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1 Introduction

The present Document constitutes the deliverable 5.3.1. “Assessment of farms achievements with regard to environmental and agronomic aspects (document)” / Action 5.3 “Assessment of farms achievements with regard to environmental and agronomic aspects” / Work Package 5 “Implementation of the model” of the project “AgroQuality: Towards a Common Quality Control and food chain traceability system for the Greek – Italian primary sector of activity”. TEI of Epirus, the leader partner (LP) of AgroQuality, was in response to implement the corresponding study for the Region of Epirus.

AgroQuality project aimed at developing a model of the total management of olive growing in order to:

- Monitor the conditions under which the olives are cultivated
- Produce and distribute a “best practice” roadmap for the cultivation of olives
- Prove the quality of the product through quantitative measures, strengthening the positioning

The rational following question *“how can we issue a health certificate for plants?”* is the core question for the AGROQuality project, which leads the initial concept and the overall development. Towards this, a novel platform based on a special purpose Geographical Information System has been developed, in order to integrate the first Electronic Cultivation Record for olive products sector (cultivation, processing, trading). The system provides traceability systems through the whole chain from farm to shelf which

The objective of WP5 was the implementation of the model at farm level, in various typologies of farm. In the framework of 5.3.1. the assessment of the achievements of selected Greek farms with regard to environmental and agronomic aspects has been made.

2 The cultivation of olive trees

Oleaceae Family, known as the Olive Family, comprises of 600 species in 24 genera (one extinct) and occur on all continents. The olive tree, *Olea europaea*, is an evergreen tree or shrub native to the Mediterranean, Asia and Africa. It is short and squat, and rarely exceeds 8–15 m in height. However, the Pisciottana, a unique variety comprising 40,000 trees found only in the area around Pisciotta in the Campania region of southern Italy often exceeds this, with correspondingly large trunk diameters. The silvery green leaves are oblong, measuring 4–10 cm long and 1–3 cm wide. The trunk is typically gnarled and twisted. The small white, feathery flowers, with ten-cleft calyx and corolla, two stamens and bifid stigma, are borne generally on the previous year's wood, in racemes springing from the axils of the leaves. The fruit (olive) is a small drupe 1–2.5 cm long, thinner-fleshed and smaller in wild plants than in orchard cultivars. A number of products is produced by olives: wood, olive oil, table olives, olive pate, stone oil, soap, olive leaves etc.

Figure 1 Typical Mediterranean landscape with xeric olive grooves

Olive farming is an ancient pursuit dating back to biblical times. Olive trees, fruit and oil have played important roles in Middle Eastern, Greek, Roman and European cultures for centuries. Today more than 750 million olive trees are cultivated worldwide, the greatest number of which are planted in the Mediterranean region. In addition, there are at least fifty different varieties of olive, each with its own distinct characteristics. The main producing areas in Greece are Crete and the Peloponnese, where the most important variety for oil production is the Koroneiki. In Greece, there are an estimated 120.000.000 olive trees and 350.000 Greek families involved in olive tree cultivation.

The coastal regions of Greece have the perfect climatic conditions it needs and a suitable ecosystem for the tree to grow and bear fruit. The trees are slow to grow, taking four or five years to yield their first fruits and another 10 to 15 to reach their full capacity. Once established, however, the olive tree can live for many years. There are stories of trees which have stood for a thousand years. The olive tree, in mainly cultivated for olive oil, fine wood, olive leaf, and the olive fruit (table olives).

The cultivation of olive concers a number of interventions: soil processing, pruning, fertilization (adding fertilizers and amendments to soil), pests and diseases control, weeds management, irrigation and harvest. Everything that happens to the olive tree, from pruning in spring through flowering and harvesting in the late autumn, will have a bearing on the quality of the fruit, and thus on the product. The bulk of the work associated with olive farming concentrates at two points in time: pruning and harvesting. Pruning is the first thing a farmer does after harvesting to prepare the tree for the next crop. Harvest time in Greece is usually between September and December depending on autumn rainfall, and may even go on into February. The harvest is an extremely critical time as far as ripeness is concerned. Most growers want to produce as much good quality oil as possible and this means optimum ripeness, but if the olives are left on the trees too long they will over ripen and oxidize as soon as they are picked, producing unpleasant oil. In Greece olive harvesting still remains predominantly a "family affair", with everyone contributing to the work: parents, grandparents (as long as they can still walk!), children back from school, and even members of the family who have opted for jobs in the city. In recent years a large influx of immigrants to Greece has also provided a ready seasonal work force.

In order to produce olive oil, after harvesting, the olives are taken to the local olive mill where they are washed to remove leaves, twigs or earth, and crushed to produce a homogeneous mixture from which the liquid can be extracted. There are two basic methods of extraction. The first is called traditional and involves the crushing of the olives and their pits. The pits are important: the broken parts help to channel the oil when the paste is pressed. The milling process continues for about half an hour. During this time the cells of the fruit start to break down and release the oil. The paste is then spread evenly over small round woven mats which are piled up in batches of 30 or 40 on the hydraulic press. The mats are designed to allow the oil to trickle out and down the stack and collect at the bottom of the press. The presses produce a reddish-brown liquid which is part oil and part natural vegetable water. The two are separated in a centrifuge. In the past this process was carried out by slowly decanting the oil into troughs. The oil was then skimmed off as it rose to the surface. Some estate producers still like to use this method today, in which case the oil may be labeled Affiorato. It is important to note that very little olive oil today is produced using the "traditional method" mainly because of the higher costs involved. The second and most widely used method is called continuous where extraction is entirely by centrifuge. Here the olives are crushed by mechanical crushers and the resulting paste is spun at high speed to separate the flesh and the oil. The main drawback of this modern method is that the mechanical crushers involve high temperatures and the hot water often added to the centrifugal phase to extract more oil contributes to washing out precious vitamins and nutrients from the oil.

The main grades of olive oil that a consumer is likely to find in the shops in order of quality are as follows:

- Extra virgin olive oil: This is the top grade of olive oil. It is the natural juice of the olive with the olive water removed. Its free acidity level must not exceed 0.8g per 100g. It must also have fault free aroma and flavour.
- Virgin olive oil: This is the next grade of olive oil. It too, is the natural juice of the olive with the olive water removed. Its free acidity level must not exceed 2g per 100g. It must also have fault free aroma and flavour. Very little of this quality is sold in the shops

- Olive oil: This oil is obtained by blending refined olive oil and virgin olive oil. Its free acidity level must not exceed 1g per 100g. In some countries this is known as 'pure' olive oil.
- Olive pomace oil: This oil is obtained by blending refined olive-pomace oil with virgin olive oil. It free acidity level must not exceed 1g per 100g.

Greece is the third largest olive oil producing country worldwide (after Spain and Italy), while the competitive advantage of Greek olive oil in relation to that of other countries is its fine quality: 80% of the olive oil produced in Greece is extra virgin. This compares with only 50% of Italian and 20% of Spanish. In terms of bottled olive oil, Italy and Spain hold first place in the international market: Italy was the first off the mark in promotion, while Spain has become the largest industrial producer. However, no other country can yet compete with Greece in terms of quality. Ironically, the same reasons that render Greece unable to compete in terms of volume of production also underpin the superior quality of the oil itself. The inaccessible mountainous areas do not lend themselves to machine-picking. The labour intensive nature of Greek production, whereby small groves of trees in remote areas are regularly tended by farmers, olives are hand-picked, and the crop is pressed on the day of picking, are factors which have prevented Greece from being competitive in mass market terms. Of course other factors include lack of effective marketing strategies: until very recently the Greeks have not tried to market their oil as a premium product, and so presentation and packaging have been minimal.

Production of olive oil in Greece fluctuates between 300 and 400 thousand tonnes. About 2/3 of domestic production is covered by Crete and the Peloponnese and especially by the counties of Heraklion and Messinia. The olive presses in Greece are small-sized family run businesses, which are set up in oil producing areas. There are approximately 3.000 of these mills in operation throughout Greece! The olive oil is either offered directly for consumption, or further processed and/or bottled. Most companies which process and/or bottle olive oil are also involved in its distribution in bulk, while there are also other trading companies (wholesale) dealing exclusively with sales within Greece and abroad. Moreover, a number of cooperatives are involved not only in the production, but also in trading and bottling of their oil.

About one half of the annual olive oil production in Greece is exported. Average yearly Greek olive oil exports amount to 140.000 tons per year, while only seven to ten thousand tons reflect the bottled product. Greek exports primarily target countries of the European Union, the main recipient being Italy, which receives about three quarters of Greece's total exports. Due to the superior quality and excellent organoleptic properties of Greek olive oil it is not surprising that bulk exports quietly sneak into bottles and cans packaged and sold elsewhere. For this reason it is more than likely that a regular olive oil consumer has tasted Greek olive oil at least once. The average annual domestic olive oil consumption of Greeks is estimated to be around 170.000 tons. The largest part of that (42%) relates to personal consumption (Greeks consume more olive oil per capita than any other people in the world at almost 16 lt annually!), the quantities of bulk olive oil which is traded by producers themselves comes up to 33%, while bottled olive oil covers just about 25% of total domestic consumption.

Table olives are the other significant product of olive cultivation. There are three major types of Greek table olives: 1.The Green olive, 2.The Kalamata olive and 3.The Black olive. More analytically:

1. Geen olives:

    1.1. Green Halkidiki olives are grown in the peninsula of Halkidiki region of northern Greece. The deep blue of the Aegean Sea, the bright sun and the fertile Greek land created these impressive and tasty table olives.

1.2. Green “Amfissa” olives are an excellent quality Greek table olive grown in Amfissa, Central Greece near the oracle of Delphi. Amfissa olives enjoy protected designation of origin (PDO) status.

2. Kalamata olives:

2.1. The Kalamata olives with their brownish-black color and their characteristic “almond” shape have a unique and splendid taste from all other olive varieties of the world. The Kalamata olives grow only in specific regions of Greece, in limited quantity, so they are considered a very special product.

3. The black olives:

3.1. Black natural olives are grown in various places in Greece, mainly in Central and West Greece (Agrinio, Amfissa, Arta, Lamia, Pilio). Some of them are PGI products. They are also called conservoelia (Olea europaea var. Rotund) and they usually take the name of the place where they grow. The shape of the olive is quite round and one of the biggest of Greek olive varieties. Another characteristic of the conservoelia olives is the their color variation according to their maturity. The color varies from green, “blonde” to black, while they are renown for their excellent quality.

Figure 2 Greek and Italian olives as sold in raw at a supermarket (Bari, Italy, Feb 2013)

The price of table olives is commonly linked to their size. A commonly used classification of olives is the following (Size Pieces of olives / kg): ATLAS 70-90 , SUPER MAMMOUTH 91-100 , MAMMOUTH 101-110, SOUPER COLOSSAL 111-120 , COLOSSAL 121-141 , GIANTS 141-160 , EXTRA JUMBO 161-180 , JUMBO 181-200 , EXTRA LARGE 201-230 , LARGE 231-260 , SUPERIOR 261-290 , BRILLIANT 291-320 , FINE 321-250 and BULLETS 351-380.

Olives are a naturally bitter fruit fermented or cured with lye or brine to make them more palatable. Green olives and black olives are typically washed thoroughly in water to remove oleuropein, a bitter glycoside. Green olives are allowed to ferment before being packed in a brine solution. In addition to oleuropein, freshly picked olives are not palatable because of phenolic compounds. Curing can employ lye, salt, brine, or fresh water. Salt cured olives (also known as dry cured) are packed in plain salt for at least a month, which produces a salty and wrinkled olive. Brine cured olives are kept in a salt water solution for a few days or more. Fresh water cured olives are soaked in a succession of baths, changed daily. Green olives are usually firmer than black olives. Olives can also be flavoured by soaking in a marinade or pitted and stuffed. Popular flavourings include herbs, spices, olive oil, chili, lemon zest, lemon juice, wine, vinegar, and juniper berries; popular stuffings include feta cheese, blue cheese, pimento, garlic cloves, jalapenos, almonds, and anchovies. Sometimes, the olives are lightly cracked with a hammer or a stone to trigger fermentation. This method of curing adds a slightly bitter taste.

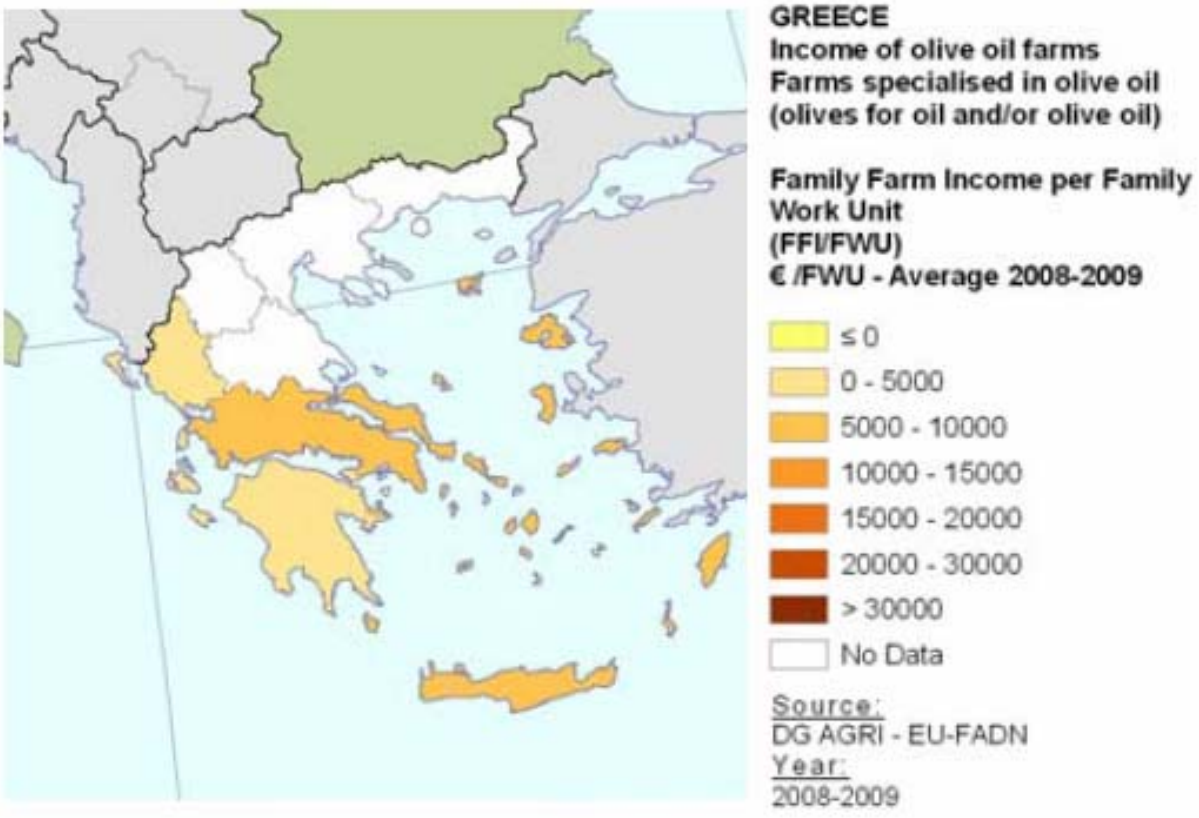

Figure 3 Income of olive farms for Greece (EU DG Agri-FADN 2008-2009)

A recent official EU report (2012) states tha olive oil farms in Greece showed a significant increase in margins and income indicators from 2000 to 2005, and an equivalent decrease from 2005 to 2009, driven by trends in price, labour productivity and cost per tonne. Compared to other types of farming, their worst trend in income was from 2005 to 2009. No significant difference was found between the two big regions studied (Ipiros-Peloponissos-Nissi Ioniou and Sterea Ellas-Nissi Egaeou-Kriti) for the average situation for 2006-2009. However, trends are slightly different with a more unfavourable development in income indicators for Ipiros-Peloponissos-Nissi Ioniou, while farms in Sterea Ellas-Nissi Egaeou-Kriti were more robust. In Greece, there is a higher share of farms in the lower income classes

than in the other two Member States: 37 % earned less than 5.000 EUR for each family work unit. Greece also has fewer farms in the higher income classes than Italy and Spain: only 3 % earned more than 30 000 EUR/FWU. As for Spain and Italy, high income seems related to large olive grove areas, a low share of family labour and above all, high labour productivity. Worryingly, the share of farms which do not generate income from farming rose over the period, and more particularly since 2005.

3 Olive farms cultivation assessment criteria

Farm management as carried out by farmers has been defined as 'the process by which resources and situations are manipulated by the farm manager in trying, with less than full information, to achieve his [or her] goals'.

Except when it serves a descriptive purpose, farm management is the science of optimizing the use of resources of farms and of achieving the optimal functioning of these systems in relation to household-specified objectives. Optimization of the planning objective is defined as achieving the farm's goals as efficiently as possible in the face of whatever constraints of a physical, environmental, legal or socio-cultural nature may be relevant. This implies obtaining maximum possible net benefit over time from the operation of the farm system. Net benefit is measured, as appropriate, in terms of output or profit or, more broadly, as satisfaction or utility. Maximization of net benefit implies efficient use of available resources and opportunities. For the achievement of a given level of net benefit, it implies the minimization of costs. This reflects a theoretical view. In the real world, the general objective is often constrained by household and social factors other than availability of physical inputs and their costs. Thus many small-farm households place a high value on the long-term sustainability of their farm system. Also, in the real world, uncertainty will generally prevail about yields, prices and other relevant influences so that the farmer's choice will lie not between sure alternatives but between alternative (subjective) probability distributions of net benefits.

Sustainable agriculture integrates three main goals:

- environmental health,
- economic profitability and
- social and economic equity.

Sustainability rests on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs. Therefore, stewardship of both natural and human resources is of prime importance. Stewardship of human resources includes consideration of social responsibilities such as working and living conditions of laborers, the needs of rural communities, and consumer health and safety both in the present and the future. Stewardship of land and natural resources involves maintaining or enhancing this vital resource base for the long term.

A systems perspective is essential to understanding sustainability. The system is envisioned in its broadest sense, from the individual farm, to the local ecosystem, and to communities affected by this farming system both locally and globally. An emphasis on the system allows a larger and more thorough view of the consequences of farming practices on both human communities and the environment. Making the transition to sustainable agriculture is a process. For farmers, the transition to sustainable agriculture normally requires a series of small, realistic steps. Family economics and personal goals influence how fast or how far participants can go in the transition. Finally, it is important to point out that reaching toward the goal of sustainable agriculture is the responsibility of all participants in the system, including farmers, laborers, policymakers, researchers, retailers, and consumers.

3.1 The selected criteria

Having in mind the progress of the model and the ECR development, a small number of crucial criteria was selected in order to asses the farms performance. These criteria:

- Environmental sustainabity (environmental impacts from cultivation activities, impacts on water, soil, energy, air, wildlife etc)
- Financial sustainability (farm budget and competency)
- Degree of compliance with the integrated management protocol and the the relevant expert advices.

4 A snapshot of the selected olive farms in Greece

Two typical cases – farmers were selected in the framework of AgroQuality implementation. They will apply the proposed method (ECR) in order to provide useful feedback for improvements, adjustments and evaluation. The two cases are farms with fair potentials for using the ECR and medium production outcomes (regarding both quantity and quality) in order to have enough margin to get improved.

Farm A: Louros, Preveza (Questionnaire No: 22 / 2012)

The trial olive grove which was chosen in Preveza there is in Louros, more specifically Prasies. The olive grove extends at 1 hectare, it belongs to a family and the olive trees are Kalamon, aged 50. The olive grove is xeric, flat and at an altitude of 17metres above the sea level. The density of the trees is 170 trees per hectare. There has not been conducted a ground analysis yet. In the olive grove there is a biennial bearing and the average production comes up to 24kg of olives per tree. The production of olive oil is 10% and the free acidity of the produced olive oil, ranges from 0 to 0.1.

Figure 4 Site (GoogleEarth) and characteristic view of the farm at Louros/Preveza

Farm B: Peta, Arta (Questionnaire No: 57 / 2012)

The selected grower in the area of Arta, Peta, owned 2 of the chosen olive groves. After visiting both of them, an olive grove in the area of Prohomata of 0.6 hectares (Fig. 4) was chosen; also a family one. The olive trees of the variety Conservoelia Artas were 60 years old. The olive grove was dry, of 10% gradient and at an altitude of 100m above sea level. The density of the trees is 200 trees per hectare. In the olive grove there has already been a ground analysis. The average production comes up to 75kg of olives per tree. The oil production is 16.6% and the free acidity of the olive oil ranges from 0.1 to 1. Cultivation is made according to the IM plan and following the ASAF's expert advices.

Figure 5 Site (GoogleEarth) and characteristic view of the farm at Peta/Arta

5 Climate of the area and climatic conditions during the analysed cultivation period

The following table present the basic climatic (30 years averages) characteristics of the area. Data are provided by the HNMS (Hellenic National Meteorological Service) meteorological station at Filothei, Arta.

Table 1 The climate of the area (HNMS, The climate of Arta)

Clima	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min monthly temperature (oC)	4,7	5,2	7,0	9,9	13,9	17,3	19,5	19,9	17,1	13,4	9,4	6,0
Mean monthly temperature (oC)	8,7	9,4	11,9	15,2	19,9	24,0	26,5	26,5	23,1	18,3	13,5	9,9
Max monthly temperature (oC)	13,3	14,0	16,7	20,1	25,0	29,1	31,8	32,0	29,0	24,1	19,0	14,9
Mean monthly relative humidity (%)	71,7	70,6	68,9	68,8	66,0	61,4	59,2	59,4	63,6	67,7	74,1	73,2
Mean montlhy wind speed (m/s)	6,5	6,5	6,1	5,7	5,3	4,7	4,6	4,7	4,6	5,1	5,0	6,1
ETo (mm/day)	0,8	1,1	1,7	2,5	3,4	4,2	4,5	3,9	2,8	1,7	1,0	0,7
ETc (mm/day)	0,3	0,5	0,8	1,1	1,5	1,9	2,0	1,7	1,3	0,8	0,4	0,3
ETc (mm/month)	10,8	14,1	23,8	33,5	48,0	57,2	62,2	54,2	37,9	23,5	13,4	10,0
Mean total monthly rain (mm)	132,0	135,0	93,8	81,5	58,5	21,8	12,6	17,2	43,5	115,0	186,0	188,0

* ETo was calculated using Hagreaves method (according to FAO paper56), ETc was calculated for olive cultivation (mean season Kc=0,45)

The following tables present the meteorological conditiobs of the area, for the last 2 years (2012-2013) inside which lays the cultivation period which is under assessment. Data are provided by the NOA (National Observatory of Athens) meteorological station at Vlaherna, Arta.

Table 2 Meteorological condition for 2012 (NOA, Arta station)

2012	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min monthly temperature (oC)	3,1	4,6	8,1	11,4	14,8	20,4	23,4	22,4	19,1	16,4	12,1	6,2
Mean monthly temperature (oC)	6,9	8	12,7	15,7	19,4	26,1	28,9	28,2	24	20,5	15,8	9,4
Max monthly temperature (oC)	11,8	12,3	18,1	20,9	24,9	32,4	35,2	35,3	30,3	25,9	20,1	13,4
ETo (mm/day)	1,069	1,385	2,506	3,37	4,409	5,956	6,103	5,638	3,917	2,487	1,485	0,957
ETc (mm/day)	0,481	0,623	1,128	1,517	1,984	2,68	2,746	2,537	1,763	1,119	0,668	0,43
ETc (mm/month)	14,91	18,07	34,96	45,5	61,51	80,41	85,14	78,65	52,88	34,7	20,05	13,34
Mean total monthly rain (mm)	99,4	207,6	205	224,4	140,8	62,2	0,2	13	77	190,1	150,8	323,4

Table 3 Meteorological condition for 2013 (NOA, Arta station)

2013	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min monthly temperature (oC)	5,9	7	8,8	12,1	16,3	18,7	21,2	23,1	18,7	15,1	12,3	6,5
Mean monthly temperature (oC)	9,3	10,2	12,7	17,3	21,5	24	26,8	28,8	23,5	19,2	15,1	10,5
Max monthly temperature (oC)	13,6	14,5	17,5	23,4	27,8	30,1	33,4	35,3	29,3	24,6	18,9	15,5
ETo (mm/day)	1,103	1,483	2,338	3,851	4,971	5,528	5,927	5,555	3,765	2,403	1,321	1,113
ETc (mm/day)	0,496	0,667	1,052	1,733	2,237	2,488	2,667	2,5	1,694	1,081	0,595	0,501
ETc (mm/month)	15,39	19,36	32,61	51,99	69,34	74,63	82,68	77,49	50,83	33,52	17,84	15,52
Mean total monthly rain (mm)	397,2	213,2	165,6	32,4	57,2	28,8	2,8	2,6	96,4	59,8	290,3	65,6

ETo was calculated using Hagreaves method (according to FAO paper56), ETc was calculated for olive cultivation (mean season Kc=0,45)

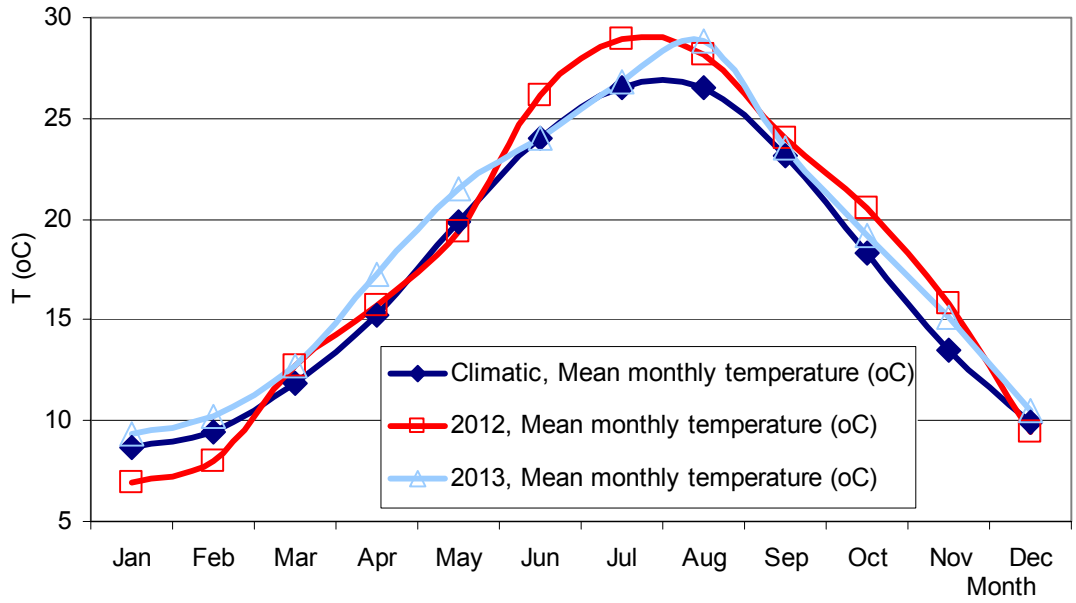

Figure 6 Mean monthly temperatures for the cultivation period under consideration

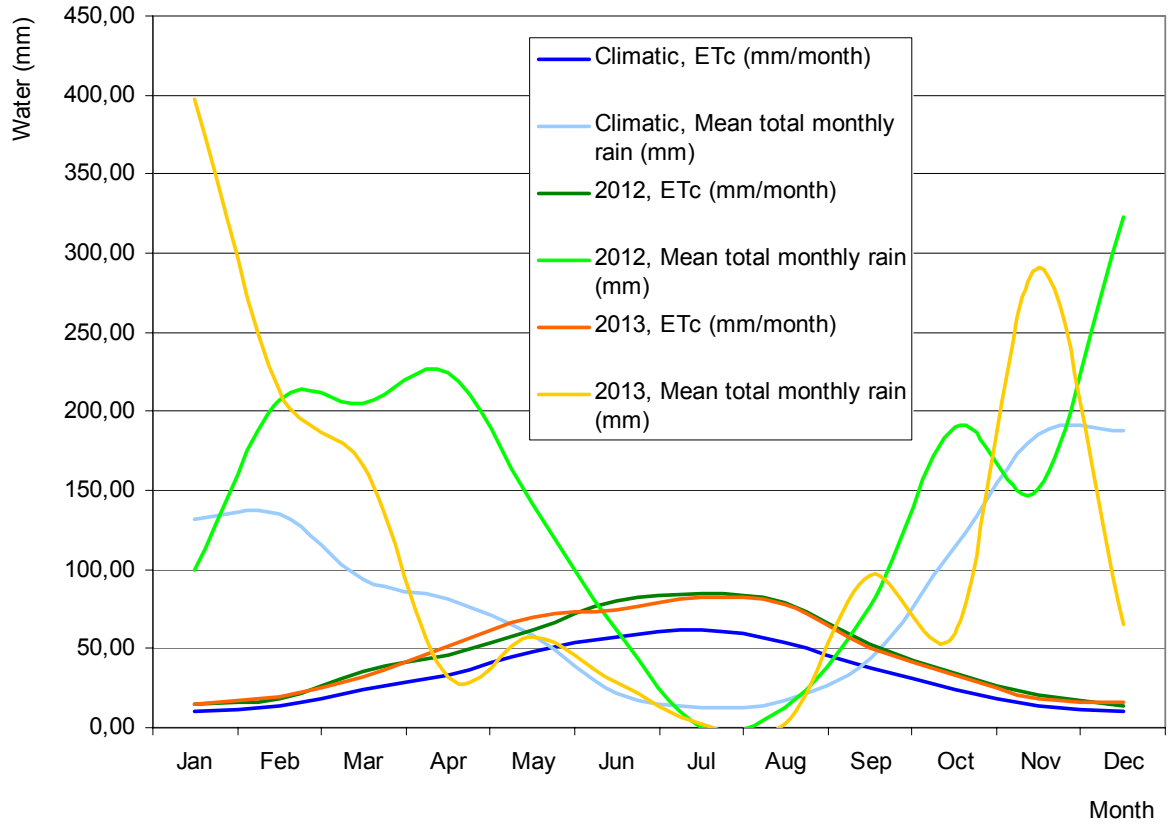

Figure 7 Total measured monthly rain and estimated ETc for olive cultivation for the cultivation period under consideration

6 Assessment of farms (monitored in Greece in the framework of Agroquality project) achievements with regard to environmental and agronomic aspects

6.1 Farm A: Louros, Preveza

Cultivation activity	Typical	2012-2013	Comments
Olive trees planting / establishment	50 years old trees	-	-
Water, soil and leaves analysis	Not made	29/01/2013 Soil and leaves analysis (BioLab, Arta)	Soil analysis help the agronomist counselor to calculate the fertigation type and dose.
Weed management (killing, removal / cutting)	Yes, using Roundup (Glyphosate), 10kg/ha during March and cutting during May	-	
Plowing	Yes, during April	-	
Irrigation	Xeric, no irrigation applied	-	
Fertilisation	11-15-15 kg/tree during February	17/03/2013 3kg of 11-15-15 fertiliser and 0.5kg of 26-0-0 fertilizer per tree 13/04/2013 Unregistered quantity of 26-0-0 fertiliser	
Plant protection	Cuprachlor (March, April)	28/04/2013 Spraying of olive trees using copper hydroxide (dose: 2.5kg of copper hydroxide in 1200 litres of water)	
Harvest	October – January using 3 persons	8/12/2012 to 19/12/2012 The harvesting process of the olive began on 8/12. Labor came from members of two	Hail storm (29/10 and 8/10/2012) damaged the olive grove, resulting significant yield losses.

Cultivation activity	**Typical**	**2012-2013**	**Comments**
		families. The harvesting was done using special brushes. 2.567kg of olives were harvested.	
Pruning	February and July. Pruning residues are burned in the field.	Started along with the harvest and in 15/02/2013. Labor came from family members and two workers.	The pruning residues were used as firewood for the house or they have been burned in the field.
Yield	2.800 kg of olives is the average yield (production every second year).	2.567kg of olives	
Olive oil extraction	120 kg in total Typical oil production rate: 10%	The extraction procedure was completed in 19/12/2013. From 2.567kg of olives, 317kg of olive oil was produced (12%).	The total volume of oil was shared equally between the two families which participated in the harvest.
Table olives processing	No data	-	
Other products	-	-	
Products trading	Table Olives	-	
Production cost of table olives	2.500€/ha	-	
Sell price of table olives	Price 2011: 1,5€/kg	-	
Production cost of olive oil	No data	-	
Sell price olive oil	No data	-	

General comments:

It has to be noted that the cultivation period, 2012-13 was one of the worst regarding yield (the period before, 2011-2012 resulted record level yield, but very low prices for table olives).

6.2 Farm B: Peta, Arta

Cultivation activity	**Typical**	**2012-2013**	**Comments**
Olive trees planting / establishment	60 year old olive trees	-	-
Water, soil and leaves analysis	Periodicaly	29/01/2013 Soil and leaves analysis (BioLab, Arta)	
Weed management (killing, removal / cutting)	Cutting during April and August	Weed cutting, two applications, one before fertilization and one mid to late May.	
Plowing	No	-	
Irrigation	Yes, using a tank truck. No data regarding frequency and volume.	-	
Fertilisation	16-20-0, 2kg per tree during February. Foliage application of 20-20-20 & micronutrients B, Cu, Fe, Mn, Zn (Murtonic) during April.	Two treatments. The first one, in the end of of January with 0,5 kg sulfuric potassium and 2,5 kg phosphate ammonia per tree, and the second one in the end of March with 1 kg of nitrate ammonium per tree.	
Plant protection	Dimethoate (April) Fastac + Kocide (July and August)	A treatment with copper (coccide) early spring (March 15) and one pyrethroid operation (Fastac 10 SC) early July (July 10) to combat the olive fly after detecting six adults at some olive fly trap.	
Harvest	October to December	-	
Pruning	Jan – March and August.	Light fructification pruning for January – February. Removal of fast growth stems in two applications, the first at	

Cultivation activity	**Typical**	**2012-2013**	**Comments**
		the end of June and the second on August 10th.	
Yield	70-75 kg/tree 6000 kg in total	-	
Olive oil extraction	500 liters in total	-	
Table olives processing	No data	-	
Other products	-	-	
Products trading	Table Olives and Olive Oil	-	
Production cost of table olives	5.000€/ha	-	
Sell price of table olives	Prices, 2010: 0,8 and 2011: 0,7€/kg	-	
Production cost of olive oil	300€/ha	-	
Sell price olive oil	Prices, 2010: 6,25 and 2011: 5,3€/liter	-	

General comments:

It has to be noted that the cultivation period, 2012-13 was one of the worst regarding yield (the period before, 2011-2012 resulted record level yield, but very low prices for table olives).

7 Conclusions

The analysed year was a very difficult one regarding yield and although improvements have been made regarding cultivation practice in both farms the results are not comparable to the typical means that were registered.

It has to be noted that regardless the obligation to fill information regarding all treatments at the cultivation record, farmers usually do not (The cultivation record that ASAF provides to IMS farmers is presented in the relevant Annex).

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9 Annex I – ASAF Cultivation Record for olive cultivation in Arta and Fillipiada area

Καλλιέργεια: **ΕΛΙΑ**
Έτος: **2009-10**

Σύστημα Ολοκληρωμένης Διαχείρισης της Παραγωγής

Ο.Ε.Φ. - Ε.Α.Σ.Α.Φ.

ΗΜΕΡΟΛΟΓΙΟ

ΑΓΡΟΥ

Όνομα Παραγωγού :

Κωδικός Παραγωγού :

Εξουσιοδοτημένος :

Κωδικός Αγροτεμαχίου	Τοποθεσία-Περιοχή	Στρμ.	Ποικιλίες

«Πρόγραμμα επιχορηγούμενο από την Ε.Ε. -καν. 867/08- δράση Β.iv του εγκεκριμένου προγράμματος με την αριθ. 286827/31.03.2009 απόφαση του Υπουργού Ανάπτυξης και Τροφίμων».

ΤΕΧΝΙΚΟΣ ΣΥΜΒΟΥΛΟΣ: AGRO Q O.E.

ΕΠΕΜΒΑΣΕΙΣ ΦΥΤΟΠΡΟΣΤΑΣΙΑΣ

Σελ. 2

Κωδικός Αγροτεμαχίου	Κωδικός ΦΠ.Π. (Πίνακας ΦΠ.Π.)	Δόση στα 100 λίτρα νερό	Απαιτούμενος χρόνος από συγκομιδή (ημέρες)	Στόχος Εφαρμογής	Α/α οδηγίας	Συνολική ποσότητα ΦΓ.Π.	Ποσότητα ψεκαστικού υγρού / στρ.	Ημερομηνία, ώρα εφαρμογής	Τρόπος εφαρμογής - εξοπλισμός (Τ, Μ, Ψ)	Ψεκαστής (υπογραφή)
								_ /_ /-		
								_ /_ /-		
								_ /_ /-		
								_ /_ /-		
								_ /_ /-		
								_ /_ /-		
								_ /_ /-		
								_ /_ /-		

Πίεση / μέση ταχύτητα ψεκασμού (PSI) / Km/h **Τουρμπίνα (T)**	Τύπος ψεκαστικού:
Πίεση : (PSI) Βυτίο – Μάνικα **(M)**	Είδος Ακροφυσίου:

ΦΥΤΟΠΑΘΟΛΟΓΙΚΟ ΙΣΤΟΡΙΚΟ

	Αγροτεμάχια		Αγροτεμάχια		Αγροτεμάχια	Ζιζάνια	Αγροτεμάχια	Ωφέλιμα	Αγροτεμάχια	Σύνορα	Αγροτεμάχια
Δάκος		Κόσσος		Καρκίνωση (φυματίωση)		Βέλιουρας		Πασχαλίτσα		Φυτοφράκτες	
Πυρηνοτρήτης		Βαμβακάδα		Γλοιοσπόριο		Αγριάδα		Χρύσοπες		Πηγές-ποτάμια	
Λεκάνιο		Φλοιοφάγος		Αρμιλλάρια		Τσουκνίδα		Chelonus eleaphilus		Αρδευτικό	
Φυλλίππια		Φλοιοτρίβης		Ξεροβούλα- Σαπροβούλα		Κύπερη		Trichogramma sp.		Δρόμος	
Πολλίνια		Ρυγχίτης		Ροζελλίνια		Περικοκλάδα		Scutellista cyanea		Κατοικίες	
Αστπιδιωτός		Θρίπας		Ζελατίνα		Αγρωστώδη		Chilocorus bipust		Αναβαθμίδες	
Παρλατόρια		Ακάρεα		Φόμα		Πλατύφυλλα		Exochomus quadr		Νερό πόσιμο	
Καλοκόρις		Ποντίκια		Κερκόσπορα				Opius concolor		Αποθήκη	
Μαργαρόνια		Βερτισιλλίωση		Κυκλοκόνιο							
Ζεύξερα											

ΟΔΗΓΙΑ ΛΙΠΑΝΣΗΣ (ΑΝΟΡΓΑΝΗ, ΟΡΓΑΝΙΚΗ & ΔΙΑΦΥΛΛΙΚΗ)	
Τεχνικός υπεύθυνος:	
(Ονοματεπώνυμο)	(υπογραφή)

ΚΑΤΑΓΡΑΦΗ ΕΦΑΡΜΟΓΩΝ ΛΙΠΑΝΣΗΣ	
Ο Παραλαβών:	
(Ονοματεπώνυμο)	(υπογραφή)

Κωδικός Αγροτεμ.	Προτεινόμενη Περίοδος εφαρμογής	Τύπος Λιπάσματος	Ποσότητα (κιλά/ δ.)

Όνομα, τύπος λιπάσματος	Ποσότητα (κιλά/ δ.)	Τρόπος εφαρμογής	Ημερομηνία Εφαρμογής	Καιρικές συνθήκες	Εφαρμοστής
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ΑΡΔΕΥΣΗ

Κωδικοί Αγροτεμαχίων	Τρόπος ποτίσματος	Προέλευση νερού	Ποσότητα νερού	Συχνότητα ποτίσματος

ΕΞΑΙΡΕΤΙΚΑ ΚΑΙΡΙΚΑ ΦΑΙΝΟΜΕΝΑ

Αγροτεμάχια	Ημερομηνία	Παγετός Ένταση ζημίας	Χαλάζι Ένταση ζημίας	Ανεμοθύελλα Ένταση ζημίας	Καύσωνας Ένταση ζημίας
	__/__/__				
	__/__/__				

Σελ. 3

Σελ. 4

ΔΙΑΧΕΙΡΙΣΗ ΖΙΖΑΝΙΩΝ

Κωδικοί Αγροτεμαχίων	Ημερομηνία εφαρμογής	Φρέζα	Χορτοκοπτικό	Καταστροφέας	Ώρες Εργασίας
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	__/__/___				
	__/__/___				
	__/__/___				

ΚΑΤΕΡΓΑΣΙΑ ΕΔΑΦΟΥΣ - ΚΑΛΛΙΕΡΓΗΤΙΚΕΣ ΦΡΟΝΤΙΔΕΣ

Αγροτεμάχια	Ημερομηνία από - έως	Είδος εργασίας (Κλάδευμα, Καλλιεργητής, Άλλη εργασία)	Ημερομίσθια
	__/__/___ έως __/__/__		
	__/__/___ έως __/__/__		
	__/__/___ έως __/__/__		
	__/__/___ έως __/__/__		
	__/__/___ έως __/__/__		-

ΕΠΕΜΒΑΣΕΙΣ ΒΕΛΤΙΩΣΗΣ ΤΟΥ ΕΔΑΦΟΥΣ

Αγροτεμάχιο	Ημερομηνία	Κοπριά κυβικά / στρ.	Ασβέστωση κιλά / στρ.	Γύψος κιλά / στρ.	Θειάφι κιλά / στρ.	Άλλο
	__/___					
	__/___					
	__/___					

ΣΥΓΚΟΜΙΔΗ

Κωδικός Αγροτεμαχίου	Άδεια έναρξης Συγκομιδής (Υπογραφή)	Ημερομηνία Από / έως	Συνολική συγκομισθείσα ποσότητα (κιλά)	Πελάτης
		__/__/__ - __/__/__		
		__/__/__ - __/__/__		
		__/__/__ - __/__/__		
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