

**EVALUATION DE L'IMPACT ENVIRONNEMENTAL  
DE L'ORGANISATION COMMUNE DE MARCHÉ DES  
CULTURES PERMANENTES**

**ANNEXE 17 : OCM VIN  
ETUDE NATIONALE GRECE**

Novembre 2005

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## GLOSSARY

COPA	: Committee of Professional Agricultural Organisations in the European Union
E.P.A.A. –A.Y	: Operational Programme for ural Development - Reconstruction of Countryside
EDOAO	: Greek Interbranch Organisation of Vine and Wine
COGECA	: General Confederation of Agricultural Co-operatives in the European Union
KEOSOE	: Central Cooperative Union of Wine Products
N.AG.RE.F	: National Agricultural Research Foundation
NSSG	: National Statistical Service of Greece
OPEKEPE	: Payment Authority
SEO	: Association of Greek wine makers
S PD RD	: Single Programming Document of Rural Development (),
SEVOP	: Association of Greek wine and liquors industries
UAA	: Utilised Agricultural Area

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## 1. CONTEXT OF WINE PRODUCTION IN GREECE

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### 1.1 Main characteristics of the wine production in Greece

#### 1.1.1 Introduction

The biggest part of Greek production concerns white wines that outclass considerably the red ones, the share of which is decreased continuously in the total domestic production of wine the last years.

With regard to the types of produced wine, the total domestic production is oriented mainly to table wines, while only a small part of production concerns quality wines psr, according to the Greek Ministry of Agricultural Development and Food.

The share of table wines in the total production was 90.2% in the period 1988/89, and after various fluctuations came back in the same level after 10 years.

Respectively, the quality wines psr wines had a share of 8.3% in the period 1988-1989, which reached 9.3% in the period 1998-1999. However, it is considered that it continues to remain in rather limited level, comparatively with other competitor countries. Therefore, it is estimated, that there are potentialities for the enlargement of the share of quality wines psr wines; a fact that will affect positively the enlargement of Greek wines' exports.

Diachronically, Greek vineyards areas present fluctuations. An area of 61,330.8 ha of vineyards existed throughout the whole country in 1988, according to data of the Ministry of Agriculture, while in 1989 there was a marginal increase of 200 ha. The area of vineyards is decreased since 1990 until today, while it was 132,317.5 ha in 1997. The aforementioned downward trend of vine-growing is about 10% during the period from 1993 to 1998.

Comparing the available data for vineyard areas of Greece (132,000 ha) with similar data from other Member States of the European Union, Greece is found in the last places abstaining by far from countries such as Spain (1,210,000 ha) and France (978,000 ha).

In respect of the geographic distribution of Greek areas, most vineyards (1996 data) are found in Crete with 29,348 ha and the areas that follow are Peloponnese with 25,956 ha and the region of Western Greece (Dytiki Ellada) with 19,580 ha, while Thessaly is much more behind with 6,233 ha.

With regard to areas of cultivated varieties in Greece, the vineyards for wine consist roughly 45% of the total vineyards, while the remainder areas are cultivated with table varieties and grapes. The medium cultivation area for Greece is roughly 0.5 ha. for quality wines psr varieties while for the E.U. it is 1.1-7.0 ha and for table varieties 0.4 ha for Greece and 0.7-3.5 ha for the E.U.

The varieties that are intended for table wine occupy the 80% of the total area of vineyards, decreasing in order of 13.4% since 1988. An important element is that the share of varieties for wines of quality is strengthened, even if they present a decrease of 2.6%, respectively. This decrease is owed mainly to the measure of subsidized grubbing up that the Community applied, aiming at the restriction of high production and the accumulation of reserves.

As far as the domestic wine production concerns, there is a declining trend from the beginning of the '80s up to today. More specifically, it decreased from 5,395 hl in the period 1980-81 to 3,987 hl in the period 1997/98 (reduction at 26.1%).

Furthermore, it is observed that at the first five-year period of the period 1980-2002 (with the exception of the interval 1982/83), the total domestic production of wine was overlapping the limit of 5,000 thousands of hectoliters, while from the period 1985-1986 and afterwards the total production of wine is under this limit.

Regarding the participation of production of the organised wine factories in the total production of wine, there were enough fluctuations during the examined period. The remainder percentage corresponds in the said "territorial vinification" that in important degree concerns also auto-consumption.

Concerning, the geographical distribution of production of wine in Greece, the greatest quantities of wine are produced in the regions of: Peloponnese and Western Greece (share 41.1%), Attica and Islands (share 30.5%) and Crete (9.1%).

Finally, the evolution of the reserves of wine presents also big interest for the sector for both Greece and the E.U. Relative data are included in Table 1 and cover the period 1989- 1998. From these data it can be said that an important increase of reserves of wine existed in 1992 and 1993 that were 2.5 millions of hectoliters (they exceeded the 60% of the corresponding annual production) creating intense problems in the market of wine. According to the opinion of sector-based institutions KEOSOE and SEVOP the reserves on 01.09.1993 were the highest ever in the last 30 years.

However this pressure of reserves of wine was decreased considerably, with the contribution of the application of various intervention measures of the CMO.

For the present, the reserves of wine are estimated to be about 1,350 thousands of hectoliters, corresponding to the 1/3 of the annual wine production.

**Table 1 : Evolution of the wine reserves in Greece and EU (1000 hl)**

	<b>Greece</b>	<b>European Union</b>
1.9.1989	1,990	115,292
1.9.1990	1,717	130,776
1.9.1991	1,704	130,737
1.9.1992	2,317	119,206
1.9.1993	2,550	123,031
1.9.1994	1,464	108,687
1.9.1995	1,215	106,000
1.9.1996	1,122	103,464
1.9.1997	1,501	107,102
1.9.1998	1,341	122,253

In regard to the composition of reserves of wine of domestic production, relative data are included in Table 2 and concern the reserves on 31.8.1997. From table 2 data, it is concluded that the reserves of wine include mainly white wines (72.2%) and the greatest share concerns the table wines, which constitute the 83.3% of the total reserves.

**Table 2: Reserves (1000 hl) on 31.8.1997**

<b>Wine category</b>	<b>Total reserves</b>	<b>Red wines</b>	<b>White wines</b>
<b>Production reserves</b>			
Table wines	1,199	230	969
Quality wines psr	207	125	82
Rest of wines	5	2	3
Total No1	1,411	357	1,054
<b>Trade reserves</b>			
Table wines	52	30	22
Quality wines psr	28	22	6
Rest of wines	-	-	-
Total No2	80	52	28
<b>Total wine reserves</b>	<b>1,491</b>	<b>409</b>	<b>1,082</b>
<b>Must reserves</b>	<b>10</b>	<b>8</b>	<b>2</b>
<b>General total of reserves</b>	<b>1,501</b>	<b>417</b>	<b>1,084</b>

### 1.1.2

### 1.1.3 Evolution of vineyards' area in Greece

The vines are classified in two categories depending on their products:

- vines of wine grapes and
- vines for table use.

The cultivated area for vines for table use and for wine production presented constant reduction during the period 1980 – 2001 (Tables 3,4,5,6). More specifically, the cultivated area of vineyards with vines of wine grapes from 100,577 ha, that was in 1980 was decreased considerably reaching 70,685 ha in 2001. It should be noted that the area of vines of wine grapes represented in 1980 the 82.6% of the total cultivated area of vines, while the corresponding percentage in 2001 was 84.2%. The vineyards evolution is given in the following tables 3 and 4.

**Table 3: Evolution of vineyards (1980-1991)**

Area (ha)	Year											
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Vines for wine	100,577	97,205	94,842	94,360	91,985	91,296	90,777	88,332	87,230	86,039	83,459	81,302
Vines for table use	21,149	20,090	20,009	19,677	19,497	19,229	19,352	18,958	18,889	19,047	18,621	18,445

Source: NSSG

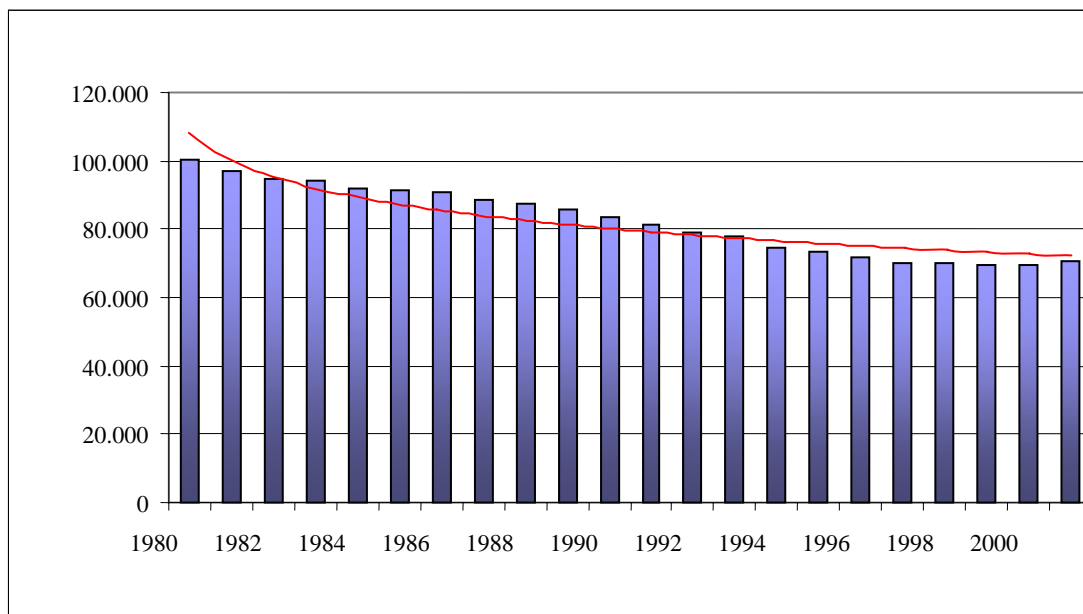
**Table 4: Evolution of vineyards (1992-2001)**

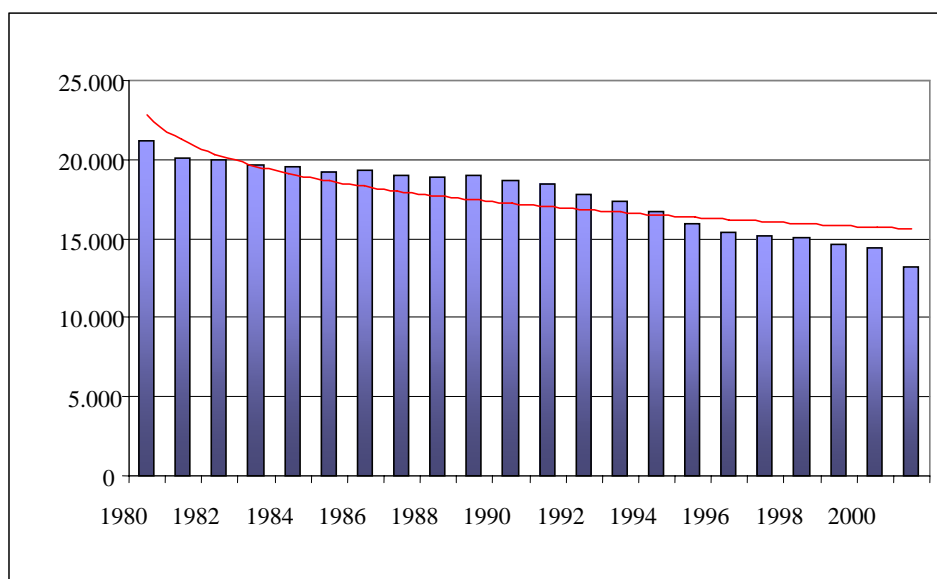
Area (ha)	Year									
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Vines for wine	78,894	77,823	74,820	73,339	71,899	70,160	70,035	69,729	69,716	70,685
Vines for table use	17,785	17,409	16,737	15,961	15,351	15,208	15,080	14,621	14,415	13,250

Source: NSSG

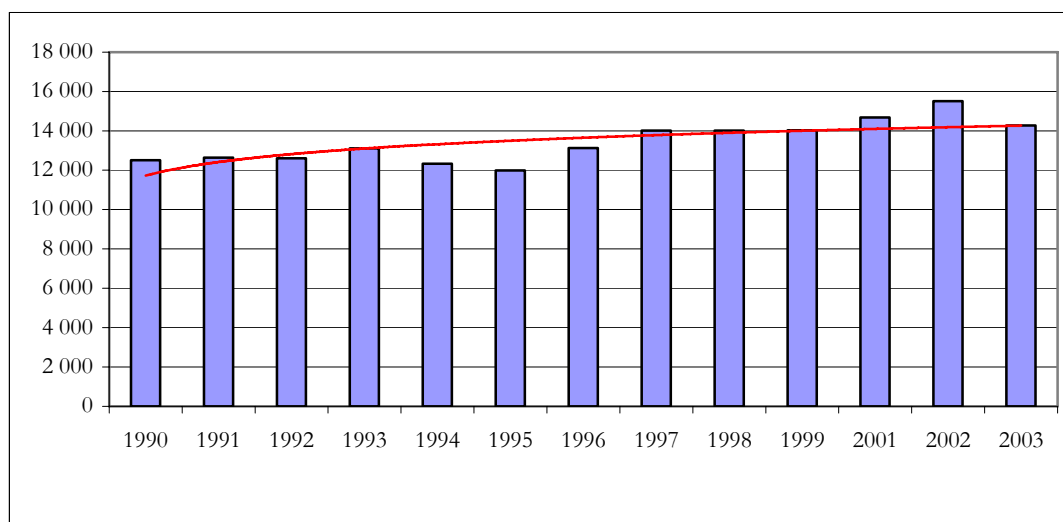
This trend of the cultivated areas is clearly presented in the next charts (Chart 1 and 2).

**Chart 1: Evolution of vineyard areas (ha)- vines for wine**



**Chart 2 : Evolution of vineyard areas (ha)- vines for table use**

As for the quality wines psr production, there is a marginal increase of the cultivation areas' size in time, which reached 15,500 ha in 2002.

**Chart 3: Evolution of quality wines psr cultivation areas (ha)**

The available data on the evolution of organic crops in Greece are limited and cover only three years (1999, 2002 and 2003). The trend for the vines for table use, for which there are more data, seems to be increasing year by year, reaching 2621 ha of cultivating land in 2003.

**Table 5 : Evolution of organic crops in Greece.**

Crops	Area (in ha) 1999	Area (in ha) 2002	Area (in ha) 2003
Vines for table use	525	2258	2621
Vines for wine	1035	Not avail.	Not avail.

#### **1.1.4 Evolution of the number of producers - 1990 to 2003**

The data available on the number of growers cover the period 1989-1999 and they are presented in Table 6, following. According to these data, most of growers cultivate vines for "other wines" (89%) and in the examined period their population was reduced significantly for about 45.7%.



**Table 6: Number of vine growers and evolution**

Wine Type	1989	1999	Variation	1988	1999	Variation
Growers of Vines for Quality wine	29,579	24,115	-18.5%	13,300	13,671	2.8%
Growers of Vines for "Other wines"	198,415	107,811	-45.7%	60,847	37,207	-38.9%
Total Growers of Vines	221,949	131,926	-40.6%	74,147	50,878	-31.4%

Source: EUROSTAT Statistics in Focus, theme 5 - 25/2003.

**Chart 4 : Evolution of vine growers (1989-1999)**

### 1.1.5 Evolution of vines and wine production

#### 1.1.5.1 Evolution of vines production

The data that are available from the National Statistic Service date up to 2001. Generally, the trend of vines production has a gradual decrease, which is more intense for the vines for table use sector. The period from 1980 to 1986 the production of vines for wine ranged between 700,000 to 600,000 tones per year, but the following years the production fell to 500,000 to 600,000 tones per year. It should be noted that in the intermediary years (between 1980 and 2001) the production of vines of wine grapes vines and must as well as the production of vines for table use presented fluctuations. This is owed to the fact that the production is generally influenced by various factors (eg soil and climatic conditions, nutrition of the nogs), which are altered year by year.

The evolution of vines for wine, vines for table use is given in table 7,8,9 and 10 and their graphical presentation in Charts 5 and 6.

In the aforementioned Tables, someone will notice that for example in Table 7 "Evolution of vines for wine" there are both data for grapes for wine and table use, which is due to the fact that some types of grapes that are for table use where used for the production of wine. The same apply for the data of tables 9 and 10, i.e. grapes for wine making were also used for table use.

**Table 7: Evolution of vines for wine (1980-1992)**

Production	Year												
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Grapes for wine	644,064	641,083	634,972	654,769	669,466	653,974	608,186	557,242	574,359	637,754	494,701	546,971	579,966
Grapes for table use	23,906	21,555	19,425	21,306	20,697	17,690	16,840	17,079	18,194	16,062	12,659	14,507	9,905
Total	667,970	662,638	654,397	676,075	690,163	671,664	625,026	574,321	592,553	653,816	507,360	561,478	589,871

Source: NSSG

**Table 8: Evolution of vines for wine (1993-2003)**

Production	Year										
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Grapes for wine	570,647	534,287	561,272	579,962	577,533	556,167	566,244	536,440	576,696	No data available from NSSG	
Grapes for table use	10,502	9,306	10,436	9,048	8,143	8,239	8,530	8,555	16,405		
Total	581,149	543,593	571,708	589,010	585,676	564,406	574,774	544,995	593,101		

Source: NSSG

**Table 9 : Evolution of vines for table use (1980-1992)**

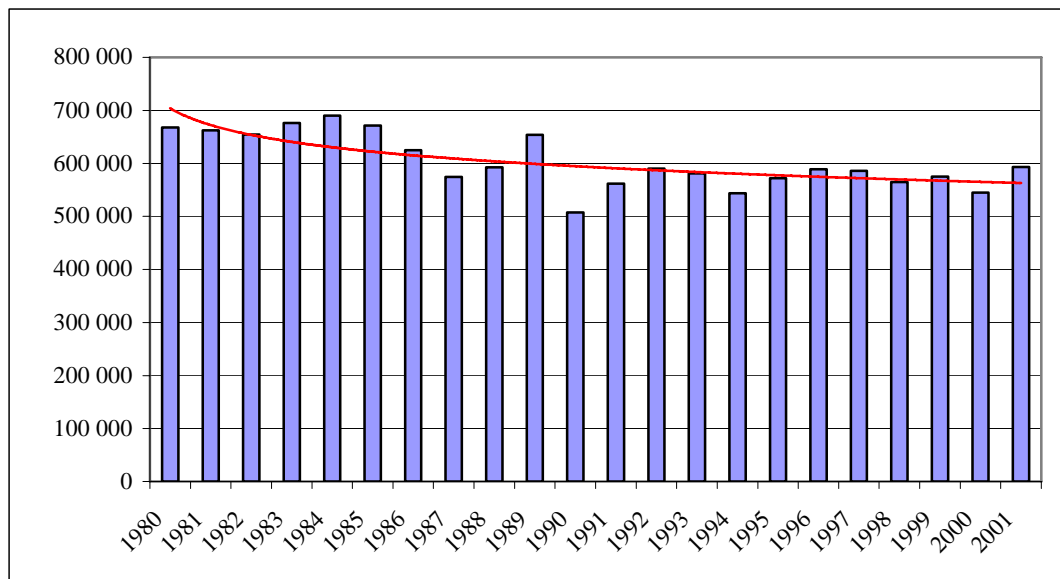
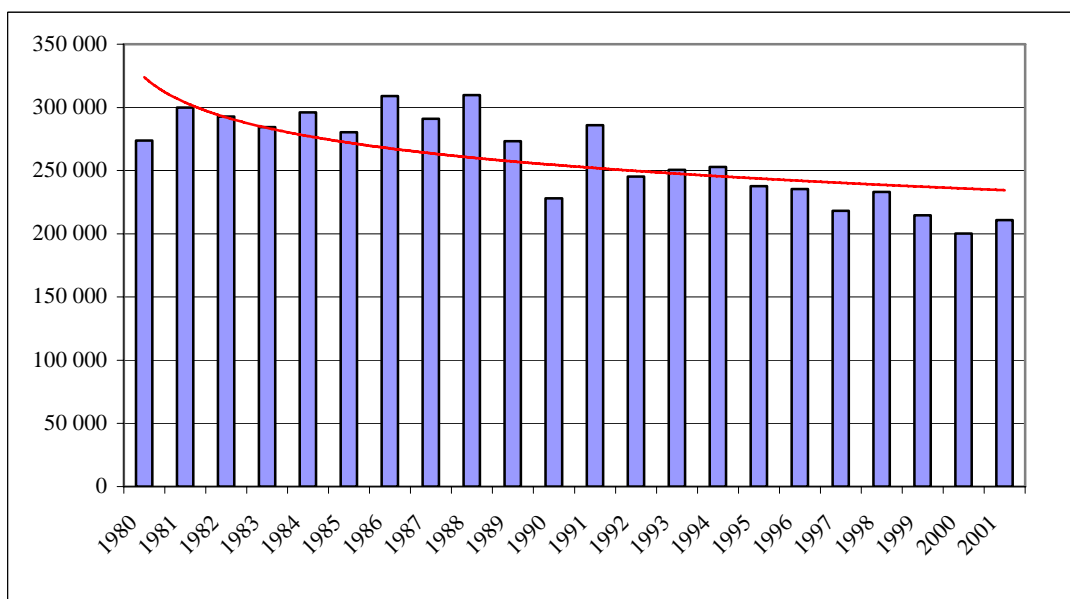
Production	Year												
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Grapes for wine	86,963	91,723	91,835	89,745	96,005	86,360	95,579	105,613	113,468	106,775	80,790	110,180	87,104
Grapes for table use	186,884	208,215	200,907	194,753	199,967	194,130	213,507	185,313	196,348	166,647	147,201	175,715	158,189
Total	273,847	299,938	292,742	284,498	295,972	280,490	309,086	290,926	309,816	273,422	227,991	285,895	245,293

Source: NSSG

**Table 10 : Evolution of vines for table use (1993-2003)**

Production	Year										
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Grapes for wine	91,127	92,146	78,905	89,062	85,043	85,828	79,386	69,045	63,409	No data available from NSSG	
Grapes for table use	159,322	160,733	158,806	146,406	133,180	147,303	135,325	131,216	147,312		
Total	250,449	252,879	237,711	235,468	218,223	233,131	214,711	200,261	210,721		

Source: NSSG

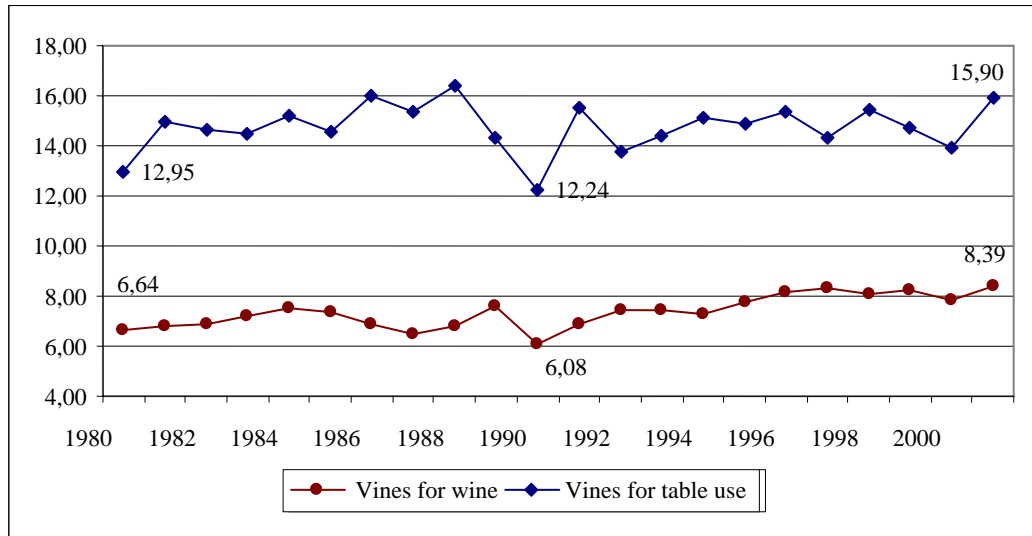
**Chart 5 : Evolution of vines for wine production (tonnes)****Chart 6 : Evolution of vines for table use production (tonnes)**

#### **1.1.5.2 Evolution of vineyards efficiency**

Vineyards efficiency of vines for wine ranged around 6 to 7 ton/ha, during the decade 1980-1990 and the next decade (1990-2001) it has been increased to a range of 7.4 to 8.4 ton/ha reaching a maximum of 8.39 in year 2001. The results are quite different on the efficiency of the vineyards where vines for table use are cultivated. Until 1988, there was a gradual increase of the efficiency up to 16.4 ton/ha, but in 1989 and 1990 there was a significant drop to 14.26 ton/ha and 12.24 ton/ha, respectively, which continue to be ranged between 14 ton/ha and 16 ton/ha the following decade. The aforementioned data are presented in table 11 and Chart 7, following.

**Table 11: Evolution of vineyards efficiency (ton/ha)**

	Year											
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Vines for wine	6,64	6,82	6,90	7,16	7,50	7,36	6,89	6,50	6,79	7,60	6,08	6,91
Vines for table use	12,95	14,93	14,63	14,46	15,18	14,59	15,97	15,35	16,40	14,36	12,24	15,50
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Vines for wine	7,48	7,47	7,27	7,80	8,19	8,35	8,06	8,24	7,82	8,39	No data available from NSSG	
Vines for table use	13,79	14,39	15,11	14,89	15,34	14,35	15,46	14,68	13,89	15,90		

**Chart 7: Evolution of vineyards efficiency (ton/ha)****1.1.5.3 Evolution of wine production**

Data for the total production that emanates from the organised wine factories of the country are presented in Table 12 (also presented in Charts 8 and 9). These data are based to their statements to the Ministry of Agriculture.

**Table 12. Wine production in Greece (1980-2002)**

Year	Table vines (in thousand hl)			Quality wines psr (in thousand hl)			Rest (in thousand hl)			Grand Total (in thousand hl)
	Total	Red	White	Total	Red	White	Total	Red	White	
1980	4984	1750	3234	243	100	143	168	70	98	5395
1981	4960	1930	3030	300	80	220	230	150	80	5490
1982	3900	1000	2900	400	200	200	200	100	100	4500
1983	4616	1664	2952	269	124	145	365	55	310	5250
1984	4674	1455	3219	289	145	144	52	13	39	5015
1985	4180	1270	2910	338	168	170	20	2	18	4538
1986	3991	1253	2738	301	137	164	40	22	18	4332
1987	4136	1338	2798	269	109	160	70	11	59	4475
1988	3937	1339	2598	361	158	203	46	1	45	4344
1989	4173	1389	2784	328	131	197	31	4	27	4532
1990	2766	800	1966	259	94	165	501	173	328	3526
1991	3381	772	2609	199	75	124	436	39	397	4016
1992	3543	851	2692	236	80	156	271	28	243	4050
1993	3184	693	2491	203	80	123	5	1	4	3392

	Table vines (in thousand hl)			Quality wines psr (in thousand hl)			Rest (in thousand hl)			
Year	Total	Red	White	Total	Red	White	Total	Red	White	Grand Total (in thousand hl)
1994	2795	538	2257	223	92	131	33	5	28	3051
1995	3554	637	2917	266	121	145	30	5	25	3850
1996	3738	726	3012	313	145	168	58	10	48	4109
1997	3602	816	2786	342	152	190	43		43	3987
1998	3474	976	2498	358	157	201	0			3832
1999	3343	891	2452	337	165	172	0			3680
2000	3231	1129	2102	327	169	158	0			3558
2001	3139	1115	2024	338	186	152	0			3477
2002	2847	817	2030	251	85	166	0			3098

Chart 8: Evolution of wine production (1 000hl) in Greece (1980-2002)

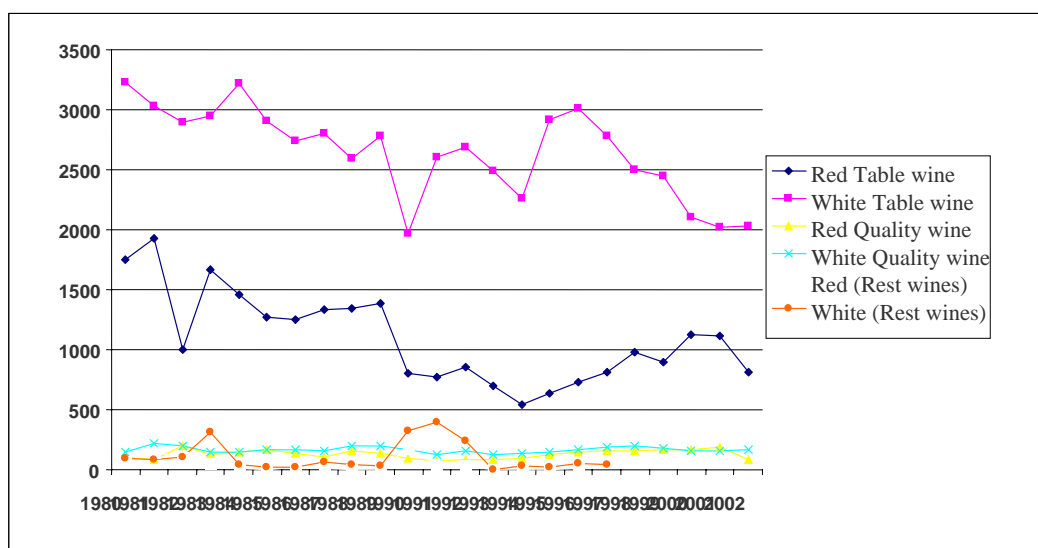
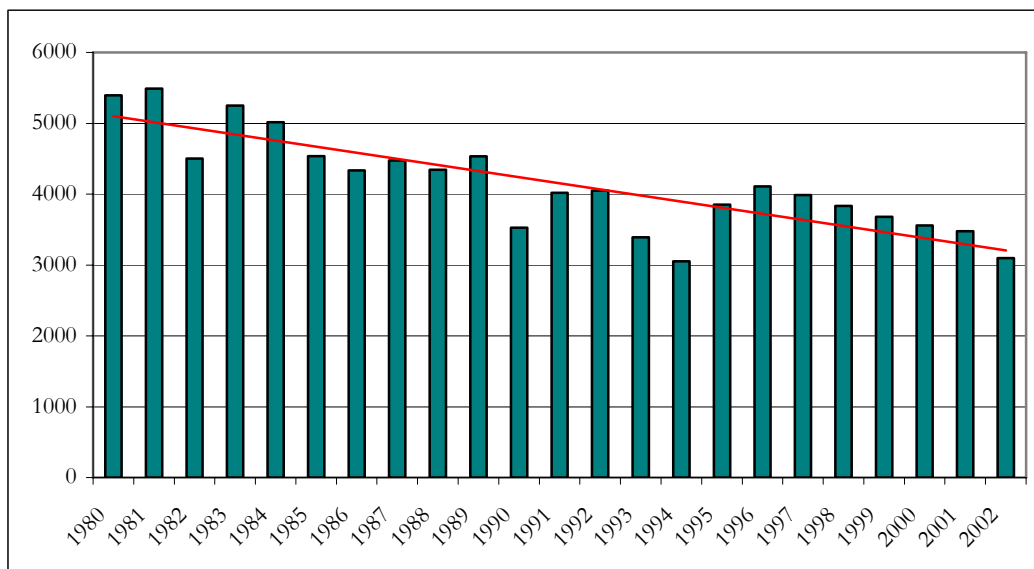


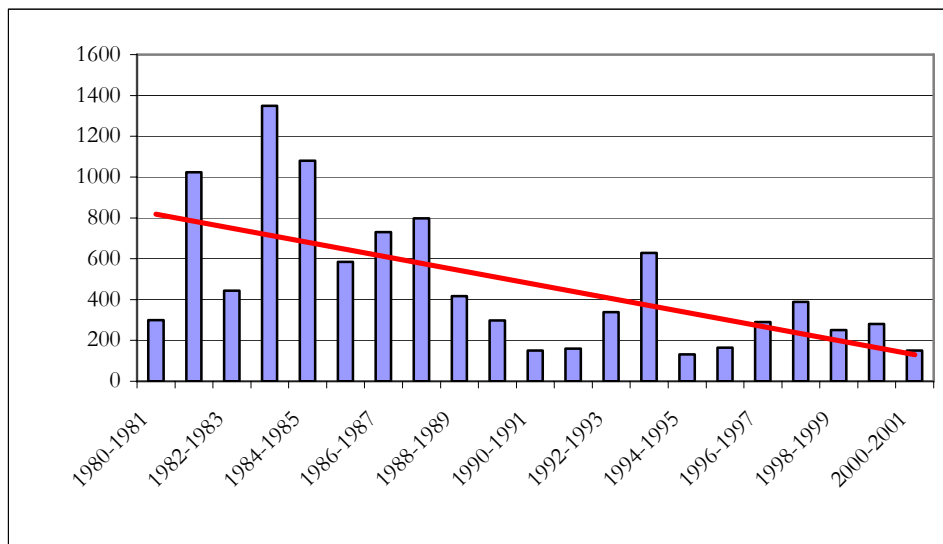
Chart 9: Total wine production evolution (1 000hl)



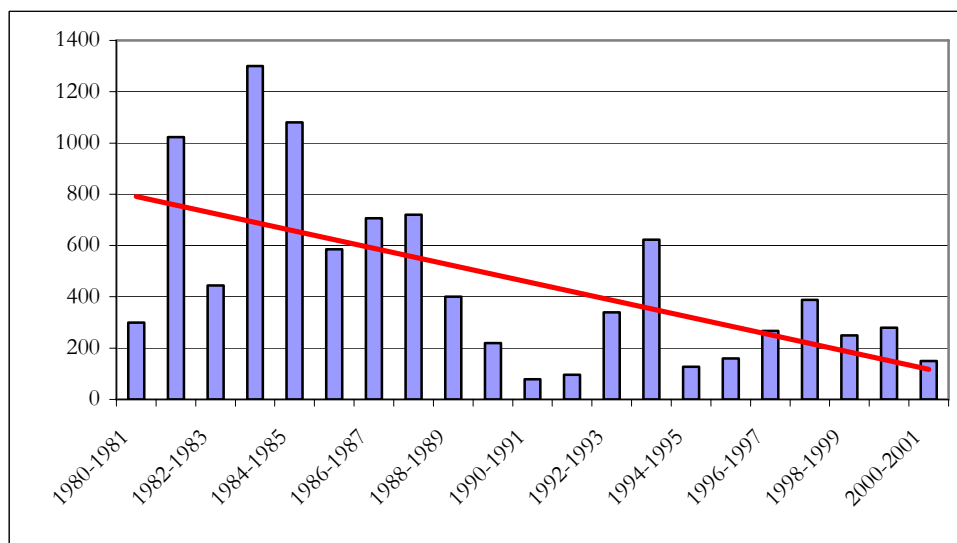
#### 1.1.5.4 Evolution of wine distillation

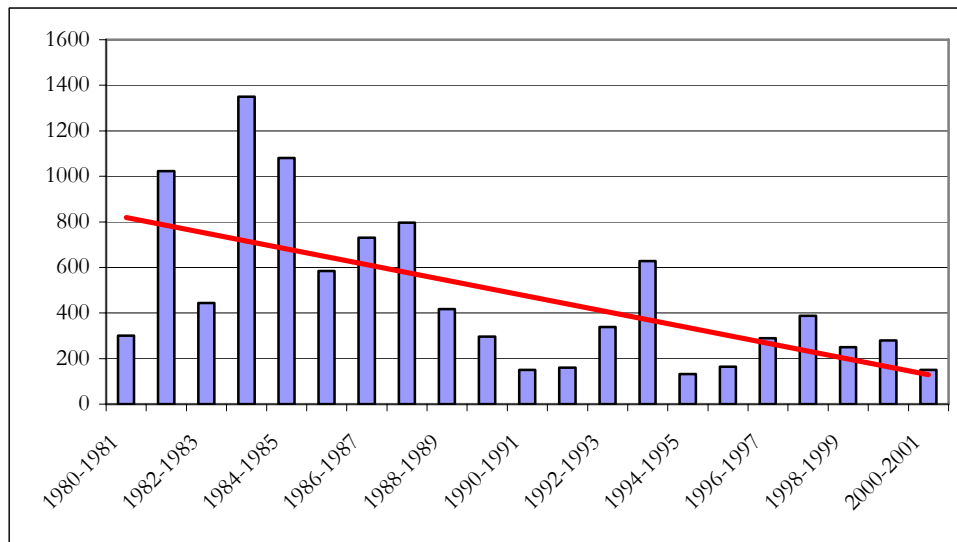
The following charts indicate that there is a remarkable decreasing trend in the distillation of total wine produced, table wine and total wine without eau de vie. It is remarkable that there are a lot of fluctuations in the different types of wine that were distilled during the examined time period, that are not in accordance with the fluctuations the wine production presented.

**Chart 10 : Total wine distillation (1 000hl) from 1980 to 2001**



**Chart 11 : Table wine distillation (1 000hl) from 1980 to 2001**



**Chart 12 : Total wine distillation without eau de vie from 1980 to 2001 (1 000hl)**

### ***1.1.6 Evolution of the number of producers organisations (PO)***

The producers organisations in the sector of vines for wine and for table use that activate in Greece today are 6, according to Greek Ministry of Agricultural Development and Food, from which:

- Two (2) exist in prefecture of Lesvos
- Two (2) exist in prefecture of Cyclades
- One (1) exists in prefecture of Samos
- One (1) exists in prefecture of Dodecanese

More data, on the evolution of the number of PO, unfortunately, are not available.

## **1.2 Level of implementation of the various measures of the CMO in Greece**

OPEKEPE the Payment Authority (its description is given in next paragraphs) has the responsibility of payments. Analytical data for each Hellenic region have been asked from OPEKEPE and they are still expected, until today.

## **1.3 Institutional framework of the vine production in Greece**

In this chapter the main public and private bodies in relation with the production, treatment, payments, control etc of fruits in Greece is included. Every body is presented with a brief description of each role.

### ***1.3.1 Institutions in charge of the management and payment of the premiums***

OPEKEPE is the responsible authority of payments under the application of the CAP and CMO. Aim of OPEKEPE is the management of credits of European Agricultural Guidance and Guarantee Fund –Department of Guarantees. This management is based on a system of control of payment documents of beneficiaries of Community aids and the consecutive recognition and liquidation of expenses, the approval of payment and the relative command, so that the legality of payments is ensured according to the national and Community requirements. Another aim of OPEKEPE is the prevention and the cracking down of any financial irregularity, as well as the recuperation of any pecuniary financial aids, which has been overwhelmed illegally or unduly. The competences of OPEKEPE, according to the article 24 of Law No 2045/01, are the following:

- the control of payment documents of and the recognition and liquidation of expenses. Recording of data and files of payments done.

- the realisation of all kinds of control relative with the legality of payments and the movement of forecasted procedures for the recuperation overwhelmed illegally or unduely, as well as for the imposition of any legal ratification.
- the collection of economic data and the proposal for the formulation of budget of Special Account of Guarantees of Agricultural Products
- the proposal for the publication of decisions and the publication of circulars and directives that determine the details of application of common agricultural policy in the sector of guarantees, the controls and the necessary supporting documents
- the publication and the issuing of imports and exports certificates, as well as certificates of predetermination of contribution in the import and return at the export
- the undertaking of competences of purchase and clearance of products of purchasing intervention, after the decision of Minister of Agriculture as well as the undertaking of competitions, contracting of relative conventions, control of supporting documents, determination of the value of cleared out products, liquidation of financial aids to be recovered or to be returned, follow-up of reserves, ascertainment and certification of deficits or surpluses, deteriorations or alterations
- the maintenance of letters of guarantee and the receipts of guarantees
- the participation in the formulation of lending contracts for the financing of Special Account of Guarantees of Agricultural Products

### ***1.3.2 Institutions in charge of the controls (premiums, surfaces, etc.)***

#### ***Agrocert***

The public, non-profit organization operating under the auspices of the Minister of Rural Development & Food with the title AGROCERT is the standardization, inspection and certification authority in Greek Agriculture. AGROCERT is a Private Law Legal Entity and operates for the public interest. The mission of AGROCERT is the contribution to the improvement of rural population income, the reinforcement of agricultural economy and the sustainable development of the countryside. AGROCERT aims to contribute to the constant collaboration of the different institutions that act as agents of development. Furthermore AGROCERT seeks to become the institutional medium that guarantees the product quality and also implement procedures responsible for the production of qualitative agricultural products.

The scope of AGROCERT is:

the promotion of quality assurance in Agriculture; the protection of terms that refer to a product origin; the support of environmental - friendly systems, such as the system of integrated management in agriculture and forest exploitation. The competences of AGROCERT, according to the current legislation, are:

- The certification of production and surveillance procedures for agricultural products, according to International, European and National Regulations and Standards. The certification is enforced by issuing certificates, compliance labels, quality system certificates and environmental management system certificates.
- The editing and publication of optional standards and guides; the drafting of principles that govern the development and certification of management systems for the quality assurance of agricultural products.
- The evaluation and supervision of the organizations that are responsible for the inspection and certification of organic agricultural and animal products; the control of trade and distribution for the organic agricultural and animal products; the granting of a single label for the acknowledgement of the Greek organic agricultural and animal products.
- The evaluation, approval and supervision of private sectors, responsible for the certification of certain documents application that are composed, published, and recognized by AGROCERT.
- The inspection, supervision and certification of the following agricultural products:
  - protected designation of origin
  - protected geographical indication



- traditional specialty guaranteed
- according to valid European regulations.
- Record keeping of the following:
  - Private Organizations that cooperate with AGROCERT and are responsible for certifications;
  - Auditors, technical experts and inspectors responsible for agricultural products;
  - All the certified products;
  - Agricultural exploitations.

The fields of interest of AGROCERT are:

- Organic Agricultural Products
- Integrated Management in Agricultural Production
- Quality Assurance of Pork
- Quality Assurance of Mariculture Products
- Quality Assurance of Beef & Veal Meat
- HACCP, ISO
- PDO, PGI, Traditional Specialty Guaranteed Agricultural Products
- Special Poultry Farming

### **1.3.3 Interbranch organisations**

- **GREEK INTERPROFESSIONAL ORGANISATION OF VINE AND WINE (E.D.O.A.O)**

The Interbranch Organisation of Vine and Wine has been recognized as National under No 339037/9-2-2001 Decision of Ministry of Agriculture and activates in national level.

It is the first Interprofessional Organisation that was recognized in Greece according to Law 2732/1999 and it represents the entire wine sector of country.

It was constituted by the representatives of production, transformation and marketing of rural products of vine and wine that is represented by the KEOSOE and the Association of Greek Wine, whose members or the members of their members deal with wine production and/or possess vineyards, or possess wine production installations, or networks of sales, in order that the problems that encumber the activities of the involved in the sector to be faced by a reinforced position.

### **1.3.4 Unions**

- **CENTRAL CO-OPERATIVE UNION OF VINE PRODUCTS (KEOSOE)**

The KEOSOE, constitutes the higher level representation of Greek viticulturists. It has, as basic aims, through staff activities, the defence of interests of viticulturists and the promotion of their private economy.

Consequently, it constitutes the main body of representation of the sector of wine economy, a sector that includes 200,000 Greek families activated.

Today in its potential includes 32 members, all secondary co-operative organisations propagated in entire the Greek territory. The KEOSOE participates in all the national and international centres of decision-making that concern the present and the future of the European and Greek viticulture.

It allocates permanent representative in the COPA and the COGECA, leading European Organisations of the sector, but also in Wine Consultancy in Brussels, institutions that address proposals in the Council of Ministers of Agriculture of the Community and in the responsible work teams.

- **THE ASSOCIATION OF GREEK WINE**

It was founded in 1995, afterwards the segregation of activities of the Association of Greek Industries of Wines and Drinks (SEVOP since 1949) in two sectors: the Wine industry and the Distilleries.

Since then, it has the form of non profit organisation, registered in the Books of Athens Court of first instance with number 9735/19 - 6 - 95.

As wine production institution it covers the increased needs of Greek wine industry as for the support of its interests in the Greek and international area.

- **HELLENIC WOMEN OF WINE**

The Association of "Hellenic Women of Wine" was founded, bringing together a number of women of wine related professions: producers, agriculturalists, oenologists, retailers, journalists and sommeliers. Their first and foremost aim is to improve people's knowledge of the various aspects of wine and to create an awareness of its nutritional, social and cultural significance.

In the three years of the Association's existence, the association has organized meetings, wine tasting, various presentations and excursions for all wine lovers, but particularly focused on the interests of women.

### **1.3.5 Research and technical institutes**

#### **1.3.5.1 Research Institutes**

##### **o National Agricultural Research Foundation (N.AG.RE.F.)**

The National Agricultural Research Foundation (N.AG.RE.F.) is the national body responsible for agricultural research and technology in Greece, functioning as a Legal Private Entity sponsored by the Ministry of Agriculture. It was established in 1989 under the Decree 1845/1989 entitled "Development and Exploitation of Agricultural Research and Technology". N.AG.RE.F. is also in charge of research for technological improvement and development in agricultural, forest, and fish production, it is also concerned with topics of veterinary, management of marine resources, soil science, land reclamation, processing and preservation of agricultural products, as well as agricultural economy and sociology. N.AG.RE.F. is administered by an eleven member Administrative Council, whereas the planning of its scientific and research activities is carried by the Scientific Council.

N.AG.RE.F. promotes research and technological activities in both the primary and secondary agricultural production sectors, aiming at an integrated approach to deal with rural problems within the framework of national agricultural policy and the agricultural policy of the European Union.

The role of N.AG.RE.F. in the improvement and creation of new plant varieties and animal breeds and in the production of healthy propagative material should be emphasised.

N.AG.RE.F. has taken part in all the EU framework programmes and has also submitted proposals for programmes that are announced directly by the different directorates of the EU and for programmes that are announced through national bodies (mainly the Ministry of Agriculture and Ministry for the Environment, Physical Planning and Public Works). Substantial participation has begun to take place within the framework of EUROPEAID with the programmes MEDA, ISPA, CARDS, SAPARD, PHARE etc that concern third countries and have as their aim the support and assistance of development in these countries.

N.AG.RE.F.'s research activities are carried out through its National Institutes.

The related to fruits, olive oil and wine CMO branches of NAGREF are:

- National Agricultural Research Foundation of arboriculture and vineyards
  - o Institute of Olive Tree and Subtropical plants of Chania
  - o Institute of vineyards and wine in Attica
  - o Institute of olive tree of Kerkyra
  - o Self existent Laboratory of genetic improvement and cultivation practices of nuts, in Fthiotida
- National Agricultural Research Foundation of soil science and water resources
  - o Institutes of Soil science
  - o Institutes of land mapping and classification in Larissa
  - o Institute of water resources and environmental management
- Agricultural Economics & Policy Research Institute (AG.E.P.R.I.)
- Self existent laboratory of economy of less favorable areas.
- Centers of Agricultural Research Application in 27 Prefectures of Greece, three of them in Peloponnese (Arkadia, Argolida, Messinia)

Universities

##### **o Agricultural University Athens**

A) Department of Rural Economics and Development,

The primary aim of the Department is to promote knowledge and to educate scientists specialized in research and in tackling problems connected with the economic, social, political and environmental dimension of a viable rural development within the framework of European integration.

The special characteristic of the Department is that it combines areas of expertise derived from both the sciences and the humanities. The agro-technical knowledge is essential for the evaluation of management intervention at the level of agricultural enterprises and the economic value of general measures of agricultural policy. On the other hand, decision-making and the formation of policy of an agro-technical nature are not possible without the knowledge of the principles and mechanisms of economics.

As far as its research activities concerns, the Department participates and plays a significant role in a great number of the most important European programs. For the conduction of its research programs, the Department has developed relations and close collaboration with many research and non-research institutions, principally within Greece and Europe. In Greece, it collaborates with the Ministry of Agriculture, the National Agricultural Research Foundation (NAGREF), KEPE, the Tobacco and Cotton Organisations, the Organisation for the Promotion of Exports, many agricultural cooperatives, etc. It also collaborates with most other Greek Universities. Abroad, apart from collaborating with many universities in all the countries of the European Union and of eastern Europe, the Department works together with a number of large research foundations of globally acknowledged status.

The research interests of the Department are oriented towards almost all modern trends in agricultural economy and concern among other issues: Agricultural policy, Integrated agricultural development, International agricultural integration, evaluation of projects and programs, innovation management sustainable development and protection of the environment

Up to now, the Department has undertaken the organisation of all the Greek conferences on Agricultural Economy that have taken place in Athens and has contributed as co-organiser to several other conferences. Teaching staff duties include further activities, such as evaluation of EU research programs and participation in working groups -depending on their specialization, professors of the Department are called upon to collaborate in groups which work on policy-determining issues. Teaching staff duties also include the evaluation of papers submitted to Greek and international scientific journals as well as presentations of topics of general interest at public events.

#### B) Department of Crop Science

The Department's objective is to train agronomists who will contribute to the development of Greek agriculture and will upgrade its competitiveness. Under the Division of Horticulture, Floriculture and Landscape Architecture the Laboratory of Vegetable Crops exists and under the Division of Pomology and Viticulture the Laboratory of Viticulture is are hosted and under the Division of Plant Protection and Environment the Laboratory of Ecology and Environmental Sciences exists.

##### ○ *Aristotle University of Thessaloniki*

The School of Agriculture of the Aristotle University of Thessaloniki is one of the Greek Schools for undergraduate and postgraduate university teaching in agricultural sciences. The mission of the School of Agriculture is to advance and transmit knowledge and understanding of the biological, physical and social sciences as they relate to the production, storage, processing, marketing, and distribution of agricultural products in a manner consistent with sustainability of the agri-food business, conservation of natural resources, maintenance or enhancement of environmental quality and the supply of safe and high quality food. The School carries out its mission through undergraduate and postgraduate education and training. The sectors of specialisation concerning permanent crops are: Agricultural Economics; Field Crops and Ecology; Horticulture and Viticulture; Crop Protection.

##### *University of Thessaly*

The "School of Agricultural Sciences" has two Departments:

- a) Department of Agriculture, Crop Production & Rural Environment
- b) Department of Agriculture, Animal Production & Aquatic Environment

The Department of Agriculture, Crop Production & Rural Environment cooperates closely with Universities and Institutions in Greece and abroad by exchanging experts and students, and by joint meetings and research projects.

The department consists of four sectors:

- a) Sustainable Production of Crop and Horticulture Plants includes amongst others the related topics Crop Cultivation, Viticulture and Vegetable Production, Organic Agriculture, Models of Plant Growth Simulation, Agricultural Sociology and Policy, Agricultural Economics and Marketing of Agricultural Products.
- b) Plant breeding and Biotechnology, which focuses amongst others on the Agricultural Pharmacology and Control of Agrochemicals in the Environment.
- c) Integrated Crop Protection and
- d) Water Resources, Soil Resources and Agricultural Engineering.

The related research topics of this Sector focus on irrigation and Drainage, Hydraulics and Water Quality, Plant Nutrition and Fertilizers, Sustainable Management of Water and Soil Resources, Soil Pollution and Management.

### **1.3.6 Institutes for statistics**

The National Statistical Service of Greece is a General Secretariat of the Ministry of Economy and Finance, with the following structure: a Central Service, with two General Directorates, twelve Central Divisions and seven Decentralised Divisions.

- Sources providing the NSSG with data

Individuals, households, public and private enterprises of almost all the branches of economic activity (agricultural, industrial and commercial enterprises, enterprises providing services), state services, local government, public utility organizations, educational establishments, hospitals, social insurance organizations etc consist the sources from which the NSSG collects data. These data are then tabulated after the appropriate processing. The response rate of the above sources is considered satisfactory and facilitates the collection of data by the NSSG.

- Data Collected

The statistics compiled by the NSSG – monthly, trimestrial, annual, quinquennial and decennial – cover almost all the activity sectors. Population data (population by different categories, vital statistics – marriages – births – deaths), employment and unemployment data, data concerning health and social insurance, education, justice, the production process, finance, prices, the national income and, finally, the cultural activities consist the main input for the derivation of statistical tables and indices compiled by the NSSG on a short-term and long-term basis.

- The use of the NSSG Data

The State is the main user of statistics and indices compiled by the NSSG. On the basis of these data it materializes and follows-up its policies in various domains. Other users are the European Union, which needs the particular data of its Member – States in order to compile the European statistics, international organizations (UN, UNESCO, FAO, ILO, OECD etc), businessmen, scientists, researchers and analysts, as well as citizens.

- Points of particular interest for the NSSG

The National Statistical Service of Greece concentrates on and operates properly in order to:

- coordinate effectively all the statistical works,
- ensure the harmonization of statistics compiled in our country, through uniform methodology, concepts, definitions and classifications to be applied by all services and institutions,
- provide methodological support to services and institutions asking its assistance,
- set up and update databases and meta-databases,
- provide products of high quality.

The data gathered by NSSG are:

- Census of Population 1991
- Censuses 2000-2001
- Demography
- Labour Market

- Indices
- National Accounts
- Trade & Services
- External Trade
- Primary Sector
  - Aquaculture and Fisheries
  - Survey on the Structure of Agricultural - Livestock Holdings
  - Distribution of the Country's Area into Basic Categories of La...
  - Agriculture and Livestock Census
  - Agricultural Statistics
  - Fishery Census
  - Livestock Surveys
  - Annual Agricultural Survey
  - Input - Output Price Indexes in Agricultural and Livestock Production
  - Survey on Agricultural and Livestock Products
- Secondary Sector (Industry)
- Social Statistics, etc.

## 1.4 CMO implementation context in Greece

### 1.4.1 *Environmental actions of operational programmes*

The environmental actions that may be included in an operational programme are given in a question of Chapter 2.

### 1.4.2 *Relationship between AEM measures and orchards.*

No specific measures relating to vineyards have been proposed in the AEM catalogues. In some measures the contracts signed concern vineyards.

According to the existing data of AEM implementation and evaluation the situation concerning AEM is as follows. The Agroenvironmental measures (AEM) have been implemented in two distinct phases in Greece.

The Agroenvironmental measures (AEM) have been implemented in two distinct phases in Greece.

During the first phase 4 measures were implemented according to Reg.(EEC) No 2078/92 from July 1995 till 1999. According to this Regulation an aid is foreseen for farmers, who undertake the obligation to follow certain codes / rules of production, with positive environmental impacts. With a 5-years contract, farmers were obliged to follow a Farming Plan in compliance to the obligations of Reg.2092/91 and its amendments and be under the inspection of a Certifying Body. In Greece, these programmes were:

- Organic farming
- Long term set aside of agricultural land
- Protection of rare breeds of farm animals
- Reduction of nitrate leaching of agricultural origin at the plain of Thessaly

The most significant programme of organic farming was approved in 1995 (1 EC Decision E(99)12 of 20-01-1999.) with a budget forecast of 4.2 millions ECU covering 6,000 ha up to 1997. Priority was given to holdings already under the inspection of Certifying Organisations (and most of them were geographically randomly distributed), holdings into NATURA 2000 candidate areas, holdings of lakesides, riversides and seaside areas, holdings of islands (with exception of plains on Crete and Evia islands) and finally mountainous and semi-mountainous areas with altitude more than 200 m. In case of no response and no uptake at the above-mentioned areas, the plains would be eligible from the beginning of 1997.

At the end of 1998 a total of 1,305 farmers and 6,501.6 ha were contracted and the programme was amended in 1999 having an extension of 14,000 ha. At the end of 1998, classified by crops, olives were representing the vast majority (58%) of the contracted UAA. The rest were **wine**

**vineyards (9%)**, cereals (9%), arboriculture (8%), citrus (6%), horticultures (5%) and raisins (4%).

At the end of 1999 organic farming covered hardly 0.12%, of the total cultivated area. That low implementation was probably a of the complexity of application of codes of organic farming, since many fungus mainly crops diseases were very difficult to be fight with methods and techniques that were suggested in the frame of the program application.

In the second phase, AEM have been launched in 2001, according to RDP (Single Programming Document of Rural Development). All AEM of SPDRD are included in one sole Axis (Axis 3): Agri-environmental measures. Priority Axis 3 of SPDRD was approved with E(2000) 2733/27.9.2000 decision of European Commission and includes AEM in compliance to Reg.1257/99 and its amendments, with an additional effort for complementarity and harmonization with other EU's legislative documents (e.g. Dir. 91/676/EEC, Dir. 92/43/EEC, Dir. 79/409/EEC).

Aim of "Priority Axis 3: Agri-environmental measures of RDR", is the support of the farming production methods intended to the protection of the environment and the conservation of natural land. But no specific measure is indented to vineyards cultivation.

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## 2. ANSWER TO EVALUATION QUESTIONS

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### 2.1 Vertical questions relating to the wine CMO

#### 2.1.1 Wine – Theme 1 : supply control

**Question 1(V1): What is the environmental impact of the ban on planting new vines except in regions of growing demand ?**

European Union established initially Regulation 822/1987 in order to organize the wine market in a better way. According to this Regulation, among various measures, new planting of vine was prohibited until 31 August 1990. However, the member states could grant new planting rights for the areas that were intended for production quality wines psr or/and for other certain aims.

It should be noted that according to Regulation 1627/1998, which concerned the modification of Regulation 822/1987, it was possible that the Member States would grant new planting rights during the viticultural periods 1998/1999 and 1999/2000. These grants could not exceed the limit of 208 ha for Greece, totally for these two periods.

Afterwards, Regulation 822/1987 was replaced by Regulation 1493/1999, which includes rules that concern the potential of wine production, the market mechanisms, the producers organisations and the interprofessional organisations, the oenological practices and processes as well as rules for the description, the name, the presentation and the protection of products, the quality wines psr, and the transactions with third countries.

According to the new regulation, the planting with classified vines of wine grape varieties is prohibited until 31 July 2010, unless carried out pursuant to:

- a) a new planting right
- v) replanting right and
- c) planting right granted from a reserve.

More specifically, the following cases are excluded from the above ban:

- new plantings carried out under measures for land consolidation or measures concerning compulsory purchases in the public interest adopted under national legislation,
- new plantings intended for wine-growing experiments,
- new plantings intended for graft nurseries.
- new plantings whose wine or vine products are intended solely for the consumption of the vine grower's family.
- new plantings in areas indented for the production of a quality wine prs or a table wine described by means of a geographical indication where it has been recognized that, owing to its quality, the production of the wine in question is far below demand (no later than 31 July 2003)
- replanting by producers who have grubbed up or are intended to grub up an area of vines. The replanting rights shall be for an area equivalent in terms of pure crop to that from which vines have been or are to be grubbed up.

It should be noted that replanting rights may be transferred, in whole or in part, to another holding in the same Member State where:

- (a) part of the holding concerned is transferred to that other holding.
- (b) areas on that other holding are intended for:
  - (i) the production of quality wines psr or table wines which are described by means of a geographical indication, or
  - (ii) for the cultivation of graft nurseries.

In order to improve the management of production potential, at a national and/or regional level, Member States shall create a national reserve, and/or as the case may be, regional reserves, of planting rights.

A Community reserve fund of newly established planting rights, which is 17,000 ha, was created, through Regulation No 1493/1999. These newly established planting rights, which also include the new planting rights that are granted by each Member State, were distributed in the



various Member States. Greece received an area equal to 1,098 ha, for which it has the possibility of granting new planting rights for vineyards.

These newly established planting rights as well as, the rights from producers that did not make use of replanting right create the national reserve or the regional reserves of planting rights that are reported above.

Member States may grant the rights allocated to the reserve:

- without payment, to producers who are under 40 years old, who possess adequate occupational skill and competence, who are setting up for the first time on a wine-producing holding and who are established as the head of the holding; or
- by payment into national and, if appropriate, regional funds, to producers who intend to use the rights to plant vineyards whose production has an assured outlet. The Member States shall define the criteria for setting the amounts of the payment, which may vary depending on the final intended product of the vineyards concerned.

In application of Regulation 1493/1999, Greece published Decision 226517/24-03-2003, whose subject was the grant of new planting rights of vineyards with vines of wine grape varieties. According to this decision:

- I. The new planting rights of vines, in zones of quality wines psr and Local wines production, that Greece acquired from the European Union and amount 1,098 ha, as aforementioned, are distributed in the various Regions and Directorates of Rural Development /Agriculture (Table 13).

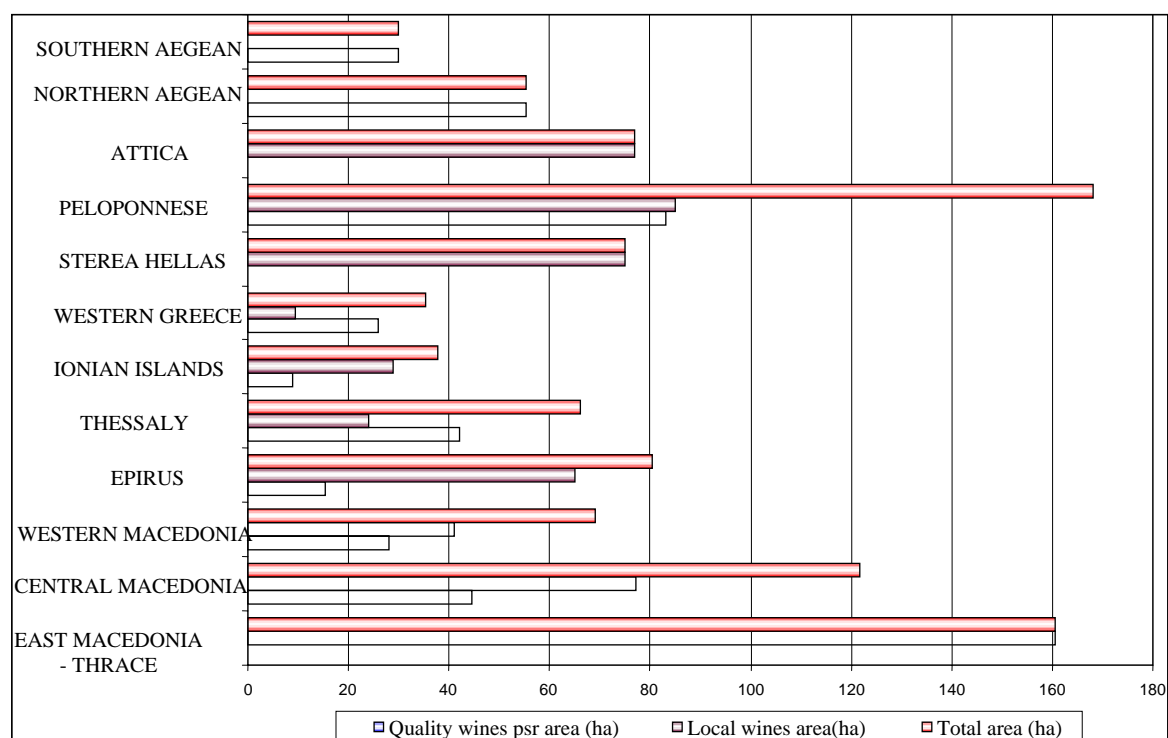
**Table 13: Distribution of new planting rights of vineyards in areas of quality wines productions and local wines, according to Regulation 1493/1999**

No	Regions	Quality wines psr area (ha)	Local wines area(ha)	Total area (ha)
	<b>EAST MACEDONIA - THRACE</b>	<b>0.0</b>	<b>160.6</b>	<b>160.6</b>
1.	PREFECTURE OF XANTHI	0.0	37.4	37.4
2.	PREFECTURE OF RODOPI	0.0	56.1	56.1
3.	PREFECTURE OF DRAMAS	0.0	37.1	37.1
4.	PREFECTURE OF KAVALA	0.0	30.0	30.0
	<b>CENTRAL MACEDONIA</b>	<b>44.5</b>	<b>77.1</b>	<b>121.6</b>
5.	PREFECTURE OF SERRES	0.0	13.1	13.1
6.	PREFECTURE OF THESSALONICA	0.0	7.5	7.5
7.	PREFECTURE OF CHALKIDIKI	3.0	15.0	18.0
8.	PREFECTURE OF KILKIS	22.4	0.0	22.4
9.	PREFECTURE OF PELLA	0.0	9.4	9.4
10.	PREFECTURE OF GIANNITSAS	0.0	13.1	13.1
11.	PREFECTURE OF IMATHIA	19.1	19.0	38.1
	<b>WESTERN MACEDONIA</b>	<b>28.0</b>	<b>41.1</b>	<b>69.1</b>
12.	PREFECTURE OF FLORINA	28.0	5.6	33.6
13.	PREFECTURE OF KOZANI	0.0	13.1	13.1
14.	PREFECTURE OF GREVENA	0.0	22.4	22.4
	<b>EPIRUS</b>	<b>15.4</b>	<b>65.0</b>	<b>80.4</b>
15.	PREFECTURE OF IOANINA	15.4	65.0	80.4
	<b>THESSALY</b>	<b>42.2</b>	<b>24.0</b>	<b>66.2</b>
16.	PREFECTURE OF LARISSA	20.0	24.0	44.0
17.	PREFECTURE OF MAGNESIA	17.5	0.0	17.5
18.	PREFECTURE OF KARDITSA	4.7	0.0	4.7
	<b>IONIAN ISLANDS</b>	<b>9.0</b>	<b>28.9</b>	<b>37.9</b>
19.	PREFECTURE OF CORFU	0.0	26.0	26
20.	PREFECTURE OF LEFKADA	0.0	1.9	1.9



No	Regions	Quality wines psr area (ha)	Local wines area(ha)	Total area (ha)
21.	PREFECTURE OF KEFALLINIA	9.0	1.0	10.0
	<b>WESTERN GREECE</b>	<b>26.0</b>	<b>9.4</b>	<b>35.4</b>
22.	PREFECTURE OF ACHAIA	26.0	0.0	26.0
23.	PREFECTURE OF ILIA	0.0	9.4	9.4
	<b>STEREA HELLAS</b>	<b>0.0</b>	<b>75.1</b>	<b>75.1</b>
24.	PREFECTURE OF FTHIOTIDA	0.0	10.4	10.4
25.	PREFECTURE OF VIOTIA	0.0	46.0	46.0
26.	PREFECTURE OF EVIA	0.0	18.7	18.7
	<b>PELOPONNESE</b>	<b>83.0</b>	<b>85.0</b>	<b>168.0</b>
27.	PREFECTURE OF ARGOLIDA	3.8	0.0	3.8
28.	PREFECTURE OF KORINTHIA	26.7	18.7	45.4
29.	PREFECTURE OF ARKADIA	52.5	7.5	60.0
30.	PREFECTURE OF MESSINIA	0.0	36.8	36.8
31.	TRIFYLLIA AREA	0.0	15.0	15.0
32.	PREFECTURE OF LAKONIA	0.0	7.0	7.0
	<b>ATTICA</b>	<b>0.0</b>	<b>77.0</b>	<b>77.0</b>
33.	PREFECTURE OF WESTERN ATTICA	0.0	16.5	16.5
34.	PREFECTURE OF EASTERN ATTICA	0.0	60.5	60.5
	<b>NORTHERN AEGEAN</b>	<b>55.2</b>	<b>0.0</b>	<b>55.2</b>
35.	PREFECTURE OF LESVOS	28.1	0.0	28.1
36.	PREFECTURE OF SAMOS	27.1	0.0	27.1
	<b>SOUTHERN AEGEAN</b>	<b>30.0</b>	<b>0.0</b>	<b>30.0</b>
37.	PREFECTURE OF CYCLADES	0.0	0.0	0.0
38.	PREFECTURE OF DODEKANISA	30.0	0.0	30.0
	<b>CRETE</b>	<b>28.6</b>	<b>92.9</b>	<b>121.5</b>
39.	PREFECTURE OF HERAKLION	12.7	72.3	85.0
40.	PREFECTURE OF LASITHI	15.9	18.7	34.6
41.	PREFECTURE OF CHANIA	0.0	1.9	1.9
	<b>TOTAL</b>	<b>361.9</b>	<b>736.1</b>	<b>1,098</b>

**Chart 13: Distribution of new planting rights of vineyards in areas of quality wines production and local wines, according to Regulation 1493/1999**



- II.** The grants of new plantings of vineyards with vines of wine grape varieties are granted:
- During the viniculture period 2002–2003 and the new planting can be realised until the end of second viniculture period, that follows the one at which the grant was granted. The new planting rights that are not used in the above deadline are given to the reserve fund (national or regional).
  - In granted areas new planting rights are also included those that will be granted to new farmers. The rights in the whole country cannot exceed the 30% of total area, i.e.  $1,098 \times 30\% = 329.4$  ha.
  - In an area equal to the approved one, in each zone of quality wines production psr and Local wines production for each prefectural Directorate of Rural Development/ Agriculture and with the engagement that the increase that is reported in the above table (Table 13) will be applied for the whole production of quality psr and local wines of each region separately.
  - For wine grape varieties only, that have been classified in each Prefecture, according to No 306590/28-11-2002 Decision 'On classification of varieties of vine in National level', in the category of vineyards with vines of wine grape varieties. These varieties are used in the quality wines production psr and Local wines that have been approved respectively.
  - The minimal area for which new planting grant can be obtained is 0,1 ha.

#### NEW PLANTINGS

New plantings of vineyards in an area equal to 12,494 ha were planted, during the period 1996 – 2002 (Table 14).

**Table 14: New plantings (ha)**

	1996-97 (1)	1998-99 (2)	2000 (3)	2001 (3)	2002 (3)	Total
Greece	208	208	-	1,098	10,980	12,494

Source: (1) EC Regulation 1592/96, (2) EC Regulation 1627/98, (3) Inventories

As analyzed before in chapter 1.1 “Main characteristics of the wine production in Greece”, **the cultivated area both for vines for table use and for wine production presented constant reduction during the period 1980 – 2001**. Specifically, the area of vines of wine grapes represented in 1980 the 82.6% of the total cultivated area of vines, while the corresponding percentage in 2001 was 84.2%. Similar evolution had also the production of vines of wine grapes, as well as the production of must. As aforementioned, the production of vines of wine grapes and must as well as the production of vines for table use presented fluctuations that are owed to the fact that the production is generally influenced by various factors (eg soil and climatic conditions, nutrition of the vines), which are altered year by year.

Contrary to the area and the production, the efficiency both of the vines that are intended for table use and the vines of wine grapes, expressed as the quotient of production to corresponding area, was increased. Specifically, the efficiency of vines of wine grapes was increased from 6.64 t/ha in 1980 to 8.39 t/ha in 2001. Moreover, the efficiency of vines that are intended for table use reached the value of 15.90 t/ha in 2001, from 12.95 t/ha that was in 1980.

It should be noted that for the years 2002 and 2003, available data do not exist in regard to the evolution of area and the production on vines that are intended for table use and also for wine production, from the National Statistical Service of Greece.

Concerning the environmental impacts the limited existed data are described in the following paragraphs.

- **Water quantity and quality effects**

There is no specific connection between geographic regions, irrigation technology and type of crop and in most regions of Greece and for most crops, all types of irrigation systems can be found. Both groundwater and surface water sources are used and, in some cases, a small proportion of water is drawn from springs. For all crop types and regions, the dominant system is support irrigation, lasting from late spring to early autumn.

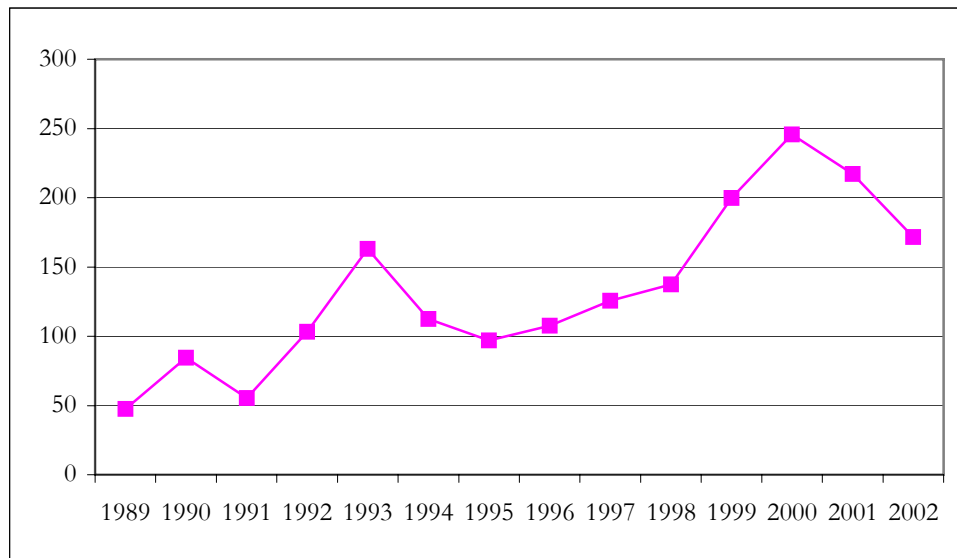
As mentioned in paragraph 1.1.1 (“Introduction”), the majority of vineyards (1996 data) are found in Crete, where a great variety of other crops are also cultivated (vegetable crops, fruit crops). In Crete, the demand for irrigation water is high, while at the same time only 31.0% of the available agricultural land is irrigated (in Crete), which is a percentage a little bit lower than that of the whole Greece (36.3%) (K.S. Chartzoulakis, N.V. Paranychianakis, A.N. Angelakis).

In Crete, there was an increase, for irrigation water, by more than 55% in the last 15 yrs, while the average increase at the same time in the country was 25%. For vegetable crops, more than 91% of the cultivated area is irrigated, while the irrigated percentage in row crops was 34.0%, in fruit trees 36.3% and in vineyards 45.1%.

It is estimated that, on average, only 55% of water diverted or extracted for irrigation is effectively used by the crop. In some cases, the losses are estimated to be as much as 50% of the delivered water (Dialynas, Diamadopoulos, & Angelakis, 1995). From the above comments we may conclude, that no reliable data exist for the irrigated areas of vineyards, even in Crete, where the majority of vineyards farming exist..

It should be noticed that the IRENA report estimates regional water abstraction rates for agriculture calculated by weighting national reported water abstraction rates by regional irrigable area. This regionalisation provides a good indication of regions that have a higher water demand. In Greece the regions estimated to require more than 1000 million m<sup>3</sup>/year are: Anatoliki Makedonia (Thrace), Kentriki Makedonia and Thessalia (representing 58% of Greek agricultural water abstraction). **None of these regions are characterised by vine farming and therefore an increase of irrigation water can not be safely connected to vine intensification.**

Furthermore, according to FADN Data the water consumption cost for vines irrigation increased more than 150% the period from 1989 to 2002. A reason of this cannot be the increase of water price, since in Greece no increase in irrigation water prices existed in the last 15 years (interview with experts). This may be derived from the turn of more and more growers to groundwater exploitation (even in large depths), which increases the energy demand for irrigation. From the above situation we may conclude indirectly and not completely safely, that we had an impact in water irrigation consumption, which cannot be determined and be quantified.

**Chart 14 : Evolution of water consumption cost in Greece (F81-AVG)**

Source : FADN

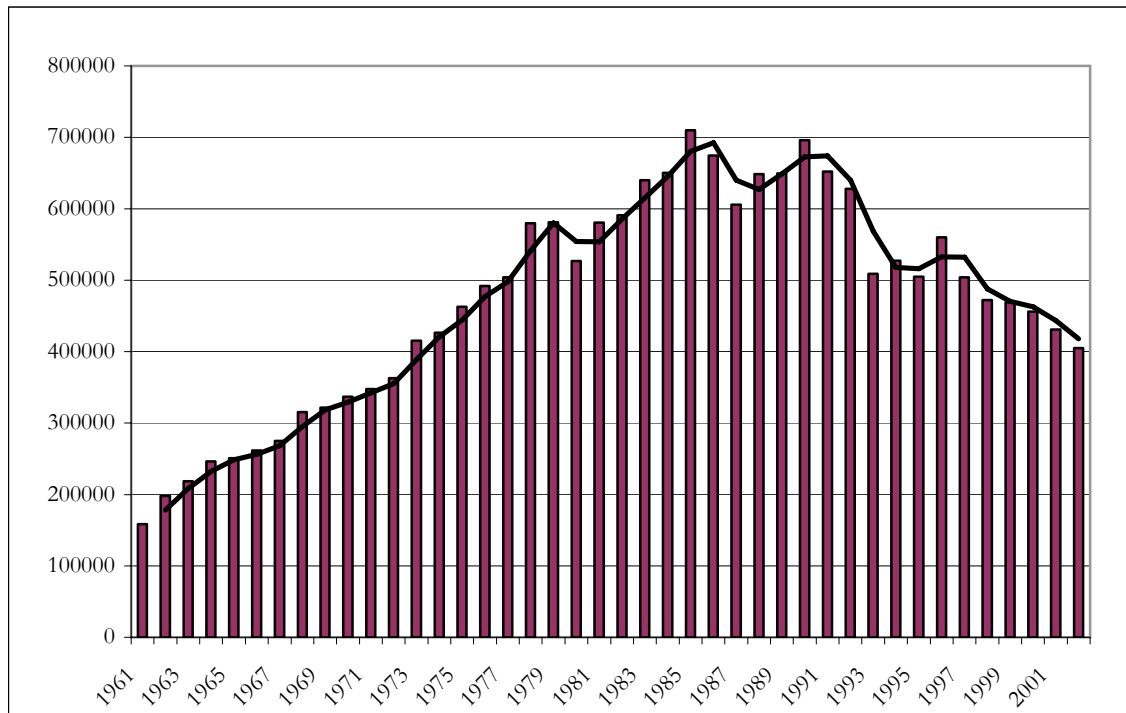
The quantification of environmental impacts regarding the pollution of water bodies through surface run-off is not possible, since no available data exist concerning the types and quantities of fertilizers and pesticides that are used, specifically to vineyards cultivations.

Pollution of water bodies does not take place, in case of right and advisable fertilization, based on the real nutritious needs of both vine and particular soil type (through soil analyses. Of course, in Greece, in some periods (mainly before 1990) excessive use of fertilizers took place in practice that has as result on one side the water pollution and on the other the pointless and useless increase of production cost.

According to IRENA project, Total nitrogen (N) mineral fertiliser consumption presented the biggest decreases (more than 30%) in Denmark and Greece, while at the same time Total phosphate ( $P_2O_5$ ) mineral fertiliser consumption in EU-15 decreased by 35% from 1990 to 2001 (3-year averages). According to IRENA project, it is difficult to link these trends directly with environmental impacts, because the final effect on the environment depends also on other factors (Chart 16).

The total fertiliser consumption in Greece presented an increasing trend from 1961 to 1990 and then a decreasing trend from 1990 until 2001. This is a point we should stress in this study, that intensification phenomena occurred well before '90s and no data or research exist on the rural production conditions at the beginning of this intensification trend.

If we take into account FADN data, we notice an increase in fertilisers consumption cost (for all the examined crops), which from the first point of view could led to incorrect conclusions.

**Chart 15 : Evolution of total fertilisers use in Greece (1961 – 2002)**

Source : IRENA indicator report

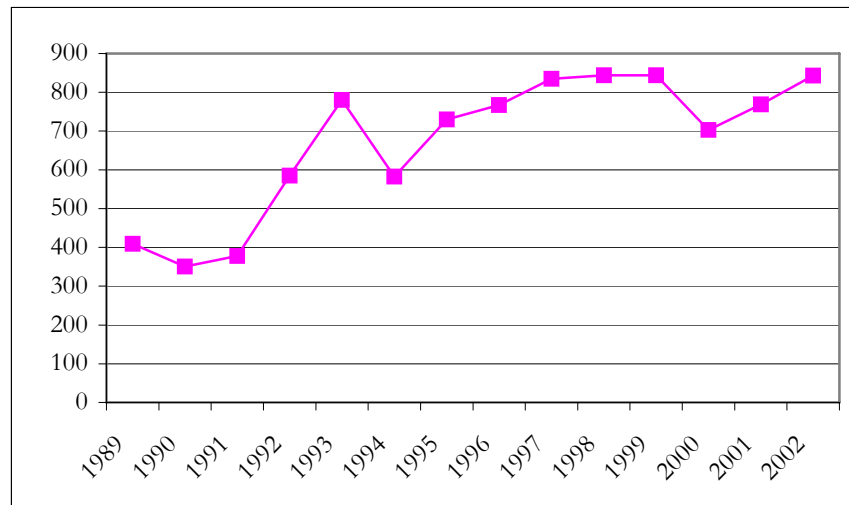
The fertilizers and soil improvers cost of specialist vineyards increase is ought to the cost increase of fertilisers, and not in the consumption increase (Chart 17).

Additionally, the use of pesticides, specifically herbicides decreases soil erosion (milling avoidance), however in case where the suitable crop protection product is not used, both soil and water bodies are polluted. Up to before one year (2003) certain pesticides (eg Simazine) were used in a small scale, which had big residual duration in the soil and caused water pollution due to surface run-off. However such type drastic products were forbidden henceforth. Most of the pesticides that are used today (eg Glyphosate) are inter systematic and they are inactivated in the ground.

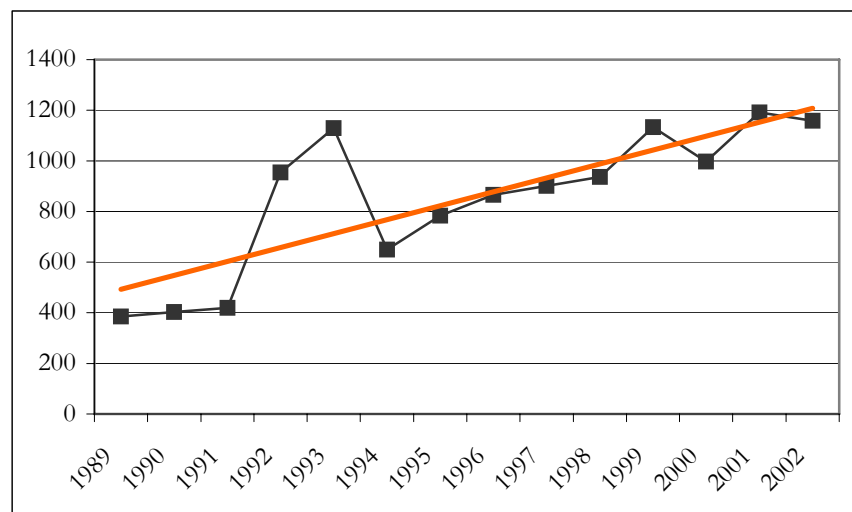
IRENA indicators report refers to estimated pesticide application rates (kg a.i./ha) in Greece higher than the EU average. Currently, existing data does not allow an assessment of the potential increase in environmental risk associated with higher pesticide sales or use volumes. This is partly due to the lack of knowledge on the spatial, seasonal and crop application patterns of pesticides by farmers, and partly due to the changing nature of plant protection products in terms of active ingredients (toxicity), application behaviour and decomposition patterns (persistence).

No specific data are available for pesticides use in vine cultivation, in Greece. According to FADN data we may notice an increase of crop protection products cost, which is much higher compared to the similar costs of fruits and olives.

**Chart 16: Evolution of fertilizers and soil improvers cost of specialist vineyards (SE295-fertilizers c.u.)**



**Chart 17 : Evolution of crop protection cost of specialist vineyards (SE300-crop protection-c.u.)**



According to the above data we may agree with IRENA's report comment that: *An increase of pesticide residues in the soil could also affect water quality through leaching into groundwater bodies or soil erosion processes. However, the information currently available is not sufficient to provide definite conclusions on trends in average annual pesticide content in soils, and even less so on water pollution risks. This highlights that further research and data collection are urgently needed in this area.*

We should emphasize more the lack of specific data concerning both fertilisers and pesticides consumption data in Greece.

Taking into consideration the above we conclude that if right use of pesticides and management of water reserves are adopted the environmental impacts of vine cultivation will be blunted a lot.

- Landscape

In Greece, the last years some areas have been reclaimed for the planting of new vine cultivations (varieties). During the decades 1980 – 1990 and 1991 – 2001 the area of vineyards was decreased at 16%. This was owed partly to the application of CMO, but mainly to the application of the premium of abandonment, but also to the changes in land uses with the installation of more efficient cultivations.

These clearances however do not downgrade the landscape, when they concern a small piece of land and a cultivation practice friendly to the environment is applied in their position (eg organic farming, integrated agricultural production, or other more environmentally friendly crops like olives). Unfortunately no official data from CORINE Land Cover are yet available, concerning the land uses changes between years 1990 and 2000. Therefore we can not reach to a safe conclusion regarding vine farming impacts to landscape.

- Biodiveristy

According IRENA Indicator report rarer and more vulnerable farmland species are in decline in Europe, as shown by the number and conservation status of butterfly species in the Prime Butterfly Areas. Their conservation status is generally negative in the EU-15, with Spain and Greece as positive exceptions. Greece has included provisions in the Codes of Good Farming Practices for both biodiversity and landscape.

**From all the above analysis, we can conclude that during the period 1980 – 2003 an intensification of vine cultivation was observed. This had as result certain environmental effects that yet cannot be measured and quantified, since registered and available data with regard to the use of agrochemicals used specifically for vineyards (fertilizers, dugs) do not exist. Moreover, there are no available data for the evolution of irrigated areas of vines.**

By inference, we could say that from one side the ban of vines planting had negative effect to the environment, since it led to the intensification of the rest of areas. As a consequence, the intensification of remained vines' cultivation effected the environment negatively (soil, water and landscape). On the other hand, however, the new planting rights that were granted at deviation from this ban, concerned areas that are intended for quality and Local wine production. At these areas of this type of vines cultivation, farming techniques are applied that respect the environment.

***Question 2 (VI): What is the environmental impact of the by-products distillation mechanism, and other market measures like aid for the use of concentrated grape must?***

In application of Regulation No 1493/1999, Greece published decision 400761/22-11-2000 on the subject: "Specification of supporting documents and the way of issuing of Community aids, that are forecasted for the optional and obligatory distillations in the wine sector. Ways of application of measures". According to this decision:

- I. The minimal characteristics of the vinification by-products that are lead for distillation are:
  - *Marcs*: 2.8 litres of clean alcohol per hectoliter of marcs
  - *Wine lees*: 4 litres of clean alcohol per hectoliter of wine lees, with humidity 45%.
- II. For the determination of the volume of alcohol that is contained in the distillation products, the natural alcoholic strength of wine that is taken into account is 10% vol.
- III. The quantity of alcohol that should be contained in total in the products that are lead for distillation are equal at least with:
  - 10% of the volume of alcohol that is naturally contained in the produced wine, when the wine is received by direct vinification of grapes.
  - 5% of the volume of alcohol that is contained in the produced wine when the wine is received by vinification of must, partially fermented must or new wine still in fermentation.
  - 5% for the producers that give smarcs for production oenocyanin.
  - 7% for the producers of white wines of Name of Origin and for the part of their production for which this indication can be used.
- IV. The ones that fall under the obligation of article 27 of Regulation 1493/1999, can be exempted from the obligation of delivering their by-products for distillation, if they withdraw these by-products under specific control measures.

All Greek producers have the right of withdrawal, because the existing hindrances both for the capability to distillate their production and for the land-planning distribution of spirit distilleries.

The minimal content in alcohol of by-products that are withdrawn under control is the following:

- *Marcs*: 2,1 liters per 100 kilos in the case of white quality wines *psr* and 3 liters per 100 kilos in the other cases.
- *Dregs*: 3,5 liters per 100 kilos in the case of white quality wines *psr* and 5 liters per 100 kilos in the other cases.

The by-products should be withdrawn without delay and no later from the end of the vinicultural period during of which they were received.

The whole process of withdrawal (quantities, alcoholic strength, minutes and dates of withdrawal under control) is registered in the books kept by the wine producers.

The responsible authorities conduct sample checks of whether the average minimal content in alcohol was kept and if the by-products were withdrawn completely in the deadlines that were determined.

V. The distillers that receive products for obligatory distillation have the following possibilities:

- ❖ to accept the economic aid that is foreseen for the particular distillation,
- ❖ to deliver to the Intervention Agency, the product of distillation that has alcoholic strength greater or equal to 92% vol, against the price that is determined for the particular distillation, and
- ❖ to profit from both the two possibilities receiving at the same time the difference of market price of alcohol and the aid and the foreseen aid for the particular distillation, provided that the possibility of delivery of alcohol to the Intervention Agency the vine period under question, is decided.

VI. The products of distillation should belong in one or more from the categories below:

- Neutral alcohol,
- Distillate of wine or marcs
- A distillation product or non processed alcohol, with alcoholic strength at least 52% vol.

In the case of production of the third product, this can be used only under official control for:

- the production of alcoholic drink,
- the transformation in one of the products that are reported in the two first cases, with the exception of the distillations of grapes' marcs, and
- the production of alcohol that is intended for industrial use.

**In Greece, as it results from the above, both the obligatory and optional distillation and the under control withdrawal of the by-products of vinification are applied.**



Also, it should be mentioned that in case of exceptional disturbance of the market that is owed to important surpluses and/or in problems owed to the quality, the measure of crisis distillation could be received according to Regulation No 1493/1999.

The objectives of the measure are:

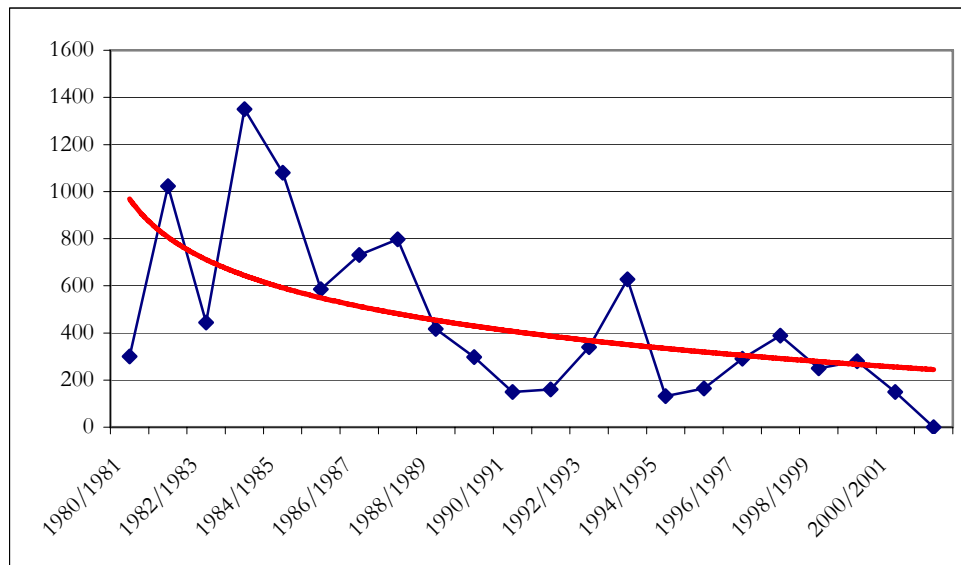
- the obliteration of concrete points of surpluses concentration, and
- the guarantee of the continuation of supply by the one year harvest to the other.

This measure can be limited for certain categories of wine or for certain production areas and it is optional for the producers.

The total quantity of wine that is used for distillation presents fluctuations from year to year, since it depends directly from the total production of grapes, which, as it was aforementioned, presents annual fluctuations. Moreover, it should be noted that the greatest part of wine that is used for distillation belongs to the category of table wine (Table 15).

**Table 15: Quantity of wine that is used for distillation (in 1000 hl)**

<b>Farming period</b>	<b>Quantity of table wine</b>	<b>Quantity of quality wine</b>	<b>Total quantity of wine</b>
<i>1980/1981</i>	300	0	300
<i>1981/1982</i>	1023	0	1023
<i>1982/1983</i>	444	0	444
<i>1983/1984</i>	1300	0	1350
<i>1984/1985</i>	1080	0	1080
<i>1985/1986</i>	585	0	585
<i>1986/1987</i>	706	0	731
<i>1987/1988</i>	720	10	797
<i>1988/1989</i>	400	0	417
<i>1989/1990</i>	220	0	297
<i>1990/1991</i>	78	0	150
<i>1991/1992</i>	96	0	160
<i>1992/1993</i>	339	0	339
<i>1993/1994</i>	623	0	628
<i>1994/1995</i>	127	0	132
<i>1995/1996</i>	160	0	165
<i>1996/1997</i>	267	0	290
<i>1997/1998</i>	388	0	388
<i>1998/1999</i>	250	0	250
<i>1999/2000</i>	280	0	280
<i>2000/2001</i>	150	0	150
<i>2001/2002</i>	0	0	0

**Chart 18 : Quantity of wine that is used for distillation (in 1000 hl)**

Regarding to the by-products of vinification that constitute the raw material for distillation, they are the following:

- *Marc*s, i.e. the mass that remains after the grapes pressing. This mass is constituted from stems, seeds and rinds, while it can also contain unfermented must, must in fermentation or even wine. Generally, stems constitute 2-7% of the total weight of the grape, the seeds 3-6% and skin 6-9%.
- *Dreg*, which is the sediment that is created during fermentation and is constituted by various components as saccharomycetaceae, remains of rinds and stems, non diluted proteins and colouring substances and salts, mainly monopotassium tartrate that is diluted progressively with the increase of alcohol content.

**Unfortunately, no available data exist regarding the quantities of vinification by-products, that is to say, marcs and dreg that are mainly used for the production of ethyl alcohol (alcohol) with distillation.** Estimation can be done using the marcs constitution, which was mentioned above. In this case, however, there are no calculation coefficients for the calculation of the volume of waste and their characteristics.

Moreover, there are no available data regarding the quantities of vinification by-products that are withdrawn under control, as well as of the methods applied. However, the methods of spreading of marcs and dreg in each vine grower's fields are usually applied. In case that the appropriate quantities are applied there are no pollution problems created to soil and water.

#### ***Production of alcohol with fermentation***

The production process of alcohol with the application of fermentation and as raw materials the by-products of wine production, is as follows:

- Preparation of sugar solution/liquid (extraction of the saccharine in aqua medium)  
(Alcohol production from figs, plums etc.)

- ❑ Fermentation of the saccharate liquid for the transformation of sugar to alcohol (Alcohol production from molasses)
- ❑ Fermentation for the receipt of alcohol (Alcohol production from B' category wines). It is noted that alcohol presents azeotropic point around 96,5% and the production of absolute alcohol demands further special treatment (which are not applied in Greece). The distillation products are: alcohol 96% (rectified), 92-93% (semi-rectified that will become denaturated) and other byproducts (essences, aldehydes)
- ❑ While fermentation is taking place the effluent of the first distillation column is vinasse that consists the main waste of the industry.

It should be mentioned that alcohol can be also produced from other raw materials. In all stages of the production process of alcohol various waste are produced, which effect the environment (air, water, soil). For the minimization of those waste, as for their treatment and management, various methods are applied, that are analyzed below.

### ***Production of Waste***

#### **A. Air emissions**

Generally no important air emission problems are generated from the processes of those industries, apart from the typical emissions from the boilers that are usually connected with energy issues and distillation process.

The air emissions of alcohol production industry consist of particulate mater (PM), volatile organic compounds (VOC) and combustion gasses that depend on the type and quality of fuels as well as the combustion equipment. The main categories of air emissions are the following:

- ❑ *Air emissions from Combustion*
- ❑ *Air emissions from Production Processes*
- ❑ *Air emissions from Fermentation*
- ❑ *Air emissions from Distillation*
- ❑ *Air emissions from Biological Treatment*

#### **B. Wastewater**

There are six basic types of wastewater:

- ❑ *Wastewater from Cooling Waters*
- ❑ *Wastewater from Floorings and Equipment Cleaning*
- ❑ *Wastewater from the extraction processes' reservoirs cleaning*
- ❑ *Wastewater from the Fermentation reservoirs cleaning*
- ❑ *Wastewater from Distillation*
- ❑ *Wastewater from the Boiler*

Wastewater is produced from the various processes of distillation of the alcoholic solution. This wastewater is mainly produced from the base of first distillation column (vinasse) and its biological content is very high [order of 10.000mg/l BOD5]. Vinasse represents the majority of the organic and hydraulic load of the wastewater of alcohol production industry.

In general the wastewater of alcohol production industry in Greece, are of quantity and quality that present important problems in their management and require particular attention.

### C. Solid Waste

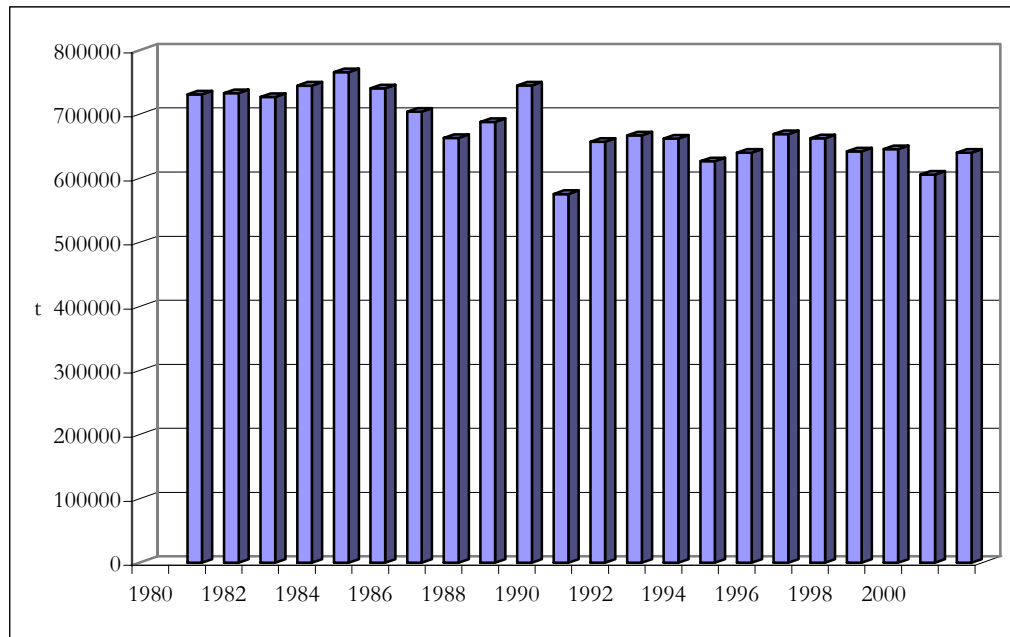
They are distinguished in four (4) categories:

- ❑ *Solid waste from spent raw materials*
- ❑ *Solid waste from Packaging*
- ❑ *Solid Waste from Personnel*
- ❑ *Solid Waste (sludge) from Biological Treatment*

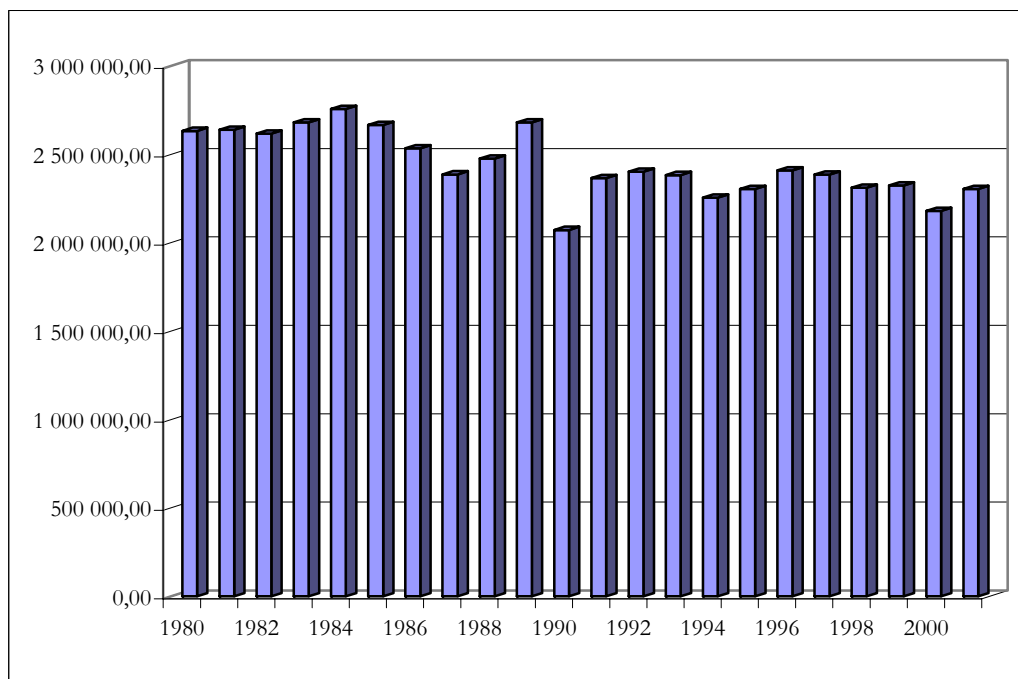
#### Characterization and Quantification of Waste

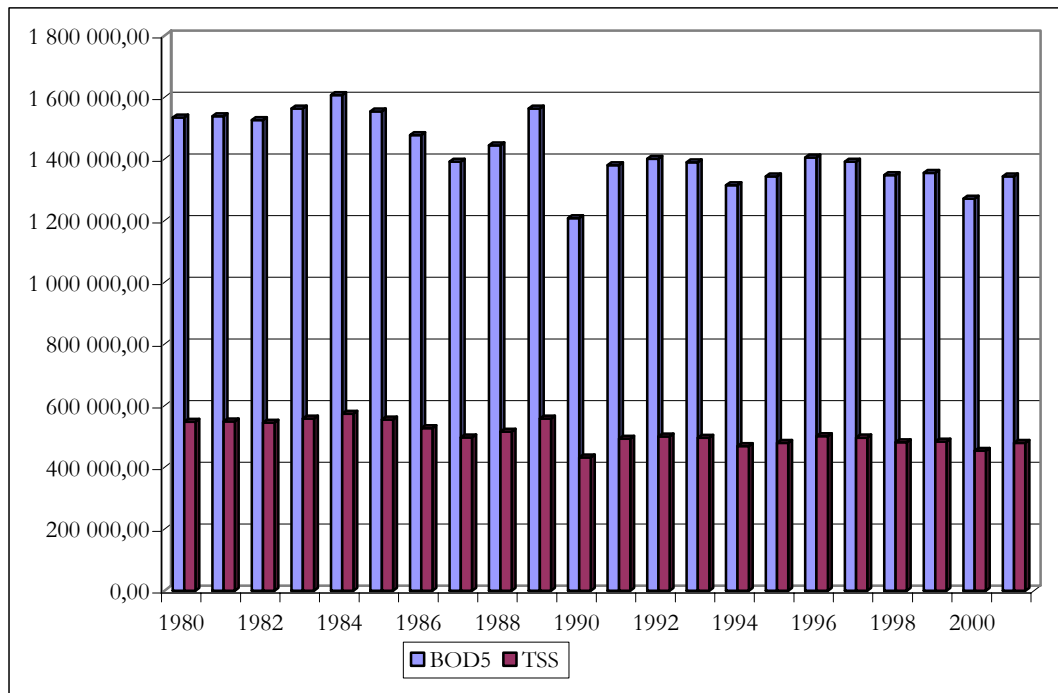
The volume, as well as the qualitative characteristics of the estimated wastewater produced from the alcohol production plants are presented in the following charts.

**Chart 19 : Evolution of Production of grapes for vinification (tn)**



**Chart 20 : Evolution of wastewater (m3 /tn grapes/year)**



**Chart 21 : Evolution of BOD<sub>5</sub> and TSS production (kg/t grape)**

The volume of wastewater during the period 1980 – 2001 presented fluctuations. This resulted from the fact that the quantity of produced wastewater depends on the production of grapes, which, as it was mentioned above, presents fluctuations from year to year. However, the overall trend of the wastewater volume produced, presents the same decrease as this one of the grapes quantity processed in distilleries. Specifically, a decrease of 12.4% occurred in grapes quantity processed in distilleries, produced wastewater and their polluting load.

### **POLLUTION PREVENTION STANDARDS AND CONTROL TECHNIQUES**

The most significant problems for which measures should be taken on pollution prevention and minimization during the alcohol production process as well as end-of-pipe measures of pollution control are the following:

- *Air emissions treatment and disposal*
- *Treatment of the Wastewater produced from the Distillation Column of Vinasse.*
- *Disposal of Solid Waste produced from spent raw materials.*
- *Energy Saving*

#### **1. Air emissions treatment and disposal**

The systems used for the air emissions treatment, applied in the examined industrial sector, are the typical ones that treat steam boiler emissions and they mainly include condensation techniques (steam).

#### **2. Wastewater Treatment and disposal**

The methods used for the wastewater treatment, except from the ones produced from the Vinasse process, applied in the alcohol production industry are the typical ones that of industrial wastewater treatment. The methods applied are the following:

- *Chemical sedimentation*
- *Aerobic treatment*  
Aerobic digestion of vinasse is not at all cost effective.
- *Anaerobic digestion*

An important problem of the application of the method in Greece is the use of different raw materials in alcohol production, and the result is that the anaerobic bioreactor often shocks of the alteration of the inlet biological load. This problem can be solved with good programming of the plant and investments on applied technological research so as the alteration of the organic load to take place step by step in a way that it will be compatible with the bioreactor's operation.

- *Biofilters*
- *Anaerobic lagoons*
- *Aerobic lagoons*
- *Biomass production*
- *Condensation of vinasse*
- *Dispersion of vinasse on soil as fertilizer*

### **3. Solid waste treatment and disposal**

The solid waste derive from the separation of sugar from raw materials and consist of spent raw materials (figs, plums etc.). These waste are two times the weight of the produced alcohol and are easily disposed for forages or composting and their management is not an important problem for the industries.

Concluding, we could say that when the pollution control techniques, waste management and disposal methods are applied, then the effects to the environment are minimized.

There are no real data available for distilleries' waste inventory. The reduction of by products quantities processed for alcohol production causes an estimated analogous reduction of the produced polluting load. This reduction of the polluting load can not be proved that is an impact derived from the CMO measure. Of course the utilisation of by products for distillation has as effect the safe disposal of these by products, however there is no literature available on the comparison between the environmental impacts derived from vinification by products disposal and waste produced through by products distillation.

Finally we should mention that neither Ministry of Agricultural Development and NSSG could provide data on concentrated grape must use and production as well as on transport from wine producers to distilleries.

#### **2.1.2 Wine – Theme 2: structural measures**

##### ***Question 1 (V2) : What are the environmental effects of abandonment premia?***

The premium for the abandonment of vineyards was imported in the CMO so that regions that were not aligned with the market demand could reduce their wine production. It was applied, substantially, until 1996. Then the system was modified and the necessary grant for subsidised land reclamation has been provided henceforth by Member States.

In Greece, the program of vineyards abandonment aid was applied in the frame of Regulation No 1442/1988 from 1989 until 1996. The total vineyards area that was reclaimed during this period was 30,058 ha (Table 16). The biggest vineyards area was reclaimed in 1991 and amounted 7,228.7 ha, representing the 7.25% of the total cultivated vineyards area at the same year (Table 16).

**Table 16 : Areas of vineyards that were abandoned according to Regulation 1442/1988**

Year	Abandoned Area (ha)	Vines Total cultivated area (ha)	Percentage (%) on the total cultivated area
1989	1,281	105,086	1.22%
1990	4,984	102,080	4.88%
1991	7,229	99,747	7.25%
1992	6,767	96,679	7.00%
1993	2,440	95,232	2.56%
1994	3,112	91,557	3.40%
1995	2,543	89,300	2.85%
1996	1,702	87,250	1.95%
<b>Total</b>	<b>30,058</b>		

The whole abandoned area during period 1989 – 1996 was 28.6% of the total vineyards area in year 1989. This area is a significant area and of course it has certain environmental impacts.

The areas of vineyards that were reclaimed were used either for the other crops cultivation or they remained uncultivated. The effects that this change had to the environment depend on the new use of areas that were reclaimed.

More specifically, concerning the first case, at which the reclaimed areas were used for planting of other cultivations, the effects to the environment depend on the type of cultivation that replaced vineyards, as well as from the farming technique that was applied. Generally, we can say that the more intensive the cultivation was the more significant were the environmental effects. Unfortunately, CORINE LAND COVER data on land cover changes are still not available. Therefore, it is not feasible to have a strict conclusion on the type of environmental impacts.

Concerning the second case, at which the areas of reclaimed vineyards remained uncultivated; soil erosion problems might occurred in sensitive grounds. A more comprehensive answer would be given after the evaluation of land use changes, according to CORINE Land Cover data.

Unfortunately, there are not available data concerning the land use of the areas of reclaimed vineyards and consequently more accurate conclusions cannot be reached on the potential effects to the environment.

However, according to the various interviews that took place during the olive study, it can be extracted that the majority of new olive plantations have replaced reclaimed vineyards. Since olive cultivation practises are still more environmental friendly in Greece. This would be only an indication that abandonment premia had a positive environmental effect.

The grubbing up process described in various legislative items (Ministerial Decisions, Common Ministerial Decisions) doesn't be connected with any environmental requirements.

**Question 2 (V2) : What are the environmental effects of restructuring and conversion of vineyards (variety conversion, relocation, adoption of new production techniques) ?**

Regulation No 895/1985 enacted the restructuring and the conversion of vineyards areas. This Regulation concerned a common action for the improvement of wine structures in Greece. In the frame of this Regulation some measures were formulated with regard to:

- the restructuring of vineyards that are intended for wine, raisin and table grapes production, and
- various actions, with a accompanying character, that related to the restructuring.

The restructuring measures included:

- a) the grubbing-up of vineyards,
- b) the replanting of vineyards that were intended for the production of quality wines psr or table wines, raisins and grapes for table use of improved quality via a suitable choice of recommended varieties of vine, and
- c) the revaccination of the vineyards.

The actions with an accompanying character are recommended for:

- a) production of replanting material in connection with the needs of realisation of a common action,
- b) land reclamation works, antifouling works in the plats that are cultivated with vine, manufacture of ditches of soil purification, draining, levelling and removal of stones,
- c) improvement of roads of access to the vineyards,
- d) redistribution, and
- e) technical aid, which is essential for the realisation of the objectives of common action.

The support of restructuring of vineyards was continued with the enactment of Regulation 1493/1999 and aimed at the alignment of the production to the market demand. In application of this Regulation, Greece published the Decision 408507/22-10-2001 according to which:

**A.** One or more from the following measures are covered:

- a) varietal conversion, including grafting-on;
- b) relocation of vineyards;
- c) improvements to vineyard management techniques

The particular program does not cover the regular renewal of vineyards that reach the end of their natural life. As regular renewal of vineyards that reach the end of their natural life, is meant the replanting of same area with the same variety, basing to the same vine-growing system.

**B.** The economic aids that are approved for the application of program of restructuring and conversion of vineyards concern the following measures:

- a) the grubbing-up and replantation of vineyards, including their geographic re-installation for reasons of qualitative improvement, without change of variety,
- b) the variety conversion of vineyards, including their revaccination,
- c) the loss of income of wine-growing areas that were grubbed-up or revaccinated, and
- d) the improvement of management techniques of the vineyards of wine-growing areas.

**C.** The level of each measure aid is determined, at maximum limit – based to the contribution of Community to the restructuring and conversion cost –as follows:

**Table 17 : Aids granted by the Community for the restructuring and conversion of vineyards**

			Mountainous and island areas	Rest of areas
			Euro	Euro
<b>1.</b>	<b>a.</b>	Grubbing-up and replantation	528	440
	<b>b.</b>	Loss of income	235	205
<b>2.</b>	<b>a.</b>	Revaccination	293	235
	<b>b.</b>	Loss of income	205	176
<b>3.</b>		Management techniques improvement	293	235

**D.** The payment of these aids concerns a total area of 1,028 ha and a total sum of 7,323,000 € for the trade period 2001 – 2002. For the next periods, the area and the level of financial funds will be determined by the European Commission after demand of Greece, according to the Community provisions in force.

**E.** The period of application of this particular program in Greece begins at the viticultural period 2001 – 2002 and expires at the viticultural period 2005 – 2006.

**F.** Natural or Legal persons, (wine-production enterprises that practice at the same time viticultural exploitation, Producers' Organisations and Agricultural Co-operative Organisations that proceed in the cultivation of vines of wine grape varieties for the production of quality wines, Local Wines and Table Wines) have the right of integration in the program, after their previous application. The minimal shred area for participation in the program is 0.1 ha.

The installation of new viniculture is realised:

- a) in the same place with the one that was grubbed-up or in different location of the same exploitation and in equivalent area to the one that was grubbed-up,



- b) according to the vine-growing modern systems with pillars (moreover for the islands of Aegean Sea with the manufacture of terraces and windbreaks),
- c) with minimal number of 2.500 nogs per hectare and for the islands of Aegean Sea 2.000 nogs,
- d) with the use of resistant to Phylloxera subjects of vine for all the country. This requirement doesn't applied in the islands of Thira and Thirasia, where due to special soil and climate conditions Phylloxera cannot be developed. In these two islands mother plant subjects can be used.

With the application of restructuring and conversion plans, the probable modification caused in the potential of wine-growing areas for quality wines psr, Local and Table wine production cannot lead to a perceptible increase of the production potential in country level.

The following criteria are, in order of precedence, the criteria for the hierarchy of participation in the restructuring program:

- vineyards that have been included in an integrated management system of production or vineyards witch cause concentration or increase of property, with their integration in the programme
- areas for quality wines psr production
- areas for Local Wines production,
- areas for Table Wines production, and
- areas of Double or Triple use.

Recommended and allowed varieties for each production area should be used for restructuring and conversion.

Moreover, it should be noticed, that in the frame of application of the restructuring and conversion program of vineyards in Greece, Decision No 300063/22-10-2002 was enacted, on the subject of the distribution of the Community funds for the restructuring and conversion of vineyards, for the period 2002–2003. According to this Decision the areas and the funds on the restructuring and conversion of vineyards are distributed in the various Regions and <https://iate.cdt.eu.int/iatenew/manipulation/dataentry/EntryDetailView.jsp?liId=1904577&srcLang=en&fromresults=true> Prefectural Administration, for the period 2002–2003 (Table 18) as follows.

**Table 18: Distribution of areas and funds on the restructuring and conversion of vineyards for the period 2002 – 2003.**

No	Prefectures	Area (ha)	Community Fund (€)
	<b>EAST MACEDONIA - THRACE</b>	<b>41.17</b>	<b>225,000</b>
1.	PREFECTURE OF DRAMAS	24.62	70,000
2.	PREFECTURE OF KAVALA	16.55	155,000
	<b>CENTRAL MACEDONIA</b>	<b>120.10</b>	<b>776,967.3</b>
3.	PREFECTURE OF SERRES	30.00	207,300
4.	PREFECTURE OF THESSALONICA	17.30	119,543
5.	PREFECTURE OF CHALKIDIKI	43.27	281,778
6.	PREFECTURE OF IMATHIA	29.53	168,346.3
	<b>WESTERN MACEDONIA</b>	<b>27.50</b>	<b>174,930</b>
7.	PREFECTURE OF FLORINA	27.50	174,930
	<b>THESSALY</b>	<b>68.98</b>	<b>461,352.2</b>
8.	PREFECTURE OF MAGNESIA	11.07	72,149.7
9.	PREFECTURE OF KARDITSA	7.91	52,038.5
10.	PREFECTURE OF LARISSA	50.00	337,164
	<b>IONIAN ISLANDS</b>	<b>20.28</b>	<b>129,300.3</b>
11.	PREFECTURE OF LEFKADA	6.73	46,504.3
12.	PREFECTURE OF KEFALLINIA	13.55	82,796

No	Prefectures	Area (ha)	Community Fund (€)
	<b>WESTERN GREECE</b>	<b>153.23</b>	<b>927,257.3</b>
13.	PREFECTURE OF ACHAIA	88.70	612,917
14.	PREFECTURE OF ILIA	64.53	314,340.3
	<b>STEREA HELLAS</b>	<b>162.50</b>	<b>1,193,752</b>
15.	PREFECTURE OF VIOTIA	124.40	941,810
16.	PREFECTURE OF EVIA	38.10	251,942
	<b>PELOPONNESE</b>	<b>77.15</b>	<b>427,411.8</b>
17.	PREFECTURE OF KORINTHIA	6.00	41,460
18.	PREFECTURE OF ARKADIA	27.77	137,604
19.	PREFECTURE OF MESSINIA	24.37	166,406.7
20.	TRJFYLLIA AREA	17.00	68,052
21.	PREFECTURE OF LAKONIA	2.01	13,889.1
	<b>ATTICA</b>	<b>60.99</b>	<b>406,312.1</b>
22.	PREFECTURE OF WESTERN ATTICA	18.96	131,013.6
23.	PREFECTURE OF EASTERN ATTICA	42.03	275,298.5
	<b>NORTHERN AEGEAN</b>	<b>83.96</b>	<b>462,822.4</b>
24.	PREFECTURE OF LESVOS	29.35	207,606.4
25.	PREFECTURE OF SAMOS	54.61	255,216
	<b>SOUTHERN AEGEAN</b>	<b>57.90</b>	<b>266,351</b>
26.	PREFECTURE OF CYCLADES	54.60	241,568
27.	PREFECTURE OF DODEKANISA	3.30	24,783
	<b>CRETE</b>	<b>612.71</b>	<b>3,833,579.6</b>
28.	PREFECTURE OF HERAKLION	416.91	2,834,408.5
29.	PREFECTURE OF LASITHI	25.10	156,565.7
30.	PREFECTURE OF CHANIA	41.13	216,063.8
31.	PREFECTURE OF RETHIMNO	129.57	626,541.6
	<b>TOTAL</b>	<b>1,486.47</b>	<b>9,285,036</b>

The total area of vineyards that was restructured in the frame of Regulation No 895/1985 come up to 4,217 ha, during the period 1986–2000 (Table 19). The larger part of the area was restructured in 1991 and reached 830.2 ha. The trend of areas included in this program presented a decrease after 1991. The areas of vineyards that were restructured under this program constituted a very small percentage of the total vine cultivation area.

**Table 19: Areas of vineyards that were restructured according to Regulation 895/1985**

Year	Restructured Area (ha)	Area of vineyards of wine grape varieties for qw psr(ha)	Total cultivated area (ha)	Portion (%) of restructured areas to the total cultivated areas
<b>1986 - 1989</b>	1041		107,156	0.97%
<b>1990</b>	328	12,506	102,079	0.32%
<b>1991</b>	830	12,629	99,747	0.83%
<b>1992</b>	488	12,595	96,679	0.50%
<b>1993</b>	439	13,100	95,232	0.46%
<b>1994</b>	343	12,325	91,556	0.37%
<b>1995</b>	181	11,980	89,300	0.20%

<b>1996</b>	143	13,114	87,250	0.16%
<b>1997</b>	162	14,021	85,367	0.19%
<b>1998</b>	201	14,017	85,115	0.24%
<b>1999</b>	60	14,027	84,351	0.07%
<b>2000</b>	1	-	84,132	0.001%
<b>2001</b>	?	14,683		
<b>2002</b>	?	15,507		
<b>2003</b>	?	14,276		
<b>Total</b>	<b>4,217</b>			

Source: Ministry of Agricultural Development and Food – Division of vine and nuts.

Processed data on restructured areas are not yet available from the Ministry of Agricultural Development and Food in years 2001, 2002 and 2003 although the areas and the funds for the period 2002 -2003 concern 1 486 ha. Missing of these data doesn't mean that Regulation 1439/99 lead to the stop of restructuring.

Contrary to restructured areas of vine growing, the areas of vineyards that are intended for quality wines psr production presented increasing trend during the same period. This is likely owed to the fact that the areas of vineyards that were restructured were used for the vineyards production that are intended for quality wines psr.

Quality wines psr are produced by vines in determined regions and with concrete qualitative characteristics. Basic requirement, for the achievement of these characteristics, is the low yield per hectare performance, since the quality is inverse proportional to the quantity. Consequently in these vineyards concrete farming techniques are applied, so that these qualitative characteristics to be achieved.

Additionally, exploitations and farmers that apply environmental friendly farming techniques (integrated production management, organic farming methods etc) have priority for the participation in the program, as it was aforementioned.

Wine-growing areas' management techniques as staking are also included in the program. The application of this technique contributes to the better airing of the nogs and it ensures more sunlight, resulting to the reduction of problems from insects and illnesses. This has as consequence the reduced use of crop-protection products.

Moreover, the manufacture of terraces and windbreaks in the islands of Aegean that are included in the program, contribute to the reduction of soil erosion.

From all the above, we may conclude that certain actions are included in the restructuring and conversion of vineyards program, which actions reduce the environmental effects of vineyards cultivation.

Unfortunately, there is lack of available data regarding to the variety conversion of these areas and the cultivation techniques that were followed before and after the application of the particular program. For this reason it is not possible to draw an inference. Until the submission of the report no data were available from the Payment Authority concerning part of grants used in mountainous and island areas.

Finally, since almost all restructuring and conversion of vineyards are carried out under funding, CMO premia seem to have a positive environmental effect. This effect is interpreted in terms of reduction of pesticides and fertilisers use, soil erosion avoidance, prevention of soil and water pollution. Lack of specialised literature cannot support quantitatively this conclusion.

***Question 3 (V2): What are the environmental impacts of grubbing-up grants and payments of compensation for cost of uprooting and income loss? [This question should be answered also in the longer term perspective of enlargement with wine producing countries in central and southern Europe]***

This question has already been answered above, in the frame of questions 1 (V2) and 2(V2).

### **2.1.3 Wine – Theme 3: other regulatory measures and especially those for quality wines produced in specified regions**

**Question 1 (V3): What are the environmental impacts of the CMO requirements for quality wines produced in specified regions? [in particular those concerning: traditional conditions of production, cultivation methods, yield per hectare and demarcation of production]**

Council Regulation No 1493/1999 determines the provisions that should be established by each Member State in order a wine to be recognized as quality wine psr. More specifically, a wine, in order to be characterized as quality wine psr, should fulfil certain criteria, which determine:

- ✓ the area of wine production,
- ✓ the variety composition of the vineyard,
- ✓ the farming techniques,
- ✓ the vinification methods,
- ✓ the minimal alcoholic strength, and
- ✓ the yield per hectare.

The Quality Wines are distinguished in:

- ✓ Wines of Name with Appellation of Origin of Superior Quality, and
- ✓ Wines of Name with Appellation of Origin Controlled

Greece enacted a series of numerous Royal and Presidential Decrees and Ministerial Decisions, on the characterization of various Greek Wines as quality wines psr, even before the enforcement of this Regulation. In the content of the present study it is not impossible to mention and analyze all of them. Indicatively, we mention No 379000/3-9-1999 Ministerial Decision on the “Recognition of wines of Name with Appellation of Origin Rhodes of Superior Quality”. According to this decision, the appellation of origin is eligible for:

1. White dry, semi-dry and semi-sweet wines, which are produced from Athiri variety grapes, from vines of the villages Emponas, Agios Isidoros, Siana, Apollo, Monolithos, and Kritinias, except the lowland regions of two last communities.
2. Red dry, semi-dry and semi-sweet wines, which are produced from the Mandilaria (Amorgjano) variety grapes, from vines of the villages of Fena, Maritsa, Salakou, Kalavarda, Emponas, Kritinias, Siana, Monolithos, Apollo and Agios Isidoros. The red dry wines are aged for at least one (1) year in oak barrels. For the red semi-dry and semi-sweet wines ageing is not required.
3. All the above types of wine are produced of grapes of vineyards shaped in cuplike or linear forms. Nogs are lopped short and the yield per hectare, of vineyards for the production of white (dry, semi-dry and semi-sweet) wines, does not exceed 900 Kgr of grapes per 0.1 ha, while for the production of red (dry, semi-dry and semi-sweet) wines does not exceed the 1,000 Kgr of grapes per 0.1 ha.
4. The content of sugar in must should be at least 188 gr per liter, for all the types of wines.
5. The sweetening of wines is allowed at least two (2) months after racking.
6. For the production of white wines of Name with Appellation of Origin Rhodes of Superior Quality the classic method of white vinification is applied. The must process is not allowed to take place with continuous presses. For the production of red wines of Name with Appellation of Origin Rhodes of Superior Quality the classic method of red vinification is applied.
7. The wine of Name with Appellation of Origin Rhodes of Superior Quality should have the chemical constitution and the organoleptic characteristics of typical Rhodes wines.

Similar content have also the rest of Royal or Presidential Decrees or the Ministerial Decisions that concern the Quality Wines psr.

It should also be noticed that, in the frame of application of the Community and National Law, Ministerial Decision No 275666/14-11-2003 on the subject: “Grand of aid per square kilometer for the maintenance of vineyard cultivation for the production of quality wines psr in the small islands of Aegean Seas” has been enacted.

According to this:

**I.** Flat-rate aid of 476 € per hectare is granted to the producers, according to the article 9 of Council Regulation (EEC) No 2019/1993 and Commission Regulation (EC) No 1999/2002 o,

aiming at the **maintenance of vineyards cultivation that are intended for the production of quality wines psr in the areas of traditional cultivation** of “small islands” of Aegean Seas.

**II.** Beneficiaries of above-mentioned Community aid are exclusively the Producers' Organisations referred in article 39 of Regulation (EC) No 1493/1999 or the Producers Organizations, that are included in the program of qualitative improvement of produced wines of islands of Samos, Limnos, Paros, Thira and Thirasia and for those vineyards' areas of quality wines psr, that fulfil the following criteria:

- ✓ They are cultivated inside the delimited area of production of wines of Name with Appellation of Origin Controlled or Superior Quality.
- ✓ They are planted exclusively with the recommended varieties for the corresponding zone for the production of wines of Name with Appellation of Origin Controlled or quality wines psr, according to No 306590/28-11-02 Decision of Minister of Agriculture.
- ✓ Cultivation and harvest have been completed in them and the farming techniques have been carried out as they are suggested by the National Law on the production of Name with Appellation of Origin Controlled wines and Quality wines psr of the above islands. The production of these vineyards is intended also for wines with Name with Appellation of Origin Controlled and Quality wines psr,.
- ✓ They have been declared as vine-growing areas in the frame of the vinicultural registration and OSDE . They are also subject of the annual Statement of Harvest and Production, according to No 417718/28-11-01 and No 398581/27-9-01 Decisions of Minister of Agriculture.
- ✓ The yield per hectare, expressed in quantity of grapes, does not exceed the determined maximum limit of variety yield for each vinicultural area.

The area of vineyards that is intended for the production of quality wines psr presented an increase during the period 1990 – 2003. The cultivated area of quality wines psr from 12,506 ha that was in 1990 increased and reached 14,276 ha in 2003 (Table 20). Moreover, the trend of the evolution of area of quality wines psr was increasing in the intermediary years.

**Table 20: Evolution of areas of vineyards for the production of wines quality wines psr**  
(area in ha)

Year	Area of vineyards for the production of quality wines psr	Total cultivated area	Percentage (%) on the total cultivated area
1990	12,506	102,079	12.3
1991	12,629	99,747	12.7
1992	12,595	96,679	13.0
1993	13,100	95,232	13.8
1994	12,325	91,556	13.5
1995	11,980	89,300	13.4
1996	13,114	87,250	15.0
1997	14,021	85,367	16.4
1998	14,017	85,115	16.5
1999	14,027	84,351	16.6
2000	Data not available	84,132	Data not available
2001	14,683	83,935	17.5
2002	15,507	Data not available	Data not available
2003	14,276	Data not available	Data not available

Source: Ministry of Agricultural Development and Food

According to Eurostat data, the cultivated area of quality wines during the period 1990 -2001 has increased representing the 27% of total area of vineyards in 2001 against 19% in 1990, despite the fact that at the same period the total area of vineyards decreased at 27% (Table 21). It

is remarkable that the greatest increase was observed in 2001 in the Northern and Southern Aegean, where the area of quality wines psr has increased at 83% and 79% respectively.

**Table 21: Comparison of Quality Wine-growing Areas and Rates of Change**

Country/Region	% Change in Total Area 1990-2001	Quality wine as % Total Wine Area 1990	Quality wine as % Total Wine Area 2001	Area Grubbed 1990-1998 as % Total Area 1990
Greece	-27	19	27	17
Stereia Ellada	50	14	0	15
Attiki	79	8	0	15
Voreio Aigaio (Northern)	-69	0	83	16
Notio Aigaio (Southern)	-59	17	79	14

Notes: Figures for Greece (including Regions) are for 2001.

Source: Eurostat Annual Survey Tables Viann 50 51, 60 & 61.

It is pointed out that despite of the fact that the area of vineyards intended for the production of quality wines was increased at 4.8% during decade 1988 - 1998, the corresponding production was decreased at 15.8% (Table 22).

**Table 22: Synthesis of area and production evolution and average yields 1988/1998**

	Vineyard Area Evolution 88/98 in %			Production Evolution 88/98 (88/02) in %			Average Yield in Hl/Ha***		
	Total	Table	Quality	Total*	Table*	Quality*	Total	Table	Quality
Greece**1	-26.6	-34.0	+4.8	-11.9 (-28.7)	-10.5 (-27.7)	-15.8 (-30.5)	50	n.a.	n.a.

\* Source: EC "Histvino" p. 80 Superficie vinicole

\*\* Source: EC "Viann \_ 50" file

\*\*\* Source: EC, 1: Data for 1990-2001, 2: Data for 1990-1997, n.a.: non available

In regard to the production of quality wines psr, we observe that between various types the white wines prevail, even if the last years and actually after 1999 the production of red and rose wines has increased against white (Table 23). The production volume presents fluctuations, since it depends from various factors (soil and climatic conditions, noys nutrition, etc).

It should be mentioned here that, the Royal and Presidential decrees for the production of quality wines psr do not include any environmental requirement of production and farming techniques that should be applied in the vineyards that are intended for the production of quality wines psr. Although, there are no specific techniques taking environment issues into account, the CMO regulation on qw.psr still has positive impacts because the production of quality wines psr poses some prerequisites that result in a more environmental friendly cultivation than the table wines ones.

Nevertheless, we can approach the environmental issues basing to all the aforementioned and more specifically:

- ✓ the high increase of areas of quality wines psr mainly in the islands (Northern and Southern Aegean),
- ✓ the aid that is granted to the vine growers of the small islands of Aegean Sea, so that they maintain the traditional methods of vineyards cultivation, and
- ✓ the conditions that a wine should fulfil in order to be recognized as quality wine psr

The cultivation of vines in the islands the Northern and Southern Aegean usually takes place in terraces, contributing thus to the protection of soil erosion.

Moreover, the restriction of production in force for each quality wines psr contributes to the avoidance of intensification of cultivation, resulting to the reduction of negative effects to soil and water quality.

**Concluding, we could say that the farming techniques that are applied for the production of quality wines psr, mainly in the islands, in combination with the fact of the great increase of the corresponding areas in those places contribute to the protection of environment, decreasing the negative effects.**

**Table 23 : Wine production in Greece (1980-2002) (in 1.000 hl)**

	Table vines (in thousand hl)			Quality wines psr (in thousand hl)			Rest (in thousand hl)			
Year	Total	Red	White	Total	Red	White	Total	Red	White	Grand Total (in thousand hl)
1980	4984	1750	3234	243	100	143	168	70	98	5395
1981	4960	1930	3030	300	80	220	230	150	80	5490
1982	3900	1000	2900	400	200	200	200	100	100	4500
1983	4616	1664	2952	269	124	145	365	55	310	5250
1984	4674	1455	3219	289	145	144	52	13	39	5015
1985	4180	1270	2910	338	168	170	20	2	18	4538
1986	3991	1253	2738	301	137	164	40	22	18	4332
1987	4136	1338	2798	269	109	160	70	11	59	4475
1988	3937	1339	2598	361	158	203	46	1	45	4344
1989	4173	1389	2784	328	131	197	31	4	27	4532
1990	2766	800	1966	259	94	165	501	173	328	3526
1991	3381	772	2609	199	75	124	436	39	397	4016
1992	3543	851	2692	236	80	156	271	28	243	4050
1993	3184	693	2491	203	80	123	5	1	4	3392
1994	2795	538	2257	223	92	131	33	5	28	3051
1995	3554	637	2917	266	121	145	30	5	25	3850
1996	3738	726	3012	313	145	168	58	10	48	4109
1997	3602	816	2786	342	152	190	43		43	3987
1998	3474	976	2498	358	157	201	0			3832
1999	3343	891	2452	337	165	172	0			3680
2000	3231	1129	2102	327	169	158	0			3558
2001	3139	1115	2024	338	186	152	0			3477
2002	2847	817	2030	251	85	166	0			3098



**Question 2 (V3) : What is the environmental impact of the regulated oenological practices?**

The most important wine production practices that are applied in Greece, in application of Regulation No 1493/1999, are the following:

- Control – inspection of production in the stage of technological maturation.
- Transportation control of grapes from the vineyard to the wine factory.
- Temperature Control during wine fermentation and maturation.
- Enrichment (probability)
- Sweeteners addition (probability).
- Closure – sealing of wine in inactive atmosphere.

In the future, two other practices are going to be materialised:

- Reduction of maximum limits of sulphur dioxide (SO<sub>2</sub>).
- Acidification with malic acid.

The above reported wine production practices are applied during the production of wine, i.e at the vinification and bottling and up to the delivery of final product.

The production process of the wine manufacture is as follows:

- Grapes reception
- Grapes weighting/Crashing (separation of stems/grape)
- Grapes squeeze out/Grapes press
- Fermentation
- Sulfuration - Condensation (storage for later use) of the must
- Transfer
- Clarification
- Filtration
- Pasteurisation
- Cooling
- Second filtration
- Bottling

Various types of waste are produced during the wine production process, which effect more or less the environment. These environmental effects are:

- a. impacts to the ground,*
- b. impacts to water, and*
- c. impacts to the atmosphere*

Various methods are used for the reduction, treatment and management of these pollutants, as well as for the management of their environmental effects.

The greatest volume of waste is produced at the harvest of grapes period and perhaps a little later (dues of August and it can be extended until the beginning of December). Other processes (transfusions, bottling) are carried out during the whole year. This periodicity of waste, both in their flow and in their organic load, creates one more serious technical problem, as their treatment is usually continuous process and the treatment installations need a continuous, constant and as much as possible more homogeneous flow.

**Production of Waste**

**A. Air emissions**

Generally, in the wine factories, there are no important pollution problems from air emissions, apart from the typical air emissions from the boilers gases that are usually connected with energy issues regarding the distillation.

The air emissions consist of particular matter (PM), volatile organic compounds (VOC) and combustion gasses that depend on the type and quality of fuels as well as combustion equipment.

The main sources of air emissions are the processes of combustion, production, fermentation, distillation and wastewater biological treatment

**B. Wastewater**

They are distinguished in six basic types:

- Wastewater from cooling water
- Wastewater from floorings and equipment cleaning
- Wastewater from bottling installations
- Wastewater from the boiler room
- Wastewater that comes from the various wine production processes, such as fermentations, transfusions, mixtures, wine bottling, and leakages of must condensation.
- Wastewater from distillation.

### C. Solid Waste

They are distinguished in four categories:

#### 1. Solid waste from production processes

The solid waste of wine factories derive from the segregation of stems from the grape (the volume of waste is approx. 3-5% of the initial weight of the grapes) and pressing of fermented juice of grapes, which leaves in the press a solid remain that is called pomace [these remains of fermentations, pomace and must, after they pass from the press they are constituted mainly from grapestones and rinds of grapes]. These waste contain 30-40% of water and their weigh is equal to the 12% of the initial weight of grape.

By the various filtrations that take place during the wine transfusions, if the filters are made of paper, they are rejected with the remnants as solid waste.

Finally, from the reservoirs of dregs' storage, when their humid part goes for refinement, then the thick part is filtered with press until all the humid part is exhausted that goes to the refinery as well. The sludge, after drying', is rejected as solid waste.

#### 2. Solid waste from bottling materials failures

The solid waste of this category comes from the broken bottles of bottling and likely from defective lots of packaging materials. The production of solid waste of packing materials is not high and usually is sold or recycled in glass industries.

#### 3. Solid waste from packaging

The solid waste of this category, which come from the packing materials of raw material are of low quantity and usually they are disposed off.

#### 4. Solid waste from personnel

#### 5. Solid waste (sludge) from wastewater biological treatment

### Characterization and Quantification of Waste

Winery wastewater are characterised by the high content of organic material and nutrients, high acidity and large variations in a seasonal flow production. The annual volume, as well as the qualitative characteristics of the wastewater produced from the wineries in Greece through the years, area presented in Table 24, which follows. The produced BOD<sub>5</sub> load (1.6 Kg / tn grapes / year) is very high, and thus the wineries wastewater is of the most organic surcharged industrial wastewater. TSS production is (0.3 Kg / tn grapes / year) is also significant.

**Table 24 : Volume and Characteristics of Waste of Wine factories at the period 1980 - 2001**

Year	Production of grapes for vinification (tn)	Volume of waste (m <sup>3</sup> of waste of/tn grapes of/year)	BOD5 kg /year	TSS Kg /year
1980	731,027	1,462,054	1,169,643.2	219,308.1
1981	732,806	1,465,612	1,172,489.6	219,841.8
1982	726,807	1,453,614	1,162,891.2	218,042.1
1983	744,514	1,489,028	1,191,222.4	223,354.2
1984	765,471	1,530,942	1,224,753.6	229,641.3
1985	740,334	1,480,668	1,184,534.4	222,100.2
1986	703,765	1,407,530	1,126,024.0	211,129.5
1987	662,855	1,325,710	1,060,568.0	198,856.5

Year	Production of grapes for vinification (tn)	Volume of waste (m <sup>3</sup> of waste of/tn grapes of/year)	BOD5 kg /year	TSS Kg /year
1988	687,827	1,375,654	1,100,523.2	206,348.1
1989	744,529	1,489,058	1,191,246.4	223,358.7
1990	575,491	1,150,982	920,785.6	172,647.3
1991	657,151	1,314,302	1,051,441.6	197,145.3
1992	667,070	1,334,140	1,067,312.0	200,121.0
1993	661,774	1,323,548	1,058,838.4	198,532.2
1994	626,433	1,252,866	1,002,292.8	187,929.9
1995	640,177	1,280,354	1,024,283.2	192,053.1
1996	669,024	1,338,048	1,070,438.4	200,707.2
1997	662,576	1,325,152	1,060,121.6	198,772.8
1998	641,995	1,283,990	1,027,192.0	192,598.5
1999	645,630	1,291,260	1,033,008.0	193,689.0
2000	605,485	1,210,970	968,776.0	181,645.5
2001	640,105	1,280,210	1,024,168.0	192,031.5

The estimated waste volume during the period 1980 – 2003 presented fluctuations. This is owed to the fact that the quantity of produced waste is connected directly on the production of grapes, which, as it was aforementioned, presents big annual fluctuations. For the anticipation of wineries environmental impacts a series of pollution prevention standards and control techniques.

## POLLUTION PREVENTION STANDARDS AND CONTROL TECHNIQUES

### *Control systems*

These systems are used in alcoholic fermentation and lead to better performance of sucrose/alcohol rate (therefore less loaded wastewater), better control of the procedures and the capability of automatic start or pause of the operation or/and alteration of the production state. Likewise, the application of this kind of systems to distillation lead to better quality of alcohol (therefore less loaded wastewater), better control of the processes and stable quality of the products.

## TECHNIQUES ON WATER SAVING AND REDUCTION OF WASTEWATER HYDRAULIC LOAD AND POLLUTANTS

Efforts are made for the exploitation of solid waste as raw materials in other similar or not industries and for the improvement of byproducts for forage use. The wine mud is concentrated and then distilled.

## POLLUTION CONTROL

### A. Treatment And Disposal Of Wastewater

The typical wastewater treatment methods in wine manufacturing industry are:

- i. *Direct land disposal:* The quantities of wine factories wastewater that can be used for the irrigation vary depending on the wastewater composition and they range between 382-1280 m<sup>3</sup> /ha/year.
- ii. *Physic-chemical treatment:* Generally the Physic-chemical treatment methods are not effective. The sedimentation is ineffective even with the addition of coagulants. The precipitation leads to anaerobic reactions and to the creation of odors.
- iii. Biological methods:
  - a. Anaerobic digestion

With the anaerobic digestion reduction of organic load is achieved at approx. 90-95%, with mean organic load of order of 3 Kg BOD/m<sup>3</sup> / day.

b. Anaerobic Filters

The anaerobic filters achieve greater reduction of organic load than the anaerobic digestion but they have higher functional and fixed cost.

c. Lagoons

Two Lagoons are usually used in line. In the first (approx. depth 2m) anaerobic conditions prevail, while in second (approx. depth 1m) aerobic. The retention time of waste ranges from 20 to 40 days and the reduction of organic load ranges from 80% to 90% for loads of 0.4-0.8 Kg BOD/m<sup>3</sup>/day and with temperatures that range from 18°C to 27°C.

d. Rotating biological trays

This method can achieve reduction of organic load at 80-95%, but it has high operational and fixed cost.

B. Treatment And Disposal Of Solid Waste

The solid waste that are produced can be used as forages or compost after further treatment, though because of their great content in string fibres materials are of low nutritive value.

C. Treatment And Disposal Of Air Emissions

The systems used for air emissions treatment, applied in the examined industrial sector, are the typical ones that treat steam boiler emissions. They include exhaust gasses reclamation techniques and condensation techniques (steam).

Concluding we may say that the most significant waste of wineries is the produced wastewater which has very heavy organic load. Since the wineries are obliged to comply with IPPC Directive requirements as well as to their environmental terms of operation, the wastewater environmental impacts are reduced year by year. Treated wastewater adds almost no polluting load in water receivers.

As far as the regulated oenological practices concerns, it is not known, in what level they are applied in the various wineries. No specific data are available. We may suppose that the increasing consumer's demands for better and constant wine quality compel the wineries to comply with the regulated oenological practices. The application of these practices has positive environmental effects mainly on water and soil pollution.

**2.1.4 Wine – Theme 4: accompanying measures**

**Question 1 (V4) : Are the accompanying measures to preserve vineyards in certain regions effective in terms of a positive environmental impact ?**

Council Regulation No 1493/1999 establishes rules concerning the description, the name and the protection of certain products. These rules include, more specifically, provisions that:

- ✓ Make the use of certain terms compulsory,
- ✓ permit the use of certain terms, subject to conditions,
- ✓ permit the use of certain other terms, including information which may be useful for consumers,
- ✓ govern protection and control arrangements for certain terms,
- ✓ govern the use of geographical indications and traditional terms .

Greece, in the frame of compliance with Regulation No 1493/1999 and particularly of those aforementioned in the various Royal or Presidential Decrees or Ministerial Decisions that enacted for the recognition of wines as quality wines psr, included also terms that concerned the description, the presentation and the protection of these products. Due to the big number of these legislative issues, it is impossible to present and analyse all of them, in the contents of the present study. Indicatively, Ministerial Decision No 379000/3-9-1999 on “the recognition of wines of Name of Origin Rhodes of Superior Quality” is presented at this point. According to that Decision:

- ✓ The bottled wines bring on the shive of the bottle, a control stripe of red' colour in which the capital letters RD will be entered that correspond to the name of origin, the

double-digit number that corresponds to the two last digits of the year of stripes utilisation as well as the serial number of stripe.

- ✓ The distribution of bottled wines without control stripe is not allowed.
- ✓ The main and auxiliary labels on the bottles, the registrations on packaging, generally and on the accompanying documents as well as on each document should be conformed to the Community and National Law.
- ✓ The way of presentation of quality wines psr, which includes the obligatory insertion of certain terms on the label, protects both the producers and the consumers.

More precisely, description of all the abovementioned data on the label of the produced wine ensures the quality and distribution of the producers' products.

On the other hand, the consumers have the possibility, by this way, to be informed and to select a wine, which has been produced with a certain way that guarantees its quality, but also a product charged with agrochemicals (fertilizers, pesticides) as little as possible. These quality wine products gain significant ground year by year. For example quality wine products, which come under organic farming practices, give a certain indication that environmental aspects are taken into account.

At this point, it should be stressed that there is inadequacy in the information of the consumers' part, with regard to the quality wines. Many consumers ignore the differences between a common wine and a quality wine.

Unfortunately, there are no available data that would validate all the above and consequently we are not able to jump to solid conclusions. The only possible analysis of the subject can be done basing to the laws of market (supply - demand), as explained above. According to what presented above we may conclude that there is no major positive impact of the accompanying measures to preserve vineyards in certain regions. This can be explained by the fact that the impact on consumers is still low (since adequate information is missing), therefore they cannot motivate the producers to be directed to the preservation of specific vineyards in certain regions.

If this weakness is covered, then, it is possible that the demand of this category of wines will be more and more increased. **This will lead to the need of production increase, so that the supply will cover this demand. It is estimates that this consumer's attitude will result to the reduction of the effects to the environment, since the production of quality wines psr is based to cultivation practices that have the less possible effects to the environment (compared to the table wines).**

Another measure to the direction of preservation of vineyards in certain regions effective which seems to have a positive environmental impact is the promotion of organic (as it has been mentioned above) or integrated produced programs. The environmental friendly organic farming technique gains ground in the specific sector. The areas of organic farming vines increased from 1,569 ha in 1999 to 3,168 ha in 2003 (Table 25). Moreover, the area of organic vineyards in 1999 constituted 1.86 % of the total cultivated vines' area, and in 2003 it was 8.12% of the total organic areas.

The percentage increase of organic vineyards is more than 100% in the period 1999 – 2003.

**Table 25 : Area of organic vineyards**

Year	Area of biological vineyards (ha)	Total vineyards cultivated area (ha)	Percentage (%) of organic vines to the total vines cultivated area	Total organic area (ha)	Percentage (%) of organic vines to the total organic area.
1999	1,569	84,351	1,86%		
2002	2,599	Data not available		29,505	8.81
2003	3,168			38,995	8.12

Source: Ministry of Agricultural Development and Food

The available data on the evolution of organic crops in Greece are limited and cover only three years (1999, 2002 and 2003). The trend for the vines for table use, for which there are more data, seems to be increasing year by year, reaching 2621 ha of cultivating land in 2003. This farming practice was funded in Greece, in the frame of Regulation No 2078/92 and the funding is continued in the frame of Regulation No 1257/1999 through a related agro-environmental measure.

More specifically, the materialization of the program of organic farming is conducted via the Priority Axe 3 of the Single Programming Document of Rural Development (EPAA), which was approved with number E (2000) 2733/27.9.2000 decision of European Committee and includes in total 13 measures (biological agriculture included). By the end of 2003, five (5) measures, among them, have started to be materialized, among of which the one of organic farming.

No specific data on vines organic farming that is financed under this Measure are available.

Apart from above agroenvironmental measures, a System of Integrated Agricultural Production Management is applied in Greece from 2000. This is a system of a rural holding organisation that includes inter alia, good farming practices, health and safety of workers, products safety, traceability and environmentally friendly actions. It aims in the development of an environment suitable for effective and profitable agricultural production in an economically viable and environmentally responsible rural holding, incorporating in the modern farming practices, useful natural processes.

The continuously increasing demands of markets for certified products according to the System of Integrated Management induced the development of the following standards:

#### ***AGRO 2-1: Specification***

This standard includes general requirements for agriculture. It includes the whole principles for the certification of the Integrated Management System that is applicable in every agricultural holding independent from its specific cultivations.

#### ***AGRO 2-2: Requirements for use***

This standard describes the technical and legal requirements of the Integrated Production Management System for crop production and accompanies the standard AGRO 2-1. It includes the general codes of Good Farming Practice and the accompanying measures of environmentally friendly agriculture (crop production), in a way that safe and qualitative products are produced and best environmental management is achieved.

The benefits deriving from the system application are:

- Guarantee of cultivations output and income of farmers
- Reduction of environmental impacts of agricultural activities
- Satisfaction of social and market requirements for both environmental protection and agricultural products free (as much as possible) from synthetic chemical substances

The total certified areas, according to the Integrated Management System, extent to 15,632.2 hectares (2005). From them 445.3 ha concern grapes for wine production and table grapes.

### ***2.1.5 Wine - Theme 5: environmental promotion***

***Question 1(V5). Has the promotion by Member States and regions of environmentally sound production techniques via producer organisations and inter-branch organisations been effective ?***

The total number of producers that deal with viticulture and the production of wine in Greece decreases continuously. More precisely, the number of growers both of vines of wine grapes for quality wine production and rest wines decreased at 18.5% and 45.7% respectively during the decade 1989-1999 (Table 26). On the contrary, during the two years period 1998-1999 despite the fact that the number of vines growers for the production of the rest of wines decreased at 38.9%, the percentage of growers of vines of wine grapes for quality wine production was increased for about 2.8%.

**Table 26 : Evolution of wine growers number**

Wine Type	1989	1999	Variation	1998	1999	Variation
Growers of vines for quality wine production	29,579	24,115	-18.5%	13,300	13,671	2.8%
Growers of vines for "Other wines" production	198,415	107,811	-45.7%	60,847	37,207	-38.9%
Total wine growers	221,949	131,926	-40.6%	74,147	50,878	-31.4%

Source: EUROSTAT Statistics in Focus, theme 5 - 25/2003

Many of those growers are members of some union or cooperative, without this to constitute their constant obligation. Moreover, many cooperatives are activated in the wine sector in Greece. Most of them have in parallel other activities apart from the production and trade of wines. The most important Wine Production Cooperatives are 19 (Table 27) and the majority of these belong in K.E.O.S.O.E., which enumerates in total approx. 45 members. Certain cooperatives are members of S.E.O.

**Table 27 : Most important Wine Production Cooperatives**

No	Name	Activity
1.	UNION OF WINE PRODUCTION COOPERATIVES OF SAMOS	Production of in bulk and bottled wines. Services to the members. Exploitation of a Supermarket. Agricultural supplies, forages, fertilizers.
2.	MARKO- CO-OPERATIVE OF WINE PRODUCTION INDUSTRY-MARKOPOULO OF MESSOGIA	Production and trade of in bulk and bottled wines (retsina)
3.	UNION OF AGRICULTURAL COOPERATIVES OF PEZA HERAKLION – CRETE	Production and trade of in bulk and bottled wines. Concentration, packing and exports of agricultural products. Production of olive oil, soaps. Services to the members.
4.	UNION OF AGRICULTURAL COOPERATIVES OF ATTICA 'PIKERMI'	Production and trade of in bulk and bottled wines (retsina). Trade of forages and fertilizers. Services to the members.
5.	UNION OF AGRICULTURAL COOPERATIVES OF HERAKLION CRETE 'AGRUnion'	Production of must and wines (in bulk – bottled). Standardisation of olive oil. Selection, packing of grapes.
6.	UNION OF AGRICULTURAL COOPERATIVES OF IOANNINA – WINE FACTORY ZITSIS	Production of wines and raki (eau de vie). Trade of agricultural supplies, tools and instruments. Services to the members. Supermarket
7.	UNION OF AGRICULTURAL COOPERATIVES OF AMYNIAIO	Production of wines (in bulk and bottled). Service station of agricultural supplies, etc
8.	UNION OF AGRICULTURAL COOPERATIVES OF PATRAS	Production of wines (in bulk and bottled). Services to the members.
9.	CONSORTIUM OF COOPERATIVES OF VITICULTURISTS OF THEBES PROVINCE	Production of wines (in bulk and bottled)
10.	AGRICULTURAL WINE PRODUCTION COOPERATIVE OF MESSINIA 'O NESTOR'	Production of wine (in bulk)
11.	AGRICULTURAL COOPERATIVE ARHANON	Production of wines (in bulk and bottled). Production of olive oil. Concentration, processing, standardisation of grapes. Collection of raisins.
12.	UNION OF AGRICULTURAL	Production and bottling of wine. Concentration of



No	Name	Activity
	COOPERATIVES OF LIMNOS	agricultural products. Mini market.
13.	WINE PRODUCTION AND OIL PRODUCTION COOPERATIVE OF NEMEA	Production of wines (in bulk and bottled).
14.	UNION OF AGRICULTURAL COOPERATIVES OF PAROS	Concentration of agricultural products. Oil factory and cheese production plant. Production (vinification – bottling) wines. Trade of agricultural supplies.
15.	UNION OF AGRICULTURAL COOPERATIVES OF SITIA	Production of wines. Concentration of agricultural products. Standardisation of olive oil, wine, raki (eau de vie). Supermarket. Service stations of agricultural supplies.
16.	AGRICULTURAL PRODUCTIVE COOPERATIVE N. AGHIALOU 'DIMITRA'	Production and bottling of wines, raki (eau de vie), etc. Olive press. Processing of nuts.
17.	UNION OF AGRICULTURAL COOPERATIVES OF KASTELI KISSAMOU	Standardisation, bottling of olive oil and wines. Trade of agricultural supplies, forages and fertilizers.
18.	VAENI – NAOUSSA, AGRICULTURAL VINICULTURAL AND WINE PRODUCTION COOPERATIVE	Production, bottling and sale of wines.
19.	WINE PRODUCTION COOPERATIVE OF TIRNAVOS	Production and bottling of wines, raki (eau de vie), ouzo.

Moreover, apart from the unions and the cooperatives that were presented above, six (6) more Producers' Organisations activate also in the wine sector, placed and named as follows:

- ❑ Prefecture of Lesbos (Northern Aegean)
  1. P. Vastardos – Chonas – I. Kremmydas – A. Tzaneros E.E.
  2. Union Of Agricultural Cooperatives Of Limnos
- ❑ Prefecture of Cyclades (Shouthern Aegean)
  3. Union Of Agricultural Cooperatives Of Paros
  4. Union Of Cooperatives Of Thira's Products
- ❑ Prefecture of Samos: (Northern Aegean)
  5. Union Of Wine Manufacture of Cooperatives Samos
- ❑ Prefecture of Dodecanese: (Shouthern Aegean)
  6. Union Of Rural Cooperatives of Dodecanese

According to Regulation No 1493/1999, the Producers' Organisations aim at:

- ❖ ensuring that production is planned and adjusted to demand, particularly regarding quality and quantity.
- ❖ promoting concentration of supply and the placing on the market of their production
- ❖ reducing production costs and stabilising the producer prices
- ❖ promoting cultivation practices, production techniques and waste management techniques, which are friendly to the environment, in order to protect the quality of water, soil and landscape and to preserve and/or to encourage biodiversity

It should, also, be noticed that the National Inter-branch Organisation of Vine and Wine has been recognized according to the Ministerial Decision No 339037/9-2-2001. The activities of this Interprofessional Organisation are the following:

- Production, Processing and Trade of grapes of wine production varieties.
- Production of wine, must, condensed must and re-purified condensed must.
- Trade of wine, must, condensed must and re-purified condensed must.

According to Regulation No 1493/1999, the inter-branch organizations follow one or more from the following actions:

- Improvement of knowledge and transparency of production and market
- Help for the best co-ordination of the products' placing on the market, particularly by means of researches and market studies



- Creation of contracts' standard forms compatible with Community Regulations
- Complete exploitation of production potential.
- Information dissemination and researches conduct, which are necessary for the adjustment of production towards products that better comply with the market requirements and the preferences and expectations of consumers, with regard to product quality and the protection of the environment.
- Seek of ways for the restricted use of crop health protection products and assurance of products' quality and conservation of soil and water.
- Development of methods and means for the improvement of products quality at all the production stages, vinification and marketing.
- Exploitation and protection of organic farming as well as names of origin, quality labels and geographical indication.
- Promotion, in particular integrated and other environmental friendly production methods.

**Unfortunately, available data relevant to the environmental actions that are included in the operational programs of Producers' Organisations do not exist.** Furthermore the financial aids that the Producers' Organisations have received for the implementation of these actions are also missing. (Payment authority did not give data until the submission of the present report).

Nevertheless either the Producers' Organisations or the Inter-branch Organisations, at their recognition, are obliged to apply environmentally friendly farming techniques.

Summarizing all the above, we could say that it is not possible jump to solid conclusions regarding the effectiveness of economic support of the Producers' Organisations from the member states, which aims in the promotion and materialization of environmental friendly actions. The environmental actions in PO programs are not yet significant. Only the last years the PO' programs started to include actions dedicated to environmental issues. Many times, these actions cover the needs for some changes in the producers farming techniques and they may have a "character" of environmental concern without be really environmental actions For example they fund the change of an irrigation system, which may be considered as an environmental action, without being that in fact.

## 2.2 Horizontal questions

### 2.2.1 Horizontal – Theme 1 : land use over time

**Question 1(H1):** *Does the CMO lead to substantial changes in land use over time (abandonment, expansion and set-aside) and if so: what are the positive and negative environmental impacts? [This question should preferably consider typical patterns of alternative status/use after or before use of the land for the permanent crop to which the CMO relates.]*

In Greece the national vinicultural register, and the inventory of production potential began to be materialised recently. The inventory of production potential of wine sector is a reliable system of concentration and classification of information and it includes:

- a) all the areas that are planted with vines, that are categorized as wine production varieties in the whole country, included also the areas with varieties of dual-purpose grapes, that are indented for wine production,
- b) all the relative wine varieties indented for wine production,
- c) the total existing planting rights.

Moreover, the management system of vinicultural register aims to the recording and the management of vinicultural resources that exist in the Hellenic jurisdiction.

The elements recorded in the system concern:

- ✓ Vine growers, i.e. natural or legal person that possesses and cultivates areas with vines.
- ✓ Vineyards, i.e. cultivated areas with mapped and coded vines from the responsible Authority per producer, according to the corresponding statements of cultivation.
- ✓ Total area per variety of vine of each producer.

Due to this delay in the creation of reliable territorial data, there are no essential data of the changes of land use that are related with the vine-growing varieties and consequently the answer to the question can be supported only in a macroscopic examination of the data of the development of the cultivated areas of vineyards, in combination with the areas that were abandoned, restructured or replanted.

The application of CMO prompted the reduction of vines cultivated areas in particular through the promotion of vine-growing abandonment.

The total area of vineyards that were grubbed up during the period 1989 - 1996 amounted in 30,058 ha (Table 28). The largest area of vineyards was grubbed up in 1991 and amounted in 7,228.7 ha, representing 7.25% of the total vines cultivated area at the same year. Also, during the application of the particular measure the areas of vineyards that were included constituted a small percentage of the total cultivated area.

**Table 28 : Areas of vineyards that were abandoned according to Regulation No 1442/1988**

Year	Area (ha)	Total vines cultivated area (ha)	Percentage (%) on total vines cultivated area
1989	1,281	105,086	1.22%
1990	4,984	102,080	4.88%
1991	7,229	99,747	7.25%
1992	6,767	96,679	7.00%
1993	2,440	95,232	2.56%
1994	3,112	91,557	3.40%
1995	2,543	89,300	2.85%
1996	1,702	87,250	1.95%
<b>Total</b>	<b>30,058</b>		

The areas of vineyards that were grubbed up, were used either for cultivation of new plantations or remained uncultivated. The effects of this change on the environment depended on the use of the grubbed up areas.

In the first case, at which the grubbed up areas were used for the planting of other cultivations, the effects to the environment depend on the type of cultivation that was installed, as well as from the farming technique that was applied. Generally, we can say that as more intensive the cultivation was, much bigger were the negative environmental effects. Unfortunately, CORINE LAND COVER data on land cover changes (between 1990 – 2000) are still not available officially. In the second case, at which the areas of vineyards that were grubbed up remained uncultivated, soil erosion problems might occurred in sensitive grounds. A more comprehensive answer would be given after the evaluation of land use changes, according to CORINE Land Cover data.

Unfortunately, there are not available data concerning the land use of the areas of reclaimed vineyards and consequently more accurate conclusions cannot be reached on the potential effects to the environment.

Nevertheless, new plantations took place at about 12,494 ha (Table 29) during 1996 - 2002. The areas that were planted in 2001 amounted in 1,098 ha and respectively 1.31% of the total vines cultivated area the same year, while the rest of the years the corresponding percentages were negligible.

**Table 29 : New plantings (ha)**

	<b>1996-97 (1)</b>	<b>Percentage (%) of the cultivated area</b>	<b>1998-99 (2)</b>	<b>Percentage (%) of the cultivated area</b>	<b>2000 (3)</b>	<b>2001 (3)</b>	<b>Percentage (%) of the cultivated area</b>	<b>2002 (3)</b>	<b>Total</b>
Greece	208	0.24%	208	0.24%	-	1,098	1.31%	10,980	12,494

Source: (1) EC Regulation 1592/96, (2) EC Regulation 1627/98, (3) Inventories

Moreover, the application of CMO led to variety transformation of certain vineyards through their restructure and conversion.

The total area of vineyards that were restructured in the frame of Regulation No 895/1985 during the period 1986 - 2000 was 4,217 ha (Table 30). The largest area of 830.2 ha was restructured in 1991. The application of this measure after 1991, however, followed a reducing trend. Also, during its application the areas of vineyards that were included constituted a very small percentage of total vines cultivated area.

**Table 30 : Areas of vineyards that were restructured according to Regulation No 895/1985**

<b>Year</b>	<b>Area</b>	<b>Area vineyards for the production of Quality Wines psr</b>	<b>Total vines cultivated area (ha)</b>	<b>Percentage (%) on the total vines cultivated area</b>
<b>1986 - 1989</b>	1,041		107,156	0.97%
<b>1990</b>	328	12,506	102,079	0.32%
<b>1991</b>	830	12,629	99,747	0.83%
<b>1992</b>	488	12,595	96,679	0.50%
<b>1993</b>	439	13,100	95,232	0.46%
<b>1994</b>	343	12,325	91,556	0.37%
<b>1995</b>	181	11,980	89,300	0.20%
<b>1996</b>	143	13,114	87,250	0.16%
<b>1997</b>	162	14,021	85,367	0.19%
<b>1998</b>	201	14,017	85,115	0.24%
<b>1999</b>	60	14,027	84,351	0.07%
<b>2000</b>	1	-	84,132	0.001%

Year	Area	Area vineyards for the production of Quality Wines psr	Total vines cultivated area (ha)	Percentage (%) on the total vines cultivated area
2001		14,683		
2002		15,507		
2003		14,276		
<b>Total</b>	<b>4,217</b>			

Source: Ministry of Agricultural Development and Food

Contrary to the restructured areas of vine-growing, the areas of vineyards that are intended for the production of quality wines psr presented increasing evolution during the same period. This is likely to be owed to the fact that the areas of vineyards that were restructured were used for the production of these wines.

Concerning the cultivated area of vines for table use and for wine production, it presented a constant reduction during the period 1980 - 2001 (Table 31). The total cultivated area of vineyards from 121,727 ha that was in 1980 decreased reaching 83,935 ha in 2001.

It should be noted that during the decades 1980 – 1990 and 1991 – 2001 the area of vineyards was decreased at 16%. This was owed partly to the application of CMO, but mainly to the application of the premium of abandonment, but also to the changes in land uses with the installation of more efficient cultivations.

In any case we cannot draw solid conclusions regarding the type of environmental effects, as data on the cultivations that have replaced the areas of vineyards that were abandoned, do not yet officially exist. The HELLENIC MAPPING AND CADASTRAL ORGANIZATION is not ready yet to provide data on land cover changes.

**Table 31 : Development of area of vines at period 1980 – 2001 for the total of country (in ha)**

Area*	Year																							
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Change 1980-1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Change 1991- 2001
<b>Vines for wine</b>	100.577	97.205	94.842	94.360	91.985	91.296	90.777	88.332	87.230	86.039	83.459	-17	81.302	78.894	77.823	74.820	73.339	71.899	70.160	70.035	69.729	69.716	70.685	-13%
<b>Vines for table use</b>	21.149	20.090	20.009	19.677	19.497	19.229	19.352	18.958	18.889	19.047	18.621	-12	18.445	17.785	17.409	16.737	15.961	15.351	15.208	15.080	14.621	14.415	13.250	-28%
<b>Total</b>	121.727	117.295	114.851	114.037	111.483	110.525	110.130	107.290	106.119	105.086	102.079	-16	99.747	96.679	95.232	91.556	89.300	87.250	85.367	85.115	84.351	84.132	83.935	-16%

### 2.2.2 Horizontal – Theme 2: adequate spending level and method

**Question 1 (H2): Are there indications that a change in total spending on the CMO in its present form would have a substantial positive or negative environmental impact? [This question should preferably address the claim of the literature that CMOs for permanent crops differ with respect to their overall environmental impact.]**

In order an answer to be drawn under this question, it is required to implement initially a kind of "cost/environmental effectiveness" analysis of each significant measure of each wine CMO, in connection with its positive or negative environmental results.

The Measures of wine CMO are:

- ☐ abandonment of vine-growing,
- ☐ restructure and conversion of vine cultivations,
- ☐ private reserves
- ☐ distillation
- ☐ utilisation of condensed must, and of re-purified musts for the increase of alcoholic strength of wine products, and
- ☐ utilisation of must and condensed must aiming at the production of grapes juice or other comestible products that are produced with the juice of grapes.

Amongst these measures the following are evaluated according to their environmental effects.

<input type="checkbox"/> Abandonment of vine-growing	
Nature of the impact	soil erosion in case of complete abandonment, biodiversity decrease, landscape deterioration
Target	local, primary, long term, average, irreversible, Fairly sensitive site
Overall characterisation	Negative
<input type="checkbox"/> Restructure and conversion of vine cultivations	
Nature of the impact	Decreased use of agrochemicals, soil and surface and groundwater preservation
Target	Local, primary, long term, average, Reversible, sensitive sites
Overall characterisation	Very Positive
<input type="checkbox"/> Distillation	
Nature of the impact	Decrease of wineries waste disposal, surface and groundwater preservation, air emissions
Target	Local, primary, long term, average, Reversible, no sensitive sites
Overall characterisation	Positive

- to deduce a list from significant measurements on the environmental level and to examine their importance from it on the budgetary level,

Unfortunately, data concerning the budget of each one measure are missing (Payment Authority hadn't provide yet the required data), therefore a kind of cost / benefit analysis can not be conducted.

**Question 2 (H2). Are there indications that decoupling of spending at its present level would have a substantial positive or negative environmental impact?**

In the frame of CMO, support is provided to:

- ☐ abandonment of vine-growing,
- ☐ restructure and conversion of vine cultivations,
- ☐ private reserves
- ☐ distillation
- ☐ utilisation of condensed must, and of re-purified musts for the increase of alcoholic strength of wine products, and
- ☐ utilisation of must and condensed must aiming at the production of grapes juice or other comestible products that are produced with the juice of grapes.

Consequently, we are not able to answer this question for the wine, since aid is not granted directly to the production.

### **2.2.3 Horizontal – Theme 3 : subsidiarity of agri-environmental schemes and horizontal measures**

***Question 1(H3) : Have the agri-environmental schemes and any environmental requirement [“cross-compliance” ex CE 1259/1999] related to these CMOs been sufficiently targeted by Member States and regions at hotspots of environmental degradation or possibilities for environmentally friendly production?***

None of the AE measures that are applied under SPD RD (or earlier in the frame of financing of N0 2078/92 Regulation) is addressed specifically to vine cultivations or to regions that present risks of environmental degradation due to vine-growing.

In the agro-environmental measures of organic farming, contracts related to the vine cultivation have been included.

Organic cultivation of vine (without regard to the integration of exploitations in the agro-environmental measures of SPD RD) gains continuously ground in Greece. The areas of vine-growing that were included in the program of organic farming in 2003 were 3,168 hectares, while the corresponding area in 1999 was 1,569 hectares, that is to say an increase at approx. 102%. Moreover, vine organic farming constitutes the more important permanent organic cultivation after olives, since in 2003 it covered 8.12% of total organic cultivations.

In order a beneficiary to be financed by any of the AEM Measures of SPD RD, he should apply obligatory the Codes of Good Farming Practice, as well as the requirements of the National Regulating Frame for the environment, which have been established in the Hellenic legal framework.

Under Joint Ministerial Decision No 125347/568/20.1.2004, from the beginning of year 2004 the application of codes of good farming practices as they approved by No (2003)3139/22.8.2003 European Commission Decision which amends the SPD RD 2000-2006, is obligatory. Codes of Good Farming Practices aim to the confrontation of the problems caused by agricultural activities.

These practices aim to:

- ✓ sustainable development of farming soils and natural
- ✓ protection and maintenance of agricultural landscape and its characteristics
- ✓ protection of growers and consumers health

Codes of Good Farming Practices intervene in all the phases of agricultural and cattle breeding activities, as well as in specific cases of areas or zones under special protection regimes.

They are dealing with issues like:

- ✓ Inputs management
- ✓ Soil treatment
- ✓ Crop rotation
- ✓ Fertilization
- ✓ Water resources protection
- ✓ Irrigation systems
- ✓ Crop protection
- ✓ Self-sown flora management
- ✓ Farming waste management
- ✓ Waste management

Apart from the above agro-environmental measures, since 2000 the System of Integrated Management in the Agricultural Production is applied in Greece, which is an organisation system of the agricultural exploitation that include inter alia, good farming practices, health and safety of workers, safety of products, tracing and environmental friendly actions. It aims at the creation of the base for effective and cost-effective production in a economically viable and environmental responsible agricultural enterprise, incorporating in the modern farming practices beneficial natural processes.

The continually increasing markets requirements for certified products, according to the Integrated Management System, prompted to the development of the following standards:

**AGRO 2-1:Specification and AGRO 2-2: Requirements for the application**

Both standards are analysed in a previous Vertical Question..

The profits from the application of the system are:

- Guarantee of cultivations output and income of farmers
- Reduction of environmental impacts of agricultural activities
- Satisfaction of social and market requirements for both environmental protection and agricultural products free (as much as possible) from synthetic chemical substances

The total certified areas, according to the Integrated Management System, extent to 15,632.2 hectares (2005). From them 445.3 ha concern grapes for wine production and table grapes.

Moreover, with Ministerial Decision 275666/14-11-2003 the aid per hectare for the maintenance of vineyard cultivations for the production of quality wines psr in the small islands of Aegean Seas, was established. More specifically, the grant of flat-rate aid per hectare to the producers, for the maintenance of vineyard cultivations that are intended for the production of quality wines psr in the areas of traditional viticulture, was determined, under the condition that the vineyards are maintained at a way that good production conditions are ensured.

Concluding, we can say that the only environmental friendly measures that are financed, on the cultivation of vine, are those of organic farming, in which the adoption and application of Good Farming Practices is obligatory. Also, there is no certain special providence for special measures on confrontation of environmental degradation as consequence of vine cultivation, beyond financing for the maintenance of traditional vineyards in the small islands of Aegean Seas.

**Therefore, we may conclude that AEM measures have not been sufficiently targeted at regions of environmental degradation derived from vineyards farming.**



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## **APPENDICES**

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**Annex 1: List of people met**

**Annex 2: Main bibliography identified (used or not) in relation with the study**

**Annex 3: Data on distilleries waste and applied BAT**

<b>Annex 1: List of people met</b>
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1. Mrs T. Papavasileiou, General Manager OPEKEPE (Payments Authority)
2. Mr Gavalekas, Directorate of land use and Environment, Ministry of Agricultural Development and Food.
3. Mrs Pyriovoli, Directorate of land use and Environment, Ministry of Agricultural Development and Food.
4. Mr Bourdaras, Ministry of Agricultural Development and Food.
5. Mr Apostolos Zontanos, Agronomist, Owner a business of crop protection sales
6. Mrs Mata Aravantinou, Ministry of Environment, National Network on Environmental Information
7. Mrs Alexia Chomata, Ministry of Environment, National Network on Environmental Information
8. Mrs Anastasia Lazarou, Ministry of Environment, Water Department

<b>Annex 2: Main bibliography identified in relation with the study</b>
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1. K.S. Chartzoulakisa\*, N.V. Paranychianakisb, A.N. Angelakis, Water resources management in the Island of Crete, Greece, with emphasis on the agricultural use, Water Policy 3 (2001) 193–205, Elsevier
2. K.P. Tsagarakis a,, G.E. Dialynas b, A.N. Angelakis a, Water resources management in Crete (Greece) including water recycling and reuse and proposed quality criteria, Agricultural Water Management 66 (2004) 35–47, Elsevier
3. Helen Caraveli, A comparative analysis on intensification and extensification in mediterranean agriculture: dilemmas for LFAs policy., Journal of Rural Studies 16 (2000) 231–242, Elsevier
4. PESERA PROJECT, SOIL EROSION RISK ASSESSMENT IN EUROPE
5. Draft Report of Sustainability Indices – Greece 2003
6. The Environmental Impacts of irrigation in the European Union, A report to Environment Directorate of EC, Institute for European Environmental Policy, Polytechnical University of Madrid, University of Athens, 2000
7. INOVA Aleardo Furlani, Pietro Corigliano, Valentina Gentile, Rebeca Lucas, 2004. Ex-post evaluation of Common Market Organisation for wine – Final Report / Tender Agri /evaluation / 2002 / 6

### Annex 3: Data on distilleries waste and applied BAT

#### *Characterization and Quantification of Waste from alcohol production plant*

The volume, as well as the qualitative characteristics of the wastewater produced from the alcohol production plants are presented in the next Table.

Year	Production of grapes for vinification (tn)	Volume of wastewater (m <sup>3</sup> /tn grapes/year)	BOD5 (Kgr / tn grapes /year)	TSS (Kgr / tn grapes / year)
1980	731,027	2,631,697.2	1,535,156.7	548,270.3
1981	732,806	2,638,101.6	1,538,892.6	549,604.5
1982	726,807	2,616,505.2	1,526,294.7	545,105.3
1983	744,514	2,680,250.4	1,563,479.4	558,385.5
1984	765,471	2,755,695.6	1,607,489.1	574,103.3
1985	740,334	2,665,202.4	1,554,701.4	555,250.5
1986	703,765	2,533,554.0	1,477,906.5	527,823.8
1987	662,855	2,386,278.0	1,391,995.5	497,141.3
1988	687,827	2,476,177.2	1,444,436.7	515,870.3
1989	744,529	2,680,304.4	1,563,510.9	558,396.8
1990	575,491	2,071,767.6	1,208,531.1	431,618.3
1991	657,151	2,365,743.6	1,380,017.1	492,863.3
1992	667,070	2,401,452.0	1,400,847.0	500,302.5
1993	661,774	2,382,386.4	1,389,725.4	496,330.5
1994	626,433	2,255,158.8	1,315,509.3	469,824.8
1995	640,177	2,304,637.2	1,344,371.7	480,132.8
1996	669,024	2,408,486.4	1,404,950.4	501,768.0
1997	662,576	2,385,273.6	1,391,409.6	496,932.0
1998	641,995	2,311,182.0	1,348,189.5	481,496.3
1999	645,630	2,324,268.0	1,355,823.0	484,222.5
2000	605,485	2,179,746.0	1,271,518.5	454,113.8
2001	640,105	2,304,378.0	1,344,220.5	480,078.8

In the following Table all the waste management techniques in alcohol making industries are presented.

**Table 32: Pollution prevention and control techniques - ethyl alcohol production from materials that are fermented**

TECHNIQUES	
<b>Adopting good practices</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Personnel Training in preventing and controlling pollution parameters, water and energy saving.</li> <li><input type="checkbox"/> Hygiene rules observance inside the installation area.</li> <li><input type="checkbox"/> Equipment control and maintenance</li> <li><input type="checkbox"/> Recording and preventing leakages</li> <li><input type="checkbox"/> Precise water quantity usage for floor and equipments cleaning</li> <li><input type="checkbox"/> Warm water or steam tubing insulations in order to prevent heat leakages.</li> <li><input type="checkbox"/> Steam condensates reuse for water saving</li> <li><input type="checkbox"/> Exhaust combustion heat recapture.</li> <li><input type="checkbox"/> Water consumption reduction through water recycling systems (specifically cooling water).</li> <li><input type="checkbox"/> Fine quality water (less hardness) usage in order to prevent using chemical material.</li> <li><input type="checkbox"/> Crude oil replacement by natural gas (major reduction of air pollution will occur, especially in smoke and sulfur dioxide).</li> </ul>
<b>Raw materials organizing, planning, control and selection</b>	Supplies check, in order to improve wines, molasses, spirituous distillates, and other utilized materials quality, for accomplishing the quality/hygiene demands and decreasing wastes production
<b>Inventory and storage improvement</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Materials reports in regular time periods</li> <li><input type="checkbox"/> Using sufficient capacity storage areas</li> </ul>
<b>Processes improvement and modification</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Spirit production output increase by production processes improvement (more efficient fermentation processes, continuous bioreactors)</li> <li><input type="checkbox"/> Energy saving by using malt energy content, for wine preheating (kneading machine spout) and vacuum usage during distillation.</li> <li><input type="checkbox"/> Processes Energy Improvement</li> </ul>
<b>Cleaning system improvement</b>	Using nozzles with automatic supplying turning off system in elastic tubes, utilized in cleaning areas.
<b>Waste use (solid and liquid) as raw materials utile in other industries. Research for preventing pollution and by-product usage.</b>	Examination of solid waste and byproducts usage need as forage.
<b>Industrial wastestreams separation</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Different organic load industrial waste stream separation (when mixture involved)</li> <li><input type="checkbox"/> Do not mixture rain water with wastewater coming from cleaning areas.</li> </ul>
<b>Wastewater treatment proper option, Wastewater treatment units correct planning, control and operation</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Wastewater treatment proper option.</li> <li><input type="checkbox"/> Wastewater treatment system correct operation planning and control.</li> <li><input type="checkbox"/> Organic loads balancing load biologic process (mainly during anaerobic digestion)</li> </ul>

In the following Table all the waste management techniques in wine production industries are presented.

**Table 33: Pollution prevention and control techniques in wine production industry<sup>1</sup>**

TECHNIQUES	
<b>Adopting good practices</b>	<ul style="list-style-type: none"> <li>• Personnel Training in preventing and controlling pollution matters, water and energy saving.</li> <li>• Hygiene rules observance inside the installation area.</li> <li>• Equipment control and maintenance</li> <li>• Recording and preventing leakages</li> <li>• Precise water quantity usage for floor and equipments cleaning</li> <li>• Warm water or steam tubing insulations in order to prevent heat leakages.</li> <li>• Steam condensates reuse for water saving</li> <li>• Exhaust combustion heat recapture.</li> <li>• Water consumption reduction through water recycling systems (specifically cooling water).</li> <li>• Fine quality water (less hardness) usage in order to prevent using chemical material.</li> <li>• Crude oil replacement by natural gas (major reduction of air pollution will occur, especially in smoke and sulfur dioxide).</li> </ul>
<b>Raw materials organizing, planning, control and selection</b>	Supplies check, in order to improve grapes, must and other utilized materials quality, for accomplishing the quality/hygiene demands and decreasing wastes production.
<b>Inventory and storage improvement</b>	<ul style="list-style-type: none"> <li>• Materials reports in regular time periods</li> <li>• Using sufficient capacity storage areas</li> </ul>
<b>Leakage prevention</b>	Using nozzles with automatic supplying turning off system in elastic tubes, utilizing in cleaning areas.
<b>Processes improvement and modification</b>	<ul style="list-style-type: none"> <li>• Spirit production output increase by production processes improvement (more efficient fermentation processes)</li> <li>• Wine sludge concentration and distillation.</li> <li>• Modification of package in order to reduce the volume of broken bottles.</li> <li>• Cleaners saving during bottles cleaning.</li> </ul>
<b>Cleaning system improvement</b>	Using nozzles with automatic supplying turning off system in elastic tubes, utilizing in cleaning areas.
<b>Waste use (solid and liquid) as raw materials utile in other industries. Research for preventing pollution and by-product usage.</b>	<ul style="list-style-type: none"> <li>• Examination of solid waste and byproducts usage need as forage.</li> <li>• Wine sludge concentration and distillation.</li> </ul>
<b>Industrial wastestreams separation</b>	<ul style="list-style-type: none"> <li>• Different biologic load industrial waste stream separation (when mixture involved)</li> <li>• Do not mixture rain water with wastewater coming from cleaning areas.</li> </ul>
<b>Wastewater treatment proper option, Wastewater treatment units correct planning, control and operation</b>	<ul style="list-style-type: none"> <li>• Wastewater treatment proper option.</li> <li>• Wastewater treatment system correct operation planning and control.</li> </ul>

<sup>1</sup> Study on IPPC implementation for Food Sector in Greece