

4.2.2 – *Olives and olive oil*

Olives cultivation constitute a major part of domestic agricultural production and is Greece's most exported commodity (olives and olive oil combined). Practically all producers belong to one of the 83 Producer Organisations (POs) that are active nationwide, which are mainly involved in administering, grouping, aiding and verifying aid applications, along with other marketing activities (EU-DGA 2003).

The distribution channel of olive oil is similar to that of Italy and notably different from that of Spain, in the sense that the producer is the one who actually markets the oil. Direct sales by olive oil producers represent as much as 30-33% of total consumption, while another 40-45% is self-consumption. Altogether, the share of standardised olive oil consumption does not account for more than 25-27% of total consumption (ICAP 2003).

The existing 3,000 mills (of which no more than 2300 are active) are in most cases not actively involved in the marketing of oil, usually providing only olive-crushing services. For these services, standard compensation is around 6.5% of the produce (ICAP 2003). Operating mills are virtually dispersed throughout the country but still nearly 60% are located in the regions of Peloponnese and Crete. There is also a wide variation in their size, ranging from traditional to modern ones, while 39% have an annual throughput of less than 100 t, 55% between 100-500, 5% between 500-1000 and less than 1% have a capacity greater than 1000 t (EU-DG 2003). The average daily capacity is around 3000 kg and they usually operate approximately 60-80 days each year. Their number is

considered sufficient, although measures are needed in order to modernise practises and facilities (Tzouramani *et al* 1999).

There are also around 250 table-olive packaging stations, 90 bottling/caning plants and 40 facilities for producing olive pomace oil. On the other hand, refining plants are a lot fewer, given the increased installation and operation costs. The latter have an annual capacity of 130-150,000 t but mostly they are processing other oilseeds and not olive oil. Standardising units are nearly 200; however in the last few years, less than 60 were active in the standardisation of olive oil, a fact associated with the prevalence of raw olive oil consumption in Greece. The annual turnover for the industry is estimated to 500-550 million € (including sales from other products), while the average gross profit margin in the period 1997-2002 was 6.9%. On the other hand, operating and net profit margins were negative, -2.1% and -1.8% respectively, mainly attributable to increased operating costs (ICAP 2003).

Packaging materials are usually plastic bottles of one or two litres and metal tins of five litres. For the exporting market there are plastic bottles of three and four litres. Glass bottles are more rarely used and only for extra virgin olive oil brands. (Baltas 2001).

Regarding the market of labelled/standardised olive oil products, despite the large number of operating firms, three companies hold 57-62% of the market (2001/02 figures), while the rest is owned by a large number of small, mainly co-operative firms that operate at a local scale. Elais is the dominant firm owning a 31-33% share and Minerva holds another 14-16%. A third firm, Elaourgiki, is a cooperative firm and has a market share of around 11-12%. It should be stressed that there is a clear pattern of market-power concentration, given that these three leading companies accounted for around 40-45% of the market in 1998/99. Regarding virgin olive oil, concentration of market power is more striking: Two brands account for more than 70% of the market, namely Elanthi (by Elais) and Chorio (by Minerva). Advertising in olive oil is quite significant, in all media from newspapers to TV, but is exercised primarily by the large firms. In 2002, around 3.8 million € were allocated in advertising (80% of which in TV) depicting a 40% increase compared to 1998. More than 53% of total advertising expenditure was made by the two leading companies (ICAP 2003).

70% of the marketed labelled olive oil is distributed and sold at retail outlet chains and 30% at smaller, specialised shops. Per capita consumption of olive oil is by far the highest in the EU, exceeding 20 kg per year (in Italy it is a little more than 10 kg). From the nearly 200,000 t of annual olive oil consumption in Greece, approximately one quarter is composed olive oil (i.e. blend of refined and virgin olive oil) and three quarters is virgin olive oil.

The supply chain of olive oil and olives was among the first in Greece that created (in 1992) an Inter-professional Body. It is comprised of all the major actors involved, namely producer associations, standardising industries, exporters and retailers. Its main target has been to reduce or eliminate the marketing of raw olive oil in the domestic market (even launching heavy advertising campaigns) and to increase the exports of labelled produce.

5 - Food consumption

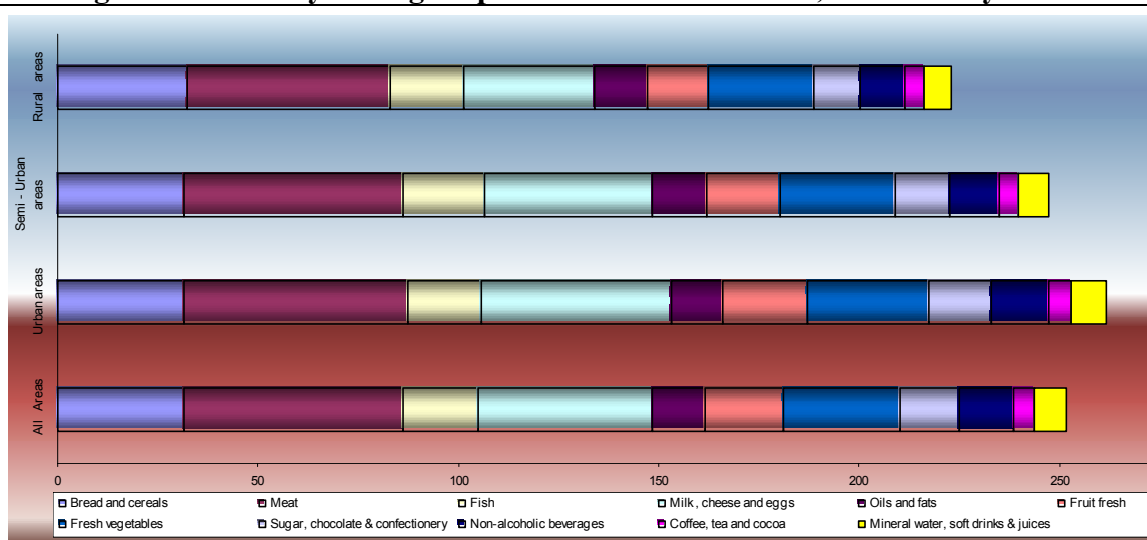
Food expenditure is a significant part of the average Greek household expenditure. Around 16.5% of total expenditure is directed to food products, 0.5% to drinks and beverages and 4.5% to alcoholic beverages and tobacco. Hence, around 18,000 million € is spent annually in food, a figure that exceeds 23,300 million € when drinks and tobacco expenditures are also accounted for (2000 data, NSSG).

However, as is the case in most developed countries, food products in Greece have an inelastic price and expenditure demand. Therefore, it is not surprising that the share of food expenditure has been declining over the last years. It is indicative that while expenditure on food has increased by 36.7% (in nominal prices) during the period 1995-2000, expenditure on communications increased by 140%, recreation and culture by 66%, miscellaneous goods and services by 64%, restaurants and hotels by 58%, clothing and footwear by 49% and total expenditure by 47%. Consequently, the share of food in total expenditure in 2000 compared to 1995 was down by 7% (Table 15).

According to the latest Household Budgetary Census conducted by the National Statistical Service of Greece (1999), food expenditure constitutes the largest portion of household expenditure, but showed a noticeable decline by 3.65% compared to 1994².

On average, a Greek household spends 240.6 € on a monthly basis for food. Meat holds the highest share among all food items, but is down by 4% compared to 1994. 29.5 € (12.3% of food expenditure) is allocated to vegetables and an additional 19.5 € (8.1%) is spent on fruits (Table 16). Fruit and vegetables combined, are the second largest food commodity, in terms of household budgetary shares.

Figure 9 - Monthly average expenditures of households, classified by areas



Source: NSSG

A distinctive variation can be noticed in food consumption patterns among urban and rural areas of Greece (Table 17): Food expenditure in urban areas is on average 1800 € per month and represents almost 15% of total expenditure, whereas in rural areas - although considerably lower (1250 €) - it

² The Household Budgetary Census is conducted every five years, hence no more recent data are available.

represents more than 21%. In Athens and Thessaloniki, food expenditure share is the lowest (14%), while in semi-urban areas it is larger (19%).

The share of fresh vegetables in total food expenditure appears to be almost similar throughout Greece (around 12%), whereas for fresh fruit significant differences are noticeable: Thessaloniki (9.5%) and Athens (8.6%) have a share well above the national average, whereas in urban areas the corresponding share is only 7%. On the other hand, oils expenditure in rural areas households appear to be higher than urban households, despite the fact that the highest share is recorded in Thessaloniki (Table 18). Urban household expenditure is around 44% greater than that of household expenditure, while food expenditure is 17% larger. For fresh fruits, urban areas spend nearly 40% more and for fresh vegetables 19%. Oil expenditure is nevertheless, higher in rural areas, by around 3%.

Based on EU estimates (EU-DGA 2003), the elasticity of demand for olive oil is very low (0.16) in Greece, thereby depicting that price changes do not seriously affect demand changes. As was mentioned in the previous section, only a quarter of total olive oil consumption is standardised produce. However, following EU's directive to disallow the marketing of olive oil in un-labelled quantities larger than 5 kg as of November 2003, the consumption of standardised olive oil is expected to increase in the following years.

Regarding quantities purchased (depicted in Table 19), fresh fruit household consumption is larger in urban than in rural areas (27 and 20 kg respectively). Similar is the case for vegetables (34 and 30 kg), whereas for olive oil, rural areas have a much higher consumption (3 lt, as opposed to 2.8 in urban areas).

According to Baltas (2001), the share of food expenditure in Greece will exhibit a stabilising pattern in the next few years remaining a little over 15%. Still, certain changes in consumption patterns will be noticeable, such as:

- Considerable growth of the dairy market
- Small increase of the meat market
- Stagnant trend for bread and cereals (after years of slow decline),
- Stagnant trend for fisheries, sugar and coffee
- Small reduction for fruit and vegetables and oils

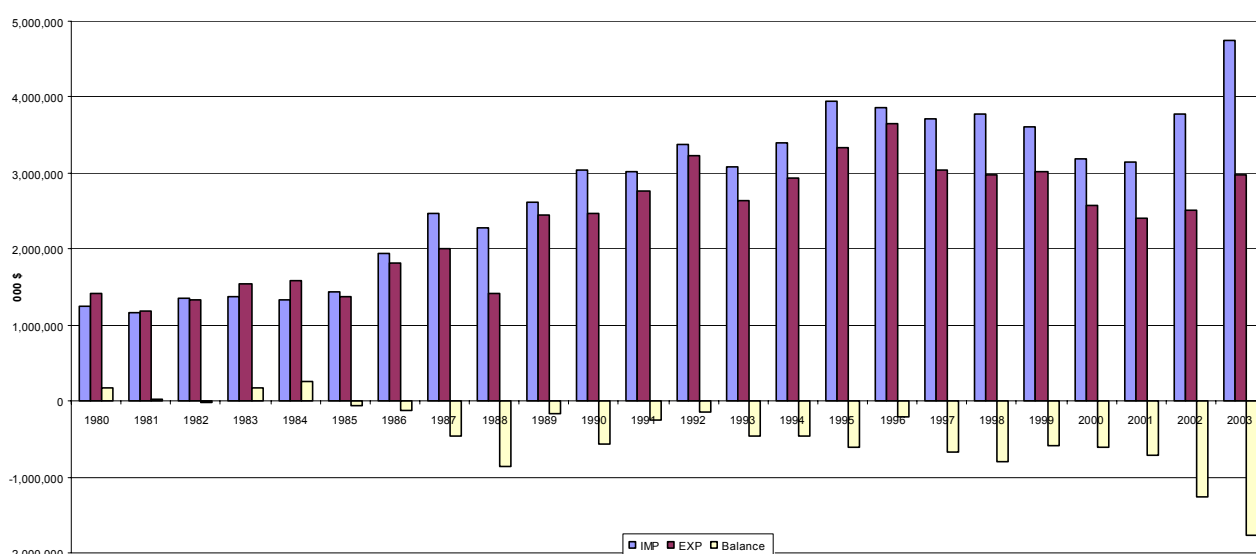
Regarding self-sufficiency, it is worthy of note that the Greek rate for crops ranges around 70-80%, but it is extremely low for meat and dairy products: The self-sufficiency rate for meat is 53% and a mere 25% in beef meat and 40% in pigmeat. On the other hand, domestic produce exceeds internal demand for fresh vegetables (105%), citrus fruits (106%) and all other fresh fruits (126%) (Table 20).

6 – Trade in agri-food products

6.1 – Structure of trade in agri-food products

The trade balance for agricultural products and foods in Greece was in balance until the beginning of the 80s, but has moved into deficit since then, eventually reaching 1.3 billion \$ in 2002 (Table 21). This fact should be attributed to the large deficit in livestock products' trade, as well as the overall poor performance of the domestic production sector in adjusting to the evolving pattern of domestic consumption.

Figure 10 - Trade balance of agricultural products, 1980-2003



Source: FAO

Agricultural exports (mainly crop products), are constantly increasing, but imports of dairy products and meat are increasing at an even greater pace. In brief, agricultural exports constitute about 30% of Greek total exports, while agricultural imports represent 15% of total imports.

Greece is in surplus where fruit and vegetables, tobacco, cotton and olive oil are concerned, but is deficient in meat, dairy products, foodstuff, coffee, spices, animal feed and oilseeds (Table 22). In brief, after Greece's accession to the European Community in 1981, there was a shift of destination markets for agricultural products away from third countries towards the EU. Since the beginning of the 90s though, exports to the countries of Central and Eastern Europe have increased (Ministry of Agriculture).

Meat trade: Meat along with dairy products are the main importing food commodities in Greece. The large deficit that is continuously growing is due to both the change in consumers' preference and the increased demand for livestock products since the 80s and the inability of domestic produce to meet this demand. Major suppliers for Greece are primarily the EU countries which represent more than 90% of total imports. The Netherlands and France are the main importing countries, followed by Italy, Germany and Belgium. The major non-EU supplier is New Zealand. As for (the negligible) exports, primarily cooked pork meat, unlike imports, non-EU countries are the major destinations, i.e. Bulgaria (more than 50%), Albania, Cyprus and Panama. The latter obviously refers to catering supplies for ships (Baltas 2001).

Dairy trade: Dairy imports are almost exclusively (99%) from EU countries, mainly Germany, Netherlands and France. These three countries represent more than 80% of total imports. Exports are almost three times less than imports, but are growing at a steady annual rate since the beginning of the 90s. Prime destination market is also the EU (the three former countries as well as Italy, UK and Spain).

Cereals trade: Most imported products are wheat and barley. Major importing countries are again from the EU (altogether around 90% of imports), although imports from third countries are increasing rapidly the last few years. Major supplier is France, followed by Germany and the UK. Non-EU suppliers are mainly the USA and Canada. Exports are primarily wheat and rice, which combined account for more than 90% of all exports. The bulk is destined to EU countries (more than 80%), notwithstanding that there is apparent downward trend. Italy is the single most important market (40%) followed by Spain, Germany, France and the UK. Significant quantities also are exported to Bulgaria and fewer to Albania.

Fruit and vegetables is a traditional exporting sector for Greece, both for fresh as well as for processed. Although for some products Greece has high shares in world market, its overall performance is hindered severely by low competitiveness, due to problems in standardisation/packaging, high prices and insufficient promotion. Fresh fruit are the major importing category (44% of total import value), primarily bananas (40%), nuts and in the last few years citrus and table grapes are also imported. Fresh vegetables account for 26% of the value of imports and main imported commodities are potatoes, onions and garlic, and tomatoes. Imports of processed fruit and vegetables are steadily growing and represent around 10% and 14% of total import value respectively. Imports of juices account for nearly 6%.

A little more than 50% of fruit and vegetables imports comes from within the EU, whereas the intra-EU share was around 70% a decade ago. Italy is the main supplier (43% of EU imports), followed by France (17%), Germany (15%) and the Netherlands (12%). The main suppliers outside the EU are Turkey (23.5% of extra-EU trade), Egypt (22%), Ecuador (14%) and Argentina (12%).

The major suppliers for fresh vegetables are Netherlands and Egypt, and to a lesser extent France, Belgium, Italy, Canada, USA and Turkey. It is worth noting that import sources among EU and non-EU countries are fairly balanced. However, for fresh fruits, imports from EU countries represent more than two thirds of total imports (Italy, Spain, Netherlands). Turkey and the Ecuador are the major non-EU suppliers.

For processed fruit and vegetables main suppliers are once again EU countries (around 90%), namely Netherlands, France, Italy and Germany. Turkey and the USA are the most important non-EU suppliers, but with shares no more than 4-5% each.

Regarding exports of fresh fruit and vegetables, in 2003 intra-EU trade accounted for less than 50% of the total value of exports, as compared to more than 60% in the late 90s. However, it is indicative that intra-EU exports represent only 30% of the exported quantities, thereby revealing significantly higher unit values for products exported to EU countries.

For fresh vegetables, the share of intra-EU trade is nearly 80% (with a steady downward trend since the early 90s), but it should be reminded that vegetables exports are only a fraction of fruit exports. Germany is the most significant importing country (60%), followed by Italy and the Netherlands. For fresh fruits, the most important EU markets are that of Germany and the UK, followed by the Netherlands and Italy, while the most important (and rising) destination market outside the EU is that of Eastern Europe (mainly Poland and Bulgaria, followed by Russia, Romania and Hungary).

Major exporting vegetables are asparagus (43% of total export value), cucumbers (12%), and to a minor extent onions/garlic and tomatoes. Fruit exports are much higher than vegetables, representing roughly 90% of total exporting volumes, and are mainly comprised of citrus (30%), grapes (30%), melons and peaches.

Exports of processed fruit and vegetables are now fairly balanced between EU and non-EU countries, as the latter have more than doubled their share during the last decade. Germany, UK and Italy (with shares ranging from 11-15%) and Brazil, USA, Libya and Canada (with shares ranging from 5-8%) are the main importing countries. Processed vegetables exported are mainly tomato products and processed fruits are primarily peach pulp, for which Greece is the world's largest exporter.

Regarding olive oil, the major outlet is Italy, representing more than two thirds of total exports, as domestic produce is exported there raw, from where it is re-exported after it is standardised and packaged. Spain and the UK follow, with shares ranging between 3-6%. All other countries have shares less than 1%. Imports, on the other hand, of olive oil in Greece are negligible.

6.2 – Trade performance of agri-food products

Food exports represent around 27% of total Greek exports (14% fresh, 13% processed) and the respective imports account for 14% of total imports (7% each category). Still however, for both categories the value of net exports (exports minus imports) is negative revealing a combined deficit of more than 1.5 billion \$. In the period 1998-2002, the annual percentage growth of exports for both categories was small, ranging from zero (processed food) to one percent (fresh food).

Although per capita exports for both categories are quite high (135.2 and 132.9 \$/inhabitant respectively) ranking Greece in the top 40 countries worldwide (indicating an export-driven market), the annual change of this figure in this period 1998-2002 is negative (-2 and -3% respectively), thereby indicating a negative turn in the export performance. Relative unit value (RUV) of these two sectors is above one; 1.3 for fresh and 2.5 for processed products, indicating that Greek exports are priced at a higher price than the world average unit. This is especially true for processed foods, for which the average annual change in RUV during the period under study was 5%, as opposed to a more modest 1% for fresh food.

For both categories Greek exports represent a little more than 0.5% of world exports, placing Greece at the top 35 countries in the world. In addition, the product diversification index (i.e. number of equivalent products) for the two categories is 14 and 16 respectively. These, although not impressive, are quite high numbers showing that the domestic industry has an increased level of diversification, i.e. it produces an adequate number of similar products. On a global rank, Greece is 29th and 32nd respectively. In the same manner, the market diversification index shows 18 equivalent markets for fresh food and 15 for processed ones. In this sense, Greece is performing quite well being sixth in the former and tenth in the latter category worldwide.

The application of the Constant Market Shares (CMS) methodology reveals that the performance of Greek food exports (fresh and processed) is poor in the period under study: the relative annual change of world market shares was negative (-3.48 and -4.95% respectively), thereby revealing a poor competitiveness. This negative trend can be further broken down in order to analyse its potential sources:

For fresh foods three out four components are negative, namely the *competitiveness effect* (i.e. gains or losses in market shares associated with changes in competitiveness) is -1.81% per annum, the

initial geographic specialisation (i.e. benefits of the initial specialisation on dynamic markets) is -0.02% and the *initial product specialisation*, i.e. benefits of the initial specialisation on dynamic products is -1.82%. Only the *adaptation to changes in world markets* (i.e. ability to adapt to changes in demand) is positive (0.17%).

Although for processed foods two components are positive (initial geographic specialisation and adaptation, both at 0.1%) and the initial product specialisation index is not as low (-0.55%), the overall performance of this group is poorer than that of fresh foods, mainly due to a much worse competitiveness effect (-4.59%).

As a final indicator, Greece is ranked quite low for both categories: For fresh food, it is ranked 29th according to its performance in year 2002, 85th according to its performance in the changes noticed during the period 1998-2002, and ultimately in the 168th place. The corresponding ranks for processed foods are 30th, 97th and 144th, respectively.

Finally, the Revealed Comparative advantage (RCA)³ shows that Greece has a considerable comparative advantage in the production of both fresh and processed products as their index number is more than 3.2 (Table 23). Compared to the other domestic sectors, it is worthy of note that a stronger advantage is noticed only for clothing, whereas the eight out of the remainder ten groups have an index below unity, indicating no comparative advantage.

6.3 – Trade performance: Fruits, vegetable and olive oil

Fruit and vegetables represented in 2003 roughly 20% of Greek food (fresh and processed) exports (i.e. fruits 15.6% and vegetables 3.9%), and around 4% of total exports. In addition, olive oil exports represent a little more than 10% of national food exports.

The most exported fruit and vegetables are oranges and grapes (around 100 million \$ each, as the 1995-2003 average), raisins (60 million), asparagus and peaches (40 million each), watermelons (30 million) and cucumbers (16 million). Regarding processed products, prepared fruit exports amount to around 285 million \$ and tomato paste to nearly 100 million. Exports of frozen vegetables and orange juices are much lesser, between 5 and 10 million \$. Preserved olives exports are nearly 110 million \$ and olives export another 15 million (Table 24). For fruit and vegetables commodities, Greece holds only a fraction of world exports, with shares ranging from 0.1 to 1.9% for most products, while only oranges appear to have a high share (5.7%). On the other hand, in the olive oil market, Greece is a considerably more influential actor, as its share in world exports is almost 10%.

As indicated in the previous section, Greece appears to have a comparative advantage in the production and marketing of fresh and processed food commodities. Accounting for a further breakdown of the major food commodities, the RCA index for fruits, olive oil and vegetables is 9.45, 7.81 and 1.41 respectively. This implies that Greece has a clear competitive edge in the production of these three groups, but it is also evident that specialisation benefits are stronger in the case of fruits rather than of vegetables: Based on the results and the difference between the two RCA ratios, it can be intuitively argued that Greece has a comparative advantage in producing fruits.

³ ITC uses a modification of the popular RCA ratio (Balassa measure) by including in the calculations each country's imports along with the exports (i.e. net trade); hence outcome would not be directly comparable with the original Balassa RCA.

Within the fruit group⁴, oranges have a high RCA ratio (3.52) indicating that there is an advantage in specialising in this cultivation over other fruits, while within the vegetables group, potatoes (-0.28) and tomatoes (-0.13) exhibit a negative ratio, which implies that Greece has no comparative advantage in these cultivations. Cucumbers appear to be more competitive (0.43) as also asparagus (0.78) (Table 25). However, given that asparagus is the most export-oriented vegetable (90% of the produce is exported), its ratio is surprisingly low, as is also its export trend (-1.56%). The corresponding market diversification index is also low (1.34), but given that Germany constitutes the major destination market for Greek asparagus exports this should not come as a surprise.

Fruits appear to perform better in world markets than vegetables, given that there is increased product diversification, i.e. number of equivalent products (4.1 as opposed to 2.7) as well as market diversification, i.e. number of equivalent markets (12.6 and 3.5 respectively). Olive oil, as it is mainly exported in Italy, has a much lower market diversification index (1.6), similar to that of cucumbers and tomatoes. Oranges, potatoes and nuts on the other hand appear to have a wider disperse of exporting markets.

A clear demonstration of the negative trend of Greek food exports is depicted by the fact the trend in exports in the period 1995-2003 is negative for almost all commodities, with the only exception of vegetables and oranges, that show an annual increase of 1.8% and 2.1% respectively. The deterioration in export performance for the rest ranges from -0.35% (fruits) to as high as -13.7% (potatoes). Even for olive oil the trend is considerably high (-5.3%).

⁴ The RCA ratios for vegetables and fruits at the HS4 level are calculated in comparison to the exports and imports at the HS2 level to determine if a product has a comparative advantage within its sector.

7 – International Competitiveness of the Mediterranean fruits, vegetables & olive oil sector

An indicator of a country's international competitiveness is the Domestic Resource Cost (DRC) ratio (see Jabarin *et al* 2000, Gorton and Davidova 2001, Martinez Ruiz 2003) which compares a good's real opportunity cost of production with its aggregated value at international prices. DRC is obtained by dividing the cost of domestic factors by the value added in social prices: If the derived value is less than one, then the country in question has a comparative advantage in producing the particular commodity; otherwise a comparative disadvantage is evident.

In this study an attempt is made to calculate DRC ratios for four commodities produced in Greece, namely tomatoes, asparagus, oranges and olive oil. However, prior to the presentation of the results, it should be mentioned that several assumptions had to be made in order to derive those necessary input data that were not available:

- i. Actual border prices (export/import parity prices) have been approximated by export unit values.
- ii. Non-tradable inputs are averages of the particular commodity's group, i.e. for tomatoes and asparagus the average of the vegetables group is used; for oranges the average of citrus is used and for olive oil the average of all olive-growing farms.
- iii. Labour prices were approximated by the actual wages paid to workers in each group, i.e. as (ii)
- iv. Land prices were approximated by the actual rents paid for each group, i.e. as (ii)
- v. Social prices for tradable inputs were approximated as a percentage of private prices (i.e. by deducting taxes and subsidies, calculated as a margin of actual private prices).
- vi. Social prices for non-tradable inputs (land and labour) were also approximated, following Gorton and Davidova (2001).
- vii. Due to lack of more recent data, all calculations were made for the three-year period 1997/98-1999/2000. As Greece was not part of the EMU at that time all prices were originally in local currency (Greek drachma).

Table 26 summarises major findings of the DRC methodology: It can be seen that all four commodities exhibit a value of less than unity, thereby indicating that a comparative advantage in their production for Greece may be inferred. Particularly regarding oranges, the DRC ratio is quite small (0.29), a fact that sustains the results obtained in the previous section, i.e. that Greece has a clear competitive edge in the production of fruits. The same holds to a great extent for olive oil, although the corresponding ratio is not as impressive (0.67). On the other hand, the results for vegetables are somewhat unsettling: Though for asparagus the obtained ratio (0.60) seems plausible, given the export orientation of this commodity, the ratio for tomatoes (0.24) neither coincides with the findings from the previous section nor does it appear realistic. A possible explanation could be the fact that in this category both greenhouse tomatoes as well as open field tomatoes and industrial tomatoes are included, thereby reducing the homogeneity of the group. More analytical presentations of the calculations for each commodity are given in Tables 27-30.

8 – Medium-term outlook

Greek agriculture, despite its considerable size relative to the economy and its contribution to main macroeconomic indicators is confronted with several natural, structural and demographic factors that seriously impede its performance and competitiveness. In brief, large mountainous and less-developed areas, scarcity of useful and fertile agricultural land, dry climate especially during irrigation periods, insufficient water resources, small size of agricultural holdings that disallows for economies of scale, high production costs, as well as ageing and low education level of farmers are the sector's main disadvantages.

Meanwhile, the international environment is changing rapidly with the liberalisation of world markets, the recent CAP reforms and the EU enlargement. The latter, can be expected to have both positive, as well as negative impacts on Greek agriculture: On one hand, exports may increase to neighbouring Balkan and East European countries which are not direct competitors (given that they do not produce the same bundle of agricultural commodities as Greece), but on the other hand, there is an existing threat of reduction of the EU-structural funds resources, as most of the fifteen new Member States have large agricultural sectors that may need high subsidies in order to modernise and meet EU standards.

The new CAP agreement in 2004 is seen as a radical change in the EU agricultural policy. There is a considerable reduction of funds allocated to direct support measures, along with an increased budget on structural measures (improvement of infrastructure and trade mechanisms, rural development etc). More importantly, there is a shift of producers aids from production levels to direct income aids ('decoupling') which are also associated with a compliance to environment-friendly production practices.

Within this context, the challenges that Greek agriculture is facing in the medium-term future are not a few. From a policy outlook point of view, it would appear that the most demanding issue that needs to be addressed is to enhance the (diminishing) competitiveness of domestic agriculture, by confronting with the standards of the new CAP that calls for increased market-orientation of the production. In the immediate future, as the EU rate of protection declines, Greek agriculture will need to turn to the production of new products (i.e. non-food products such as bio-fuel, or biological products), for which it is today well below the EU-average. Moreover, the sector's infrastructure is relatively poor and a number of policy measures are needed in order to alleviate the shortcomings and weaknesses that impede Greek competitiveness in the international markets.

Given that the agricultural population is quite large and that agricultural incomes have been declining in the past years - thereby even more widening the gap with non-agricultural incomes - it is evident that rural development (i.e. measures that will lead to an overall restructuring of the countryside) is also a key topic. If agriculture is to maintain its role as a factor of social cohesion in rural areas, especially now that it is feared that decoupling may lead to a gradual abandonment of farms, immediate actions need to be taken in order to improve the interrelations of agriculture with other sectors and the creation of supplementary incomes.

In general, most of these actions were, and still are, funded by EU policies (3rd and 4th Community Support Framework), but as the absorption rate of community resources by Greece has been up to now low, means of speeding-up the process has become an issue of top priority in the political agenda. Hence it is understandable, that for Greece, the continuation of CAP funding until 2012 is a matter of utmost importance.

Regarding the environment and the protection of the ecosystem, several issues need also to be addressed in the forthcoming years. The country is faced with a twofold problem: On one hand there is an increased abandonment of agrarian land (especially in mountainous and insular areas) and on the other hand, there is a heavy intensification of the production and cultivation practices in other areas (especially in Central Greece). Hence, in some parts of the country, land is gradually turning into wasteland, whereas in other parts intensive agriculture is generating problems, such as pollution of natural resources (brackishness of the waters, salted grounds, chronic scarcity of water) and ecosystems destruction. As most of the measures that have been introduced up to now did not have the expected results (in terms of moderate input usage and rational management of water resources), additional policy measures and the strengthening of incentives are necessary in order to ensure that further damage to the ecosystem by agricultural practices will be prevented (Ministry of Agriculture). Considering the overall increasing awareness on protecting the environment (by the EU and the public), as well as the country's limited water resources, the diminishing rate of annual precipitation and the increasing reduction of forests, it can be argued that such environmental aspects will be of considerable importance in the next few years.

9 – Conclusion

The importance of the agricultural sector to the Greek economy is evident not only by its contribution to key macroeconomic indicators, such as GDP, employment and exports, but also by the fact that it is the main supplier of necessary inputs to several other activities (i.e. food and drink industry, tobacco processing, textile industry, transports, etc).

In general, Greece appears to have a competitive advantage in the production and marketing (exporting) of food products compared to other sectors, but due to several endogenous disadvantages mentioned in the previous sections (in essence mainly high selling prices and low quality) is not competitive in the world market. It is indicative that in the period 1998-2002 the annual change in world market shares was negative (3.5-5%), as most componential effects were also negative.

Fruit and vegetables, along with olive oil, are traditional Mediterranean products which have been cultivated in Greece for centuries. These two sectors constitute a large part of the domestic agricultural economy, expressed in terms of employment, production areas, volumes and values. They are the main exporting food commodities of Greece and the ones with the largest trade surpluses. In addition, the domestic market outlook appears favourable, given that per capita consumption for both products is very high (the highest in the EU-15). Nevertheless, the terms of exports for most of these products in the period 1995-2003 have worsened, indicating a deterioration in Greece's competitiveness in world markets: Despite the clear competitive advantage that Greece has in the production of such products, export trend is negative for most commodities, probably due to the small number of exporting commodities (and in essence, such that have a stagnant demand worldwide, i.e. cucumbers, tomatoes) and the small number of exporting markets. In particular regarding fruit and vegetables, it could be argued that Greece is specialising in the production of 'saturated' products, hence its exporting mix is not comprised of highly-demanded products, whereas for olive oil, it appears that the main reason for its low competitiveness is Greece's single-market orientation; no market diversification is evident, given that practically all exports are destined to a single country, namely Italy, and in fact they are comprised of raw and not standardised/labelled produce.

Prospects for olive oil seem quite favourable: Domestic production is sufficient to meet demand and per capita consumption is the highest in the EU. In the domestic market, increased brand-competition is evident, but the main problem remains the share of olive oil quantities distributed raw. Notably due to the considerably lower price of such olive oil, consumers prefer it over standardised products, despite criticisms that often raw produce does not meet quality standards. In the following years however, it is expected that the share of standardised olive oil will increase rapidly. Although labelled Greek olive oil is gradually gaining shares in world markets, the bulk of domestically produced olive oil is still exported raw (nearly 90%), mainly to Italy. Hence, Greek brand names are not well-known abroad and a well-organised promotion campaign in major importing markets (northern European countries, USA) is necessary.

The outlook for fruit and vegetables on the other hand, may not be as prosperous, although it is not safe to generalise for such a broad category that includes several commodities. Despite the favourable soil and climatic conditions, the sector's competitiveness is hindered by several factors such as the lack of early or late ripening varieties, the lack of use of certified seed, low yields, increased production costs and prices and low quality. In addition, the low levels of standardised marketed quantities, the large number of small, ill-equipped standardising, storage and packaging facilities, the absence of a national exporting strategy (i.e. lack of advertising and promotion campaigns, market research, brand names, contracts with major retail chains etc) and poor exporting

mix, further impede the country's ability to gain significant market shares abroad. It is indicative that in Germany, where the highest per capita consumption is for tomatoes (12.5 kg), cabbage (7 kg), onions (6.4), cucumbers (6.2) and carrots (5.5), followed by lettuce, beans, asparagus and spinach (around 1.1 and 2.9 kg), Greece exports significant quantities only regarding asparagus and cucumbers (Hellenic Consulate in Munich).

An important finding in this study is the fact that Greece has a clear competitive advantage in the production of fruits rather than of vegetables. In general, although certain fruit and vegetables are dynamic and are thus mainly exported (asparagus, grapes, canned peaches and tomatoes) for most, increased prices, low quality and lack of standardisation, resulted in decreased shares in major markets such as the EU and as a consequence they are now exported to lower income markets such as East European countries. Even in the domestic market, imported products from third countries (Spain, Italy, Turkey) are gradually gaining market shares at the expense of domestic produce. Large retail chains especially, tend to import various fruit and vegetables, and given that there is a tendency of Greek consumers to shift their purchases from traditional (specialised) outlets to retail outlets, it can be intuitively argued that the sector will be facing notable threats in the future.

References

- Baltas N. (2001). Development Strategy and Investments in the Processing and Marketing of Agricultural Products. Ministry of Agriculture. (*in Greek*)
- Commission of the European Communities (2004). Analysis of the common market organization in fruit and vegetables. Commission Staff Working Document. SEC(2004) 1120, 03/09/2004.
- EU-DG Agriculture (2003). The olive oil and table olives sector. Working paper of the DG for Agriculture. Brussels.
- Galanopoulos K. (2003). Country Report: Greece. In Development and agri-food policies in the Mediterranean region 2003. CIHEAM, France.
- Gorton, M. and Davidova, S. (2001). The International Competitiveness of CEEC Agriculture, The World Economy, 24, pp.185-200.
- Hellenic Consulate in Munich. Web-site: <http://www.grhandel.de/genika9.htm>
- ICAP (2003). Olive oil and seed-oil. Sectoral Analysis. Athens. (*in Greek*).
- ICAP (2004). Standardisation and packaging of fresh fruit and vegetables. Sectoral Analysis. Athens. (*in Greek*).
- Jabarin, A. S., Sahawneh M., Assaf L., Muaz S (2000). The Impact of Euro-Mediterranean Partnership on the Agricultural Sectors of Jordan, Palestine, Syria, Lebanon and Egypt (The case of Horticultural Exports to EU Markets), Femise Research Program, 2004.
- Kaldis P., Galanopoulos K. (2002). Country Report: Greece. In Development and agri-food policies in the Mediterranean region 2002. CIHEAM, France.
- Louloudis L. and N. Beopoulos (2001): "Broadening the traditional sectoral perspective on agricultural policy in Greece", In F.Brower & J.v.d. Straaten (eds), "*Nature and Agriculture in the European Union: New perspectives on policies that shape the European countryside*", Cheltenham, Edward Elgar.
- Maravegias N., Apostolopoulos K., Mattas K., Baltas N., Moisisidis A., Papageorgiou K., Psaltopoulos D. (2003). Sustainable Agriculture in a Developed Countryside: A 10-year Vision for Greek Agriculture and Rural Areas. Ministry of Agriculture. (*in Greek*).
- Martinez Ruiz E. (2003). Autarkic policy and efficiency in the Spanish industrial sector. An estimate of DRC in 1958. LSE, Working Paper No.77/03.
- Ministry of Agriculture. Internet web-site: www.minagric.gr
- National Statistical Service of Greece. Various issues 2001-2004.
- Papanagiotou E. (1998). Economic implications of fertiliser limitation policies. In Lekakis J (ed.) '*Freer trade, sustainability and the primary production sector in the southern EU: Unraveling the evidence from Greece*'. Kluwer Academic Publishers, The Netherlands.
- Papavassiliou (1991). Factors affecting the competitiveness of Greek horticultural products. Research Centre of the Economics University of Athens. *Taken from Baltas (2001)*.
- Pezaros P. (2004). A brief overview of Greek agriculture, in S. Stamatiadis, J. M. Lynch & J. S. Schepers (eds), "*Remote Sensing for Agriculture and the Environment*", GAIA Center & OECD. Taken from the Ministry of Agriculture web-site.
- Tsiourtis N. (2002). Greece – Water resources, planning and climate change adaptation. Water, weather and climate change. Building linkages for the integrated management. Mediterranean Regional Roundtable. Athens, Greece, 10-11/12/2002.
- Tzouramani E., Mattas K., Fotopoulos Ch.. (1999). "Olive Oil". In Apostolopoulos K. Fotopoulos Ch. (eds.) "*Mediterranean products as traditional Greek products and the future of their supporting measures*" (*in Greek*).
- WWF (2003). WWF Water and Wetland Index – Critical issues in water policy across Europe. Results overview for Greece. November 2003.

Appendix

Table 1 – Gross Value Added of agriculture to the GDP, 1998-2003 (million €)

	Current prices			Constant prices (of the previous year)		
	Agriculture**	GDP	%	Agriculture**	GDP	%
1998	7,919	105,773	7.49	7,731	100,505	7.69
1999	8,047	112,686	7.14	8,196	109,391	7.49
2000	8,030	121,668	6.60	7,752	117,700	6.59
2001	8,321	131,024	6.35	7,728	126,584	6.11
2002*	8,984	141,334	6.36	8,226	136,082	6.04
2003*	9,252	152,572	6.06	8,520	147,387	5.78

* Provisional data

** Including hunting and forestry; fishing and operation of fish hatcheries and fish farms

Source: National Statistical Service of Greece, NSSG

Table 2 – Employment in agriculture and in the other economic sectors ('000)*

	1999		2000		2001		2002		2003	
	No.	%	No.	%	No.	%	No.	%	No.	%
Primary	756.5	19.1	735.3	18.5	680.7	17.3	668.0	16.7	676.4	16.6
Agriculture	743.2		722.4		667.4		654.7		663.7	
Fishing	13.2		12.8		13.4		13.3		12.7	
Secondary	895.4	22.6	893.6	22.5	895.3	22.7	907.3	22.7	916.4	22.4
Tertiary	2,316.3	58.4	2,350.7	59.1	2,365.4	60.0	2,430.3	60.7	2,490.9	61.0
TOTAL	3,968.2		3,979.5		3,941.4		4,005.6		4,083.7	

* Averages of 4-trimester data

Source: Compiled from data from NSSG, Labour Force Survey

Table 3 – Total cultivated areas (annual crops and permanent plantations) and total agricultural land, 1999-2002 (1000 ha)

	1999	2000	2001	2002
Agricultural land ¹	3870	3854	3857	3846
Cultivated area	3463	3459	3464	3456
thereof irrigated (%)	41.6	41.9	41.3	41.4
Crops on arable land	2228	2223	2213	2211
thereof irrigated (%)	42.7	43.1	42.1	42.1
Vegetables	127	123	119	116
irrigated garden area (%)	94.5	95.1	95.8	95.7
Vineyards ²	135	133	134	132
thereof irrigated (%)	28.9	29.3	29.9	30.3
Trees in compact plantations	973	980	998	997
thereof irrigated (%)	33.9	34.3	34.7	35.1

¹ Agricultural land is estimated by adding to the cultivated area the fallow land and deducting mixed and successive cultivations.

² Including grapes and raisins.

Source: NSSG

Table 4 – Areas & production volumes of major agricultural products

	2000	2001	2002	2003
Cereals				
Area Harv	1,278,931	1,285,340	1,295,807	1,282,500
Production	4,792,820	4,661,576	4,591,200	4,286,200
Yield	37.5	36.3	35.4	33.4
Citrus Fruit				
Area Harv	60,800	61,000	61,050	61,050
Production	1,336,244	1,316,614	1,437,500	1,482,500
Yield	219.8	215.8	235.5	242.8
Fibre Crops Primary				
Area Harv	413,600	403,140	388,339	350,000
Production	443,000	455,600	370,000	333,122
Yield	10.7	11.3	9.5	9.5
Fruit excl Melons				
Area Harv	322,770	323,660	323,685	323,680
Production	4,199,838	4,027,651	4,170,300	4,123,600
Yield	130.1	124.4	128.8	127.4
Oilcrops Primary				
Area Harv	1,208,072	1,192,237	1,174,932	1,136,510
Production	632,936	619,084	547,059	660,289
Yield	5.2	5.2	4.7	5.8
Pulses				
Area Harv	24,983	24,147	24,112	24,200
Production	41,937	41,573	40,500	41,600
Yield	16.8	17.2	16.8	17.2
Roots and Tubers				
Area Harv	46,730	45,709	47,506	48,100
Production	885,289	938,703	877,000	902,000
Yield	189.4	205.4	184.6	187.5
Treenuts				
Area Harv	69,662	69,663	69,663	69,660
Production	90,282	99,194	97,000	83,000
Yield	13.0	14.2	13.9	11.9
Vegetables&Melons				
Area Harv	143,889	137,452	134,695	136,300
Production	4,250,377	4,014,508	3,869,500	3,861,500
Yield	295.4	292.1	287.3	283.3

Area: ha ; Production: MT ; Yield: Hg/Ha

Source: FAO

Table 5 – Index value of agricultural output (Base 1999-2001)

	1990	1995	1999	2000	2001	2002	2003
Agriculture (Crops & livestock)	83.1	101.2	99.1	101.2	99.7	96.4	95.0
Crops (grains, vegetables & fruit)	78.0	100.3	98.2	101.6	100.2	95.5	94.4
Livestock	103.9	104.6	102.8	99.6	97.6	100.1	97.2
Grains	94.0	105.7	98.5	102.2	99.3	102.1	90.4
Roots and tubers	106.4	117.3	96.8	98.6	104.6	98.5	100.5
Sugar cane and sugar beets	100.4	92.3	86.9	110.4	102.7	98.7	80.0
Pulses and beans	102.9	105.0	103.1	98.4	98.5	94.1	97.1
Nuts	98.0	106.7	94.6	97.8	107.6	92.2	94.9
Oil bearing crops	46.4	98.4	98.8	101.4	99.9	112.8	106.6
Olives	44.8	98.2	98.1	101.5	100.4	114.9	107.1
Vegetables	88.5	98.6	103.1	101.9	95.1	88.0	91.3
Cabbages	94.6	96.8	96.4	101.8	101.8	101.8	101.8
Artichokes	96.0	71.1	100.0	100.0	100.0	100.0	100.0
Asparagus	39.8	78.6	100.5	99.8	99.8	99.8	99.8
Lettuce	80.4	86.5	102.2	98.9	98.9	98.9	98.9
Spinach	80.4	86.5	102.2	98.9	98.9	98.9	98.9
Tomatoes	92.6	103.6	105.4	103.3	91.4	79.0	85.3
Cauliflower	88.6	82.2	101.7	102.7	95.6	83.6	83.6
Pumpkins, Squash, Gourds	119.5	119.0	95.8	98.9	105.3	101.5	101.5
Cucumbers and Gherkins	103.1	114.4	98.0	101.3	100.7	100.7	100.7
Eggplants	86.8	122.7	100.9	97.6	101.5	102.8	102.8
Chillies&Peppers, Green	83.2	100.0	100.8	102.2	97.0	98.6	98.6
Onions, Dry	56.8	77.6	101.6	94.6	103.8	104.3	99.9
Garlic	92.3	86.9	89.6	116.7	93.7	95.0	95.0
Beans, Green	92.6	100.9	103.7	98.1	98.1	98.1	98.1
Broad Beans, Green	101.3	101.1	100.0	100.0	100.0	100.0	100.0
Carrots	131.4	107.9	107.0	98.9	94.1	92.0	94.9
Fruits	94.4	97.5	99.1	100.8	100.1	88.2	96.4
Bananas	181.4	145.6	98.8	100.6	100.6	100.6	100.6
Oranges	82.1	87.7	104.5	99.9	95.6	108.9	112.2
Tang.Mand.Clement.Satsma	93.8	99.5	97.8	88.7	113.5	126.0	116.1
Lemons and Limes	109.1	97.0	103.2	98.0	98.8	85.9	90.7
Grapefruit and Pomelos	72.9	95.9	86.6	103.3	110.1	96.4	110.1
Citrus Fruit nes	110.3	73.7	81.8	95.5	122.7	122.7	122.7
Apples	123.6	115.5	112.8	101.0	86.2	95.3	88.6
Pears	120.8	103.6	86.8	113.2	100.0	70.8	82.1
Apricots	144.0	54.5	108.5	104.4	87.1	95.0	95.4
Cherries	100.8	106.2	103.5	107.7	88.8	100.2	107.1
Peaches and Nectarines	86.4	113.6	97.1	101.1	101.8	81.2	87.9
Plums	131.6	95.1	115.7	93.6	90.7	93.6	93.6
Strawberries	94.4	102.7	102.2	98.9	98.9	98.9	98.9
Grapes	90.3	90.8	95.6	100.7	103.7	80.5	96.6
Watermelons	94.9	93.8	103.1	99.8	97.0	95.3	97.9
Cantaloupes&oth Melons	83.3	91.1	95.8	98.3	105.9	89.9	89.9
Figs	150.0	102.6	100.0	100.0	100.0	100.0	100.0
Other crops	63.3	103.2	93.2	102.4	104.5	85.7	80.8
Cotton Lint	49.2	101.3	89.8	103.6	106.6	83.0	77.9
Tobacco Leaves	98.6	107.9	101.6	99.3	99.2	92.3	87.9
Livestock	103.9	104.6	102.8	99.6	97.6	100.1	97.2

Source: FAO

Table 6 - Fertilisers and pesticides consumption

	Total Fertilizers		Fungicides & Bactericides		Herbicides		Insecticides		Mineral Oils		Plant Growth Regulators	
	MT	kg/ha	MT	kg/ha	MT	kg/ha	MT	kg/ha	MT	kg/ha	MT	kg/ha
1998	472,000	13,641.6	4,731	136.7	2,303	66.6	2,505	72.4	919	26.6	227	6.6
1999	469,000	13,543.2	3,707	107.0	2,318	66.9	2,835	81.9	613	17.7	151	4.4
2000	456,000	13,183.0	4,676	135.2	2,331	67.4	2,864	82.8	597	17.3	148	4.3
2001	431,000	12,442.3	4,860	140.3	2,650	76.5	2,638	76.2	456	13.2	113	3.3
2002	405,000	11,718.8	n.a.		n.a.		n.a.		n.a.		n.a.	

Source: FAO

Table 7 – Employment (in thousands) in agriculture and in the other economic sectors

	1999		2000		2001		2002		2003	
	No.	%	No.	%	No.	%	No.	%	No.	%
Primary	756.5	19.1	735.3	18.5	680.7	17.3	668	16.7	676.4	16.6
Agriculture	743.2		722.4		667.4		654.7		663.7	
Fishing	13.2		12.8		13.4		13.3		12.7	
Secondary	895.4	22.6	893.6	22.5	895.3	22.7	907.3	22.7	916.4	22.4
Tertiary	2,316.3	58.4	2,350.7	59.1	2,365.4	60	2,430.3	60.7	2,490.9	61.0
TOTAL	3,968.2		3,979.5		3,941.4		4,005.6		4,083.7	

Source: Compiled from data from NSSG, Labour Force Survey

Table 8 – Breakdown of employment according to occupational status*

	2001			2002			2003		
	Aggreg. economy	Agric.	Fishing	Aggreg. economy	Agric.	Fishing	Aggreg. economy	Agric.	Fishing
Employers	325.5	53.3	2.3	302.5	46.0	2.4	299.0	42.6	1.0
Own-account workers	955.6	388.7	6.2	991.3	390.5	5.5	1,007.3	397.2	7.2
Salaried employees	2,320.9	26.2	3.4	2,378.7	27.4	3.3	2,429.4	30.8	3.2
Unpaid family workers	339.4	199.1	1.4	333.2	190.8	2.2	348.1	193.1	1.3
Total	3,941.4	667.4	13.4	4,005.6	654.7	13.3	4,083.7	663.7	12.7

* Averages of 4-trimester data

Source: Compiled from data from NSSG, Labour Force Survey

Table 9 - Average Monthly labour cost by activity sector & sex (€)*

		1999	2000	2001	2002
Males	Primary sector	946.25	987.25	1010	1066.5
	All sectors	1299.25	1329.75	1378.75	1452
	%	72.8	74.2	73.3	73.5
Females	Primary sector	755	756.75	804.25	845.5
	All sectors	1091.5	1132	1144.5	1226.25
	%	69.2	66.9	70.3	69.0
Both sexes	Primary sector	897	927	957.25	1019.25
	All sectors	1221.75	1264.5	1285	1361.25
	%	73.4	73.3	74.5	74.9

* Averages of 4-trimester data

Source: Compiled from data from NSSG, Labour Force Survey

**Table 10 – Agricultural income (million €)
and Annual Working Units**

	Agricultural income	AWU (000)	Agric. Income per AWU
1998	7621.9	599.5	13598.48
1999	8025.3	594.4	14908.87
2000	8113.6	577.3	15727.36
2001	8346.6	551.5	12303.78
2002	8146.2	546.4	13033.27
2003	8368.5	532.1	14406.28

Source: EUROSTAT Economic Accounts for Agriculture Ministry of Agriculture

**Table 11 - Producer price indices in real terms (excluding
VAT) (1995=100)**

	1999	2000	2001	2002
Crop products	90.6	90.6	92.5	96.5
Livestock	83.6	88.5	90.7	83.5
Total	89.6	90.6	92.9	94.1

Source: European Commission Eurostat

Table 11a - Producer prices of selected products (1995 = 100)*

	2001	2002	2003
Overall	120.3	127.2	137.6
Crop production	119.8	130.6	145
Livestock production	121.6	119.4	120.9
Wheat, soft	114.4	107.7	109.3
Wheat, durum	120.8	116.4	116
Maize	109.1	111.2	114.1
Rice	114.4	122.8	118
Cabbage	113	197.7	146.2
Potatoes	138	130.7	153.9
Tomatoes	157.8	173.6	182.4
Peaches	127.8	161.1	271.9
Watermelons	148	126	194.3
Melons	158.4	138.6	183.3
Table grapes	143.8	219.1	169.3
Oranges	128.9	143.9	146
Lemons	102	138.5	142.8
Almonds	123.5	138.5	149.9
Olive oil	90.8	102.5	108.3
Cotton	93.4	92.1	112
Sheep milk	106.5	109.1	110.3
Cow milk	113.6	117.1	118.4
Eggs	134.5	139	142.6
Veal	113.6	112.6	114.9
Lamb	133.1	128.7	136.1
Goats	134.2	129.6	134.9
Pork	144.7	123.8	116.5

*Nominal indices excluding subsidies

Source: NSSG

Table 12 – Average indices of agricultural input prices, 1996-2001 (1995=100)

	1996	1997	1998	1999	2000	2001
Overall input price index	107.6	110.0	112.2	114.3	120.5	123.4
Consumables index	107.7	110.0	111.0	113.1	120.1	122.6
Grains, seeds	108.6	111.8	114.5	117.6	122.2	126.9
Fertilisers	103.2	110.3	113.0	111.7	112.3	124.9
Fuel, lubricants	112.5	112.9	107.0	111.8	140.7	137.7
Pesticides, medical	108.2	111.8	118.8	124.1	124.5	126.6
Feedingstuffs	107.0	107.5	109.1	110.9	113.8	116.1
Veterinary services	105.0	111.3	111.3	111.3	111.1	113.5
Equipment R&M ¹	110.4	114.9	122.9	122.3	124.4	128.2
Buildings R&M ¹	105.7	111.4	117.6	120.3	124.4	129.1
Capital formation index	107.1	110.3	117.5	119.7	122.4	127.0
Agric. machinery	-	109.7	117.0	118.6	120.8	125.5
Agric. buildings	106.1	111.6	118.0	122.6	125.5	129.1
Interest payments	103.8	93.3	91.2	78.0	62.4	48.85

¹ Repair and maintenance

Source: NSSG

Table 13 – Average indices of agricultural output prices*, 1996-2001 (1995=100)

	1996	1997	1998	1999	2000	2001
Overall output index	106.8	109.2	108.3	108.9	113.1	120.5
Crops	110.1	112.0	109.3	110.0	113.2	120.0
Cereals, rice	100.9	101.4	102.0	102.6	106.0	113.6
Vegetables	106.2	124.7	125.7	132.5	141.9	150.1
Fruits	110.2	139.1	139.2	116.9	121.7	124.8
Citrus	106.8	89.9	93.3	105.2	106.6	139.8
Nuts	100.0	103.7	112.8	110.9	117.3	120.9
Wine	104.8	105.2	109.9	115.1	119.4	120.0
Olive	132.6	107.9	89.9	102.8	97.3	98.2
Industrial plants	105.2	103.8	99.8	93.0	99.0	90.5
Pulses	105.7	105.3	108.1	107.9	112.4	112.8
Flowers	94.8	99.5	105.3	101.8	102.5	108.2
Animal products	99.3	102.8	106.3	106.3	113.1	121.6
Meat	107.3	110.5	110.3	108.5	116.4	128.3
Milk	86.6	89.6	97.2	99.4	105.0	109.0
Eggs	112.8	122.8	131.0	133.0	135.3	134.5
Other animal prod.	107.2	111.2	114.7	114.2	125.0	145.2

* Excluding subsidies

Source: NSSG

Table 14 – Food and drinks sector, 2001

Code	Sub-sector description	Prod. volumes mill. T	Sales volumes mill. T	Value of sales mill. €	No of firms
151	Meat and meat products	179	151	402	247
152	Edible fish	7	6	17	30
153	Fruit & vegetables	1,414	1,245	1,067	463
154	Vegetable & animal oils & fats	581	540	324	146
155	Dairy products	1,143	1,084	1,726	475
156	Flour and products	2,306	1,942	630	303
157	Animal feedingstuff	1,602	1,356	401	198
158	Other foodstuffs	1,284	1,192	1,332	706
159	Drinks & beverages	2,595	2,635	929	521
	TOTAL	11,111	10,150	6,828	

Source: NSSG PRODCOM 2001

Table 15 - Final consumption expenditure¹ by purpose, Greece

	1998	1999 [†]	2000 [†]	2000 / 1995 (%)
Food and non-alcoholic beverages	13,726	14,189	15,244	36.9
Food	13,302	13,772	14,799	36.7
Non-alcoholic beverages	425	417	445	43.0
Alcoholic beverages, tobacco	3,635	3,817	4,039	55.7
Alcoholic beverages	761	767	794	51.2
Tobacco	2,874	3,049	3,246	56.8
All other goods and services	63,321	66,416	70,851	49.3
Total consumption expenditure	80,682	84,422	90,134	47.3
<i>% in total consumption expenditure of:</i>				
Food and non-alcoholic beverages	17.01	16.81	16.91	-7.1
Food	16.49	16.31	16.42	-7.2
Non-alcoholic beverages	0.53	0.49	0.49	-2.9
Alcoholic beverages, tobacco	4.50	4.52	4.48	5.7
Alcoholic beverages	0.94	0.91	0.88	2.7
Tobacco	3.56	3.61	3.60	6.5
Food beverages and tobacco	21.52	21.33	21.39	-4.7
All other goods and services	78.48	78.67	78.61	1.3

[†] Provisional data

¹ in million Euro, current prices

Source: Compiled from data from NSSG

Table 16 - Monthly average expenditures of food groups

	1993/94 *		1998/99		% change
	€	% in total food	€	% in total food	
Cereals	-	-	31.52	13.10	
Meat	64.04	26.76	54.78	22.76	-4.00
Fish	15.73	6.57	18.61	7.74	1.16
Dairy	41.19	17.21	43.68	18.15	0.94
Oils and fats	13.34	5.58	12.84	5.34	-0.24
Fruits	19.79	8.27	19.49	8.10	-0.17
Vegetables	26.55	11.09	29.51	12.26	1.17
Sugar and confectionery	-	-	14.47	6.01	
Other food	-	-	2.23	0.93	
Non-alcoholic beverages	-	-	13.51	5.61	
TOTAL FOOD	239.34		240.65		

* Inflated prices

Source: NSSG

Table 17 - Expenditure of households (purchases and benefits in kind), in the whole country on the nine basic groups of goods and services, of certain household categories, as a percentage of overall expenditures, 1999

Household categories	Monthly Average Expenditure	Food	Alcoholic Beverages and Tobacco	Clothing and Footwear	Housing Water - electricity	Durable household Goods	Health	Transport	Communications	Recreation and Culture	Education	Hotels, Cafes and Restaurants	Miscellaneous goods & services
	Euro	%	%	%	%	%	%	%	%	%	%	%	%
All households :	1640.63	16.3	3.2	7.9	21.6	6.9	5.8	10.4	3.0	4.2	2.4	8.3	10
Urban areas	1800.21	14.8	3.0	7.9	22.6	7.2	5.9	10.5	3.1	4.4	2.7	8.4	9.5
Greater Athens	1966.82	14.1	2.8	8.0	22.6	7.3	6.5	10.5	3.1	4.6	2.8	8.5	9.1
Greater Thessalonika	1657.64	14.1	2.9	8.3	25.1	6.7	5.5	10.4	3.1	4.3	2.8	7.8	9.1
Rest of urban areas	1504.21	17.2	3.4	7.6	21.5	7.1	4.7	10.5	3.1	3.8	2.3	8.2	10.6
Semi- urban areas	1435.24	19.2	3.4	8.2	20.8	6.1	5.2	11.1	2.8	3.9	2.0	7.8	9.4
Rural areas	1249.27	21.3	4.0	7.5	18.0	6.2	5.3	9.3	2.6	3.2	1.4	8.3	12.7

Source: NSSG Household Budgetary Survey

Table 18 - Monthly average purchases and receipts in the kind of households, classified by areas, 1999

	All Areas	Urban Areas					
		Total	Greater Athens	Greater Thessaloniki	Rest of Urban areas	Semi - Urban areas	Rural areas
TOTAL EXPENDITURE	1,640.63	1,800.21	1,966.82	1,657.64	1,504.21	1,435.24	1,249.27
01 FOOD & NON ALCOH.	240.65	249.90	260.33	227.98	235.40	236.84	213.57
0111 Bread and cereals	31.52	31.35	32.32	27.92	30.43	31.40	32.14
<i>% in food</i>	13.1	12.5	12.4	12.2	12.9	13.3	15.0
0112 Meat	54.78	56.07	58.50	41.32	55.66	54.79	50.70
<i>% in food</i>	22.8	22.4	22.5	18.1	23.6	23.1	23.7
0113 Fish	18.61	18.41	17.78	17.56	19.97	20.36	18.32
<i>% in food</i>	7.7	7.4	6.8	7.7	8.5	8.6	8.6
0114 Milk , cheese and eggs	43.68	47.40	50.05	48.34	41.69	41.75	33.00
<i>% in food</i>	18.2	19.0	19.2	21.2	17.7	17.6	15.5
0115 Oils and fats	12.84	12.66	12.32	14.40	12.82	13.58	13.02
<i>% in food</i>	5.3	5.1	4.7	6.3	5.4	5.7	6.1
0116 Fruit fresh	19.49	21.06	22.27	21.60	18.42	18.58	15.06
<i>% in food</i>	8.1	8.4	8.6	9.5	7.8	7.8	7.0
0117 Fresh vegetables	29.51	30.61	32.29	26.59	28.43	28.47	26.59
<i>% in food</i>	12.3	12.2	12.4	11.7	12.1	12.0	12.4
0118 Sugar, chocolate & confectionery	14.47	15.57	16.53	14.80	13.86	13.61	11.48
<i>% in food</i>	6.0	6.2	6.3	6.5	5.9	5.7	5.4
012 Non-alcoholic beverages	13.51	14.38	15.65	12.88	12.27	12.47	11.31
<i>% in food</i>	5.6	5.8	6.0	5.6	5.2	5.3	5.3
0121 Coffee, tea and cocoa	5.15	5.37	6.06	4.70	4.16	4.61	4.74
<i>% in food</i>	2.1	2.1	2.3	2.1	1.8	1.9	2.2
0122 Mineral water, soft drinks & juices	8.36	9.01	9.58	8.18	8.10	7.85	6.57
<i>% in food</i>	3.5	3.6	3.7	3.6	3.4	3.3	3.1
02 ALCOHOL & TOBACCO	50.59	53.02	55.20	47.70	50.23	46.43	45.19
<i>% in food</i>	21.0	21.2	21.2	20.9	21.3	19.6	21.2

Source: NSSG, Household Budgetary Survey

Table 19 - Monthly average of quantities of certain items consumed by households, classified by areas

Code	GOODS AND SERVICES	UNITS	Urban Areas						
			All Areas	Total	Greater Athens	Greater Thessalonika	Rest of Urban areas	Semi - Urban areas	Rural areas
			Q U A N T I T Y						
0111	Bread and cereals	Grams	21,155	19,016	18,291	18,288	20,719	23,095	26,839
0112	Meat	Grams	11,583	11,879	12,403	9,168	11,648	11,395	10,753
0113	Fish	Grams	3,707	3,496	3,443	2,936	3,775	4,160	4,129
011510	Milk butter	Grams	0,065	0,072	0,071	0,093	0,066	0,073	0,040
011521	Vegetable fats and other	Grams	0,497	0,520	0,519	0,601	0,498	0,516	0,415
011530	Olive oil	Litres	2,880	2,808	2,723	2,808	2,982	3,071	3,002
011540	Edible oils	Litres	1,040	0,993	0,957	1,379	0,945	1,200	1,101
0116	Fruit fresh	Grams	24,999	26,696	28,359	25,517	23,668	23,519	20,458
011611	Fresh fruits (excl. citrus fruits)	Grams	16,460	16,940	17,542	15,789	16,067	17,027	14,642
011612	Lemons	Grams	1,401	1,566	1,790	1,521	1,124	1,059	1,066
011613	Citrus	Grams	6,723	7,770	8,607	7,728	6,074	4,969	4,374
011681	Dried fruits, nuts and edible seeds	Grams	0,400	0,404	0,408	0,452	0,382	0,439	0,365
011691	Canned and chilled fruits	Grams	0,004	0,003	0,002	0	0,005	0,007	0,005
0117	Vegetables, dried and potatoes	Grams	33,117	34,350	36,300	29,656	31,823	31,182	30,280
011711	Fresh vegetables	Grams	16,847	18,277	19,238	17,503	16,554	15,745	12,940
011751	Dried vegetables	Grams	1,146	0,958	0,902	0,823	1,114	1,330	1,640
011752	Dried onions and garlic	Grams	2,238	2,300	2,466	2,272	1,968	2,069	2,137
011761	Frozen/preserved/canned vegetable	Grams	0,558	0,618	0,671	0,597	0,517	0,528	0,387
011763	Olives	Grams	0,254	0,229	0,214	0,338	0,226	0,223	0,350
011764	Tomato paste, canned & peeled	Grams	0,877	0,971	1,157	0,529	0,728	0,740	0,656
011770	Potatoes	Grams	11,195	10,997	11,653	7,589	10,713	10,546	12,170
0118	Sugar, chocolate & confectionery	Grams	3,126	3,020	3,133	2,438	2,969	3,211	3,413
0122	Mineral water, soft drinks & juices	Litres	10,671	11,370	10,870	10,436	12,680	10,575	8,525
021	Alcoholic beverages	Litres	3,225	3,162	3,523	2,149	2,738	3,339	3,361

Source: NSSG, Household Budgetary Survey

Table 20 – Self-sufficiency in certain agricultural products (%)

Product	2000	2002
Cereals		
Total cereals (excl. rice)	75	75
of which: - Total wheat	81	84
- Rye	97	96
- Barley	60	58
- Grain/maize	74	71
- Total milled rice	-	167
Potatoes	84	85
Sugar	63	98
Fresh vegetables	107	105
Fresh fruit (excl. citrus fruit)	120	126
- Citrus fruit	125	106
Wine	116	-
Milk products		
- Fresh milk products	93	95
- Butter	-	73
Eggs	96	97
Meat	54	53
of which: - Total beef/veal	25	25
- Piguemeat	41	40
- Poultrymeat	79	79
- Sheepmeat and goatmeat	82	80

Source: Eurostat

Table 21 - External trade of Greece (1000\$)

	Agricult.Products		Food Excl Fish		Fruit + Vegetables		Olive Oil		Meat and Meat Prep	
	<i>Imports</i>	<i>Exports</i>	<i>Imports</i>	<i>Exports</i>	<i>Imports</i>	<i>Exports</i>	<i>Imports</i>	<i>Exports</i>	<i>Imports</i>	<i>Exports</i>
1990	3,038,339	2,473,882	2,278,434	1,823,074	215,420	1,153,793	23,617	286,621	858,226	21,574
1991	3,019,552	2,768,039	2,273,155	2,042,604	252,358	1,193,913	122,798	206,477	652,086	32,476
1992	3,366,221	3,219,613	2,523,447	2,372,887	258,584	1,199,141	8,347	494,145	947,583	28,083
1993	3,078,910	2,628,457	2,257,191	1,787,803	226,221	1,008,308	6,283	282,866	768,593	30,747
1994	3,397,379	2,944,014	2,526,827	2,048,787	313,124	1,122,920	17,823	329,901	808,985	51,170
1995	3,941,597	3,341,304	2,977,690	2,260,331	385,067	1,218,438	7,687	553,634	905,874	46,688
1996	3,867,331	3,657,308	2,830,964	2,339,071	397,851	1,177,907	8,868	682,488	805,081	26,784
1997	3,711,677	3,039,343	2,716,912	1,955,264	370,029	1,053,672	10,360	362,808	797,467	68,203
1998	3,779,747	2,979,153	2,753,329	2,071,164	401,309	1,318,630	9,949	296,910	814,810	35,662
1999	3,605,949	3,015,795	2,613,706	1,965,953	413,773	1,049,327	4,890	504,643	725,878	23,502
2000	3,193,275	2,577,316	2,268,005	1,647,277	325,100	1,057,628	3,271	217,539	677,754	23,418
2001	3,134,874	2,414,245	2,251,960	1,654,469	354,310	1,040,891	7,302	220,778	611,341	13,230
2002	3,774,663	2,517,404	2,778,088	1,742,265	481,102	1,058,409	11,690	186,412	726,274	15,115

Source: FAO

Table 22 - Imports and exports of selected agricultural products (US\$ '000)

	Exports					Imports				
	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002
001 - LIVE ANIMALS EXCEPT FISH	1,361	1,286	1,140	1,192	5,025	74,398	93,773	70,841	70,031	72,174
011 - BEEF, FRESH/CHILLD/FROZN	5,592	7,328	5,957	1,550	1,795	432,218	368,520	290,109	151,874	279,863
012 - MEAT NES,FRESH/CHLD/FROZ	12,048	14,263	12,208	11,523	12,601	385,073	361,052	360,542	434,722	428,177
016 - MEAT/OFFAL PRESERVED	191	189	722	56	177	2,956	2,886	2,514	3,258	4,098
017 - MEAT/OFFAL PRESVD N.E.S	19,948	5,105	6,039	2,517	2,950	36,217	32,356	31,311	33,043	47,637
022 - MILK PR EXC BUTTR/CHEESE	34,056	31,821	27,626	27,591	30,527	258,096	247,098	225,250	217,305	248,932
023 - BUTTER AND CHEESE	368	261	57	60	38	32,382	26,891	17,419	18,056	20,848
024 - CHEESE AND CURD	96,356	89,714	82,859	93,265	89,802	273,062	237,426	211,888	220,474	271,954
025 - EGGS, ALBUMIN	1,036	1,672	1,805	1,159	297	13,821	12,731	6,626	9,032	8,194
034 - FISH,LIVE/FRSH/CHLD/FROZ	200,070	242,224	194,855	177,376	178,493	121,642	128,407	107,528	109,744	125,524
035 - FISH,DRIED/SALTED/SMOKED	10,275	11,545	4,241	4,452	10,634	37,284	40,035	29,561	25,401	28,116
036 - CRUSTACEANS MOLLUSCS ETC	24,206	26,141	16,054	18,707	27,978	92,096	83,862	77,943	86,479	116,134
037 - FISH/SHELLFISH,PREP/PRES	24,401	23,037	17,622	18,258	16,549	36,263	42,576	36,875	35,443	48,081
041 - WHEAT/MESLIN	30,724	40,339	19,394	56,114	78,878	134,759	114,806	96,803	91,839	164,724
042 - RICE	29,617	19,729	16,393	11,375	12,739	7,492	9,689	8,787	10,365	13,348
043 - BARLEY GRAIN	4	4	12	6	4,195	27,207	24,504	24,845	23,494	34,367
044 - MAIZE EXCEPT SWEET CORN.	2,284	3,922	2,183	2,907	7,844	83,135	93,416	70,041	85,379	101,810
045 - CEREAL GRAINS NES	2	231	4	3	2,891	3,536	2,577	2,443	4,302	5,668
046 - FLOUR/MEAL WHEAT/MESLIN	19,933	15,010	14,120	14,028	12,049	3,992	2,933	2,359	2,498	2,373
047 - CEREAL MEAL/FLOUR N.E.S	681	476	427	403	359	1,040	908	646	687	331
048 - CEREAL ETC FLOUR/STARCH	79,265	72,226	64,568	63,705	86,378	108,823	103,180	91,978	92,248	127,365
054 - VEGETABLES,FRSH/CHLD/FRZ	125,422	104,916	83,653	106,396	126,554	110,622	119,537	90,843	82,463	144,436
056 - VEG ROOT/TUBER PREP/PRES	327,202	267,039	205,439	204,261	254,844	66,956	69,041	56,224	57,015	78,207
057 - FRUIT/NUTS, FRESH/DRIED	492,775	477,852	417,456	476,415	399,684	173,763	171,695	132,345	156,500	195,585
058 - FRUIT PRESVD/FRUIT PREPS	319,102	248,442	270,934	265,357	307,250	29,821	25,916	24,727	30,743	41,670
059 - FRUIT/VEG JUICES	25,855	14,928	17,839	14,439	8,576	41,184	46,780	38,932	34,938	42,755
061 - SUGAR/MOLLASSES/HONEY	11,365	7,573	4,476	12,430	10,834	31,609	61,368	62,476	20,772	21,786
062 - SUGAR CONFECTIONERY	18,017	15,910	14,905	16,806	15,321	28,235	27,209	22,101	22,657	27,336
071 - COFFEE/COFFEE SUBSTITUTE	7,608	12,236	12,131	19,695	10,195	125,029	110,601	97,718	83,100	84,875
072 - COCOA	659	541	833	1,145	1,066	29,047	24,635	19,684	19,584	30,027

	Exports					Imports				
	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002
073 - CHOCOLATE/COCOA PREPS	13,271	10,630	10,315	12,473	10,114	63,071	72,452	66,870	56,216	83,920
074 - TEA AND MATE	52	146	174	283	205	2,808	2,550	3,495	4,178	5,659
075 - SPICES	5,550	4,523	4,601	3,712	3,416	8,972	7,610	8,510	6,918	6,601
081 - ANIMAL FEED EX UNML CER.	19,786	25,675	25,760	27,948	30,570	230,498	220,559	179,940	197,500	230,949
091 - MARGARINE/SHORTENING	5,678	3,209	4,202	5,427	6,092	18,459	16,039	12,382	11,045	17,330
098 - EDIBLE PRODUCTS N.E.S.	36,179	38,277	35,786	39,258	50,642	183,439	199,196	151,036	139,111	169,027
111 - BEVERAGE NON-ALCOHOL NES	11,977	12,841	16,887	17,913	24,386	26,939	28,579	21,375	26,156	35,855
112 - ALCOHOLIC BEVERAGES	137,293	125,366	102,976	96,766	93,259	274,845	274,456	238,127	262,434	312,949
121 - TOBACCO, RAW AND WASTES	333,626	360,064	264,003	224,686	241,568	89,670	107,507	96,500	93,274	104,122
122 - TOBACCO, MANUFACTURED	113,611	142,498	129,584	122,811	132,826	168,213	166,867	133,135	125,508	176,413
211 - HIDE/SKIN (EX FUR) RAW	21,648	10,610	19,419	28,093	25,141	10,633	6,525	3,400	4,738	5,466
212 - FURSKINS/PIECES, RAW	2,156	526	296	597	360	74,360	32,788	30,883	49,894	43,569
222 - OIL SEEDS ETC - SOFT OIL	17,376	32,491	26,737	29,939	53,800	149,499	115,548	98,541	127,721	130,513
223 - OIL SEEDS-NOT SOFT OIL	4,716	3,752	2,745	3,505	3,480	8,108	1,894	1,037	2,725	935
263 - COTTON	253,148	350,770	305,045	270,972	225,292	11,679	11,083	11,791	5,296	4,008
272 - FERTILIZERS CRUDE	82	205	111	139	86	27,408	23,591	17,782	18,749	17,493

Source: FAO

Table 23 - RCA for Greece

	Rank	RCA
Clothing	29	3.86
Processed food	33	3.28
Fresh food	76	3.20
Basic manufactures	22	1.94
Textiles	24	1.75
Minerals	72	0.95
Chemicals	35	0.89
Miscellaneous manufacturing	62	0.50
Leathe rproducts	75	0.50
Non-electric machinery	43	0.48
Wood products	89	0.45
Electronic componets	54	0.37
IT and consumer electronics	42	0.27

Source: ITC

Table 24 – Exports of major fruit and vegetables (000\$)

	1995	1999	2000	2001	2002	2003	1995- 2003
Fruit Prepared nes	333,727	227,277	304,315	255,602	288,349	243,771	284,913
Olives, Preserved	89,817	110,645	94,030	78,939	119,941	133,720	109,685
Grapes	105,706	123,006	109,256	120,322	65,287	93,876	106,301
Oranges	72,235	86,848	66,385	122,257	132,564	130,864	100,659
Tomato Paste	121,883	92,646	65,730	68,166	74,912	58,011	96,255
Raisins	70,661	68,422	104,490	39,778	32,933	34,366	62,499
Asparagus	61,088	41,840	31,315	41,995	38,847	20,997	43,735
Peaches and Nectarines	51,656	39,501	47,156	65,977	50,944	14,485	38,010
Watermelons	32,911	31,009	25,085	21,865	27,390	26,228	29,715
Vegetables Pr by Vinegar	19,517	19,646	23,592	18,866	16,322	23,431	19,502
Cucumbers and Gherkins	24,977	17,424	11,173	17,686	20,002	16,312	16,313
Kiwi Fruit	13,678	18,524	14,972	15,609	11,256	14,065	15,428
Tang.Mand.Clement.Satsma	9,444	11,362	11,250	15,757	23,217	14,732	14,399
Olives	10,897	13,234	12,739	11,271	19,222	19,240	14,314
Lemons and Limes	10,373	11,711	11,559	11,706	4,636	10,235	12,834
Vegetables Frozen	4,757	9,236	7,984	12,024	10,903	7,224	9,078
Cherries	15,080	12,153	7,039	6,694	6,585	1,631	8,272
Peeled Tomatoes	6,205	7,139	6,603	8,904	14,617	10,174	8,247
Apricots	14,034	9,493	8,669	8,716	5,877	7,653	7,879
Apples	7,109	4,863	6,674	8,376	6,059	15,091	7,703
Prepared Groundnuts	8,385	5,944	3,981	3,211	3,869	4,977	6,457
Chillies&Peppers, Green	3,636	3,718	2,317	6,241	12,002	11,053	6,125
Potatoes	17,673	4,240	3,283	2,319	4,177	2,628	6,041
Oranjice Single-Strengt	6,328	4,200	5,176	4,293	2,030	3,799	5,089
Fruit,Nut,Peel,Sugar Prs	3,829	4,621	3,740	2,785	1,786	2,939	3,208
Preprd Nuts(Excl.Grnuts)	3,658	2,020	2,590	1,757	1,695	1,926	2,414
Tomatojuice Single-Stren	3,644	1,183	378	230	995	207	1,852
Tomatoes	2,013	2,303	1,338	1,948	1,948	1,175	1,811
Oranjice Concentrated	1,698	885	2,804	724	2,034	678	1,512
Beans, Dry	961	1,556	779	684	647	556	851
Cantaloupes&oth Melons	133	315	328	1,198	311	139	400

Source: FAO

Table 25 – Trade Performance Indices for fruit, vegetables and olive oil

	Vegetables HS 07	Fruit HS 08	Potatoes HS 0701	Tomatoes HS 0702	Cucumbers HS 0707	Nuts HS 0802	Oranges HS 080510	Olive Oil HS 1509
Value of exports 2003 (\$)	111,376,896	445,056,128	2,639,914	1,181,416	17,344,036	13,243,838	136,019,808	301,304,928
Trend in exports (1995-2003)	1.83%	-0.35%	-13.70%	-1.41%	-1.70%	-1.80%	2.08%	-5.27%
Share in national exports	0.81%	3.26%	0.02%	0.01%	0.13%	0.10%	0.99%	2.21%
RUV (world average = 1)	-	-	1.02	0.51	3.10	1.31	1.05	1.03
Average annual change in RUV	-	-	-8.29%	-1.82%	16.85%	-1.42%	3.95%	-2.44%
RCA (Balassa measure)	1.41	9.45	-0.28	-0.13	0.43	-0.27	3.52	7.81
Value in net exports (\$)	-78009200	168480864	-40676254	19227322	14397039	-64540082	131087928	290644586
Per capita exports	10.15	40.55	0.24	0.11	1.58	1.21	12.39	27.45
Share in world market	0.80%	1.90%	0.14%	0.03%	1.45%	0.31%	5.68%	9.72%
Product Diversification	2.67	4.11	na	na	na	na	na	na
Product Diversification WS [*]	0.153	0.005	na	na	na	na	na	na
Market Diversification	3.54	12.58	5.01	2.02	1.81	6.87	4.08	1.64
Market Diversification WS	0.072	0.031	0.089	0.170	0.186	0.061	0.067	0.096

^{*} Weighted spread
Source: ITC

Table 26 – Summary of DRC ratios for the four commodities

	Tomatoes		Asparagus		Oranges		Olive Oil	
	Gr.Drch.	€	Gr.Drch.	€	Gr.Drch.	€	Gr.Drch.	€
Years			1997/98-1999/00 (3-year average)					
1. Yield (kg/ha)	45764.86		3656.89		27376.33		871.60	
2. Farm gate price (Currency/ton)	96503	283.21	469063	1376.56	49073	144.02	703328	2064.06
3. Adjusted border price	112509	330.18	576703	1692.45	92532	271.55	792815	2326.68
4. Social cost of non-tradable inputs	23657	69.43	232738	683.02	21436	62.91	410012	1203.26
5. Social value added	100568	295.14	410032	1203.32	76223	223.69	645561	1894.53
6. Social cost of tradable inputs	11941	35.04	166671	489.13	16308	47.86	147255	432.15
7. DRC (4/5)	0.235		0.568		0.281		0.635	

Table 27 –DRC calculations for tomatoes

	1997		1998		1999		Average	
	Gr.Drch.	€	Gr.Drch.	€	Gr.Drch.	€	Gr.Drch.	€
Farm gate price (Curr/ton)	103870.00	304.83	95170.00	279.30	90470.00	265.50	96503.33	283.21
Yield (kg/ha)	46565.95		46457.60		44271.01		45764.86	
<u>Tradeable inputs</u>								
Seeds	5365.76	15.75	6148.95	18.05	4645.43	13.63	5397.98	15.81
Fertilisers	2245.40	6.59	2447.22	7.18	2687.21	7.89	2464.53	7.22
Chemicals	2163.24	6.35	2207.61	6.48	2721.57	7.99	2368.42	6.94
Fuel etc	2478.95	7.27	2926.53	8.59	3523.13	10.34	2981.49	8.73
TOTAL	12253.35	35.96	13730.30	40.29	13577.34	39.85	13212.42	38.70
<u>Non-tradeable inputs</u>								
Labour	1473.56	4.32	1307.85	3.84	1417.06	4.16	1402.21	4.11
Land	4563.42	13.39	5744.54	16.86	4331.41	12.71	4889.88	14.32
Depreciation	6858.12	20.13	8386.28	24.61	8185.19	24.02	7824.78	22.92
Social Contributions	9990.29	29.32	11079.40	32.51	7761.35	22.78	9630.96	28.20
TOTAL	22885.38	67.16	26518.07	77.82	21695.02	63.67	23747.82	69.55

ANALYSIS of PRIVATE PROFITABILITY

	Gr.Drch.	€
Private Output Price (Pf)	96503.33	283.21
Private Value of tradeable inputs (Ef)	13187.00	38.70
Private Value Added (VAf=Pf-Ef)	83316.34	244.51
Total Value of non-tradeable factors (VNf)	23699.49	69.55
Gross Private Profitability per tonne (VAf-VNf)	59616.85	174.96

ANALYSIS OF SOCIAL PROFITABILITY

Adjusted Border Price (Ps)	112509.39	330.18
Social Value of tradeable inputs (Es)	11941.11	35.04
Social Value Added (VAs)	100568.28	295.14
Social Value of Non-tradeable inputs (VNs)	23657.14	69.43
Gross Social Profitability per tonne (VAs-VNs)	76911.14	225.71

COMPARATIVE ADVANTAGE ANALYSIS**PROTECTION COEFFICIENT**

Nominal Protection on Product (NPCp=Pf/Ps)	0.858	0.858
Nominal Protection on tradeable inputs (NPCi=Ef/Es)	1.104	1.104
Effective protection coefficient (EPC=VAf/VAs)	0.828	0.828
DRC (VNs/VAs)	0.235	0.235

Table 28 –DRC calculations for asparagus

	1997		1998		1999		Average	
	Gr.Drch.	€	Gr.Drch.	€	Gr.Drch.	€	Gr.Drch.	€
Farm gate price (Curr/ton)	505450.00	1483.35	465630.00	1366.49	436110.00	1279.85	469063.33	1376.56
Yield (kg/ha)	3728.93		3616.95		3624.80		3656.89	
<u>Tradeable inputs</u>								
Seeds	33043.42	96.97	36193.31	106.22	36167.70	106.14	35134.81	103.11
Fertilisers	62077.87	182.18	68391.95	200.71	70812.25	207.81	67094.03	196.90
Chemicals	30272.55	88.84	33510.01	98.34	35122.43	103.07	32968.33	96.75
Fuel etc	47641.11	139.81	54357.44	159.52	55742.79	163.59	52580.45	154.31
TOTAL	173034.95	507.81	192452.71	564.79	197845.18	580.62	187777.61	551.07
<u>Non-tradeable inputs</u>								
Labour	18401.41	54.00	16332.12	47.93	17695.93	51.93	17476.48	51.29
Land	56986.89	167.24	71736.44	210.53	54089.66	158.74	60937.67	178.83
Depreciation	27188.11	79.79	37716.95	110.69	39617.36	116.27	34840.81	102.25
Social Contributions	124756.34	366.12	138356.87	406.04	96921.83	284.44	120011.68	352.20
TOTAL	227332.75	667.15	264142.38	775.18	208324.78	611.37	233266.64	684.57

ANALYSIS of PRIVATE PROFITABILITY

	Gr.Drch.	€
Private Output Price (Pf)	469063.33	1376.56
Private Value of tradeable inputs (Ef)	187777.61	551.07
Private Value Added (VAf=Pf-Ef)	281285.72	825.49
Total Value of non-tradeable factors (VNf)	233266.64	684.57
Gross Private Profitability per tonne (VAf-VNf)	48019.08	140.92

ANALYSIS OF SOCIAL PROFITABILITY

Adjusted Border Price (Ps)	576702.70	1692.45
Social Value of tradeable inputs (Es)	166670.51	489.13
Social Value Added (VAs)	410032.18	1203.32
Social Value of Non-tradeable inputs (VNs)	232737.74	683.02
Gross Social Profitability per tonne (VAs-VNs)	177294.44	520.31

COMPARATIVE ADVANTAGE ANALYSIS**PROTECTION COEFFICIENT**

Nominal Protection on Product (NPCp=Pf/Ps)	0.81	0.81
Nominal Protection on tradeable inputs (NPCi=Ef/Es)	1.13	1.13
Effective protection coefficient (EPC=VAf/VAs)	0.69	0.69
DRC (VNs/VAs)	0.568	0.568

Table 29 –DRC calculations for oranges

	1997		1998		1999		Average	
	Gr.Drch.	€	Gr.Drch.	€	Gr.Drch.	€	Gr.Drch.	€
Farm gate price (Curr/ton)	48340.00	141.86	49180.00	144.33	49700.00	145.85	49073.33	144.02
Yield (kg/ha)	30600.00		25329.21		26199.79		27376.33	
<u>Tradeable inputs</u>								
Seeds	6418.16	18.84	8578.99	25.18	8387.48	24.61	7794.88	22.88
Fertilisers	3027.65	8.89	4357.35	12.79	3648.64	10.71	3677.88	10.79
Chemicals	2647.67	7.77	3797.61	11.14	3873.06	11.37	3439.45	10.09
Fuel etc	2383.24	6.99	2553.20	7.49	2884.33	8.46	2606.92	7.65
TOTAL	14476.72	42.48	19287.15	56.60	18793.51	55.15	17519.13	51.41
<u>Non-tradeable inputs</u>								
Labour	2989.00	8.77	1671.18	4.90	2005.05	5.88	2221.74	6.52
Land	4058.61	11.91	5650.08	16.58	6927.59	20.33	5545.43	16.27
Depreciation	8152.66	23.93	7391.47	21.69	6969.51	20.45	7504.55	22.02
Social Contributions	5811.94	17.06	5724.27	16.80	7291.10	21.40	6275.77	18.42
TOTAL	21012.22	61.66	20437.00	59.98	23193.24	68.07	21547.49	63.24

ANALYSIS of PRIVATE PROFITABILITY

	Gr.Drch.	€
Private Output Price (Pf)	49073.33	144.02
Private Value of tradeable inputs (Ef)	17519.13	51.41
Private Value Added (VAf=Pf-Ef)	31554.21	92.60
Total Value of non-tradeable factors (VNf)	21547.49	63.24
Gross Private Profitability per tonne (VAf-VNf)	10006.72	29.37

ANALYSIS OF SOCIAL PROFITABILITY

Adjusted Border Price (Ps)	92531.75	271.55
Social Value of tradeable inputs (Es)	16308.46	47.86
Social Value Added (VAs)	76223.29	223.69
Social Value of Non-tradeable inputs (VNs)	21436.22	62.91
Gross Social Profitability per tonne (VAs-VNs)	54787.07	160.78

COMPARATIVE ADVANTAGE ANALYSIS**PROTECTION COEFFICIENT**

Nominal Protection on Product (NPCp=Pf/Ps)	0.53	0.53
Nominal Protection on tradeable inputs (NPCi=Ef/Es)	1.074	1.074
Effective protection coefficient (EPC=VAf/VAs)	0.41	0.41
DRC (VNs/VAs)	0.281	0.281

Table 30 –DRC calculations for olive oil

	1997		1998		1999		Average	
	Gr.Drch.	€	Gr.Drch.	€	Gr.Drch.	€	Gr.Drch.	€
Farm gate price (Curr/ton)	763779.82	2241.47	665809.74	1953.95	680393.68	1996.75	703327.75	2064.06
Yield (kg/ha)	840.64		763.21		1010.94		871.60	
<u>Tradeable inputs</u>								
Seeds (dr/ton)	-	-	-	-	-	-	-	0.00
Fertilisers (dr/ton)	55653.47	163.33	65027.65	190.84	55014.23	161.45	58565.11	171.87
Chemicals (dr/ton)	28108.52	82.49	35396.66	103.88	31842.87	93.45	31782.69	93.27
Fuel etc (dr/ton)	86265.68	253.16	99689.61	292.56	85031.33	249.54	90328.87	265.09
TOTAL	170027.67	498.98	200113.92	587.27	171888.43	504.44	180676.67	530.23
<u>Non-tradeable inputs</u>								
Labour	42014.49	123.30	56770.11	166.60	41353.19	121.36	46712.60	137.09
Land	101357.63	297.45	88494.14	259.70	90414.94	265.34	93422.24	274.17
Depreciation	112028.11	328.77	134931.87	395.98	130123.39	381.87	125694.45	368.88
Social Contributions	117058.46	343.53	156563.47	459.47	167334.63	491.08	146985.52	431.36
TOTAL	372458.68	1093.06	436759.59	1281.76	429226.16	1259.65	412814.81	1211.49

ANALYSIS of PRIVATE PROFITABILITY

	Gr.Drch.	€
Private Output Price (Pf)	703327.75	2064.06
Private Value of tradeable inputs (Ef)	180676.67	530.23
Private Value Added (VAf=Pf-Ef)	522651.07	1533.83
Total Value of non-tradeable factors (VNf)	412814.81	1211.49
Gross Private Profitability per tonne (VAf-VNf)	109836.26	322.34

ANALYSIS OF SOCIAL PROFITABILITY

Adjusted Border Price (Ps)	792815.29	2326.68
Social Value of tradeable inputs (Es)	147254.61	432.15
Social Value Added (VAs)	645560.68	1894.53
Social Value of Non-tradeable inputs (VNs)	410012.00	1203.26
Gross Social Profitability per tonne (VAs-VNs)	235548.68	691.27

COMPARATIVE ADVANTAGE ANALYSIS**PROTECTION COEFFICIENT**

Nominal Protection on Product (NPCp=Pf/Ps)	0.89	0.89
Nominal Protection on tradeable inputs (NPCi=Ef/Es)	1.227	1.227
Effective protection coefficient (EPC=VAf/VAs)	0.81	0.81
DRC (VNs/VAs)	0.635	0.635