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### **Project Title**

## **Towards a Common Quality Control and food chain traceability system for the Greek – Italian primary sector of activity**



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## INTRODUCTION

This document has been produced within the project *“Agroquality – Towards a Common Quality Control and Food Chain Traceability System for the Greek – Italian Primary Sector of Activity”*. This project is funded by the European territorial cooperation Programme Greece-Italy 2007/2013 and is realised by the Technological Education Institute of Epirus (TEI), the project leader, and the Municipality of Lecce, the Italian representative.

This Document is the final product **3.2.2 “Studying the development of an electronic record”** of Action 3.2 of the Agroquality project.

Therefore, the main aim of this Document is to provide a guideline for the development of the Agroquality Electronic Cultivation Record (ECR).

This work has been developed together with a whole series of studies and researches within the project activities (D3.1.2 - D3.2.2). The intermediate and final results of these studies will be furthermore discussed in chapter 6, where the characteristics of the Agroquality project ECR will be detailed.

### 1. Farm traceability system in Italy

Traceability system aims to follow (trace) all the stages of the Italian extra virgin olive oil production, from the origin to the commercial use, from the field (the olives) to the oil mill and then to the bottle exactly as the consumer finds it in the point of sale.

It is a system which increases transparency between the businesses working in the olive cultivation chain and provides concrete warranties for consumers, especially on food safety issues.

#### ***What is Traceability?***

It is the possibility to retrace the production process going backwards from the finished product to the origin of the raw material. It consists in the localization of every single business which played a role in the production and packaging process.

Talking about traceability, another distinction needs to be made.

According to EU and Italian Regulations, there are two kinds of traceability:

- **compulsory traceability** (Council Reg. (EC) No. 178/2002)

- and **voluntary traceability** (UNI<sup>1</sup> Rule No. 10939/2001).

The first kind of traceability does not allow consumer to obtain information about the product and there are no agreements between the different parties involved in the olive oil chain. On the other hand, voluntary traceability aims not only to trace the product and to link the different parties involved in the chain but also and especially to display this information in the proper way for consumer reference.

Following this preamble, it is evident that voluntary traceability is not just a recording system but also an opportunity for farms to add value to their product by providing a whole series of information to consumer about the place of production, the cultivated olives variety, the cultivation methods adopted and the transformation and packaging process, together with the quality characteristics of the oil produced. An accredited Certification Body provides all this information by performing periodical controls on all the parties involved in the olive oil chain.

Through this approach, a real **“oil identity document”** is created, as the codification system allows to trace every single producer that has contributed to form a specific batch of oil. Furthermore, if this system is properly digitized, consumer may have direct access to the information about the oil contained in every single package.

Benefits:

- **More transparency and guarantees for consumer:** oil production is managed and monitored since the initial step and during the whole process.
- **Less economic and image damages for producers:** in case of emergency, it is possible to easily detect and withdraw from the market all the damaged packages, in order to relegate the guilty "link" and avoid to extend doubts to all the participants on the production process.
- **Better relations between suppliers and intermediaries,** who share the same chain values.
- **Food fraud prevention.**

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<sup>1</sup> Ente Nazionale Italiano di Unificazione (Italian unification authority) – Nota del traduttore

Concerning the Traceability system, we need to mention in particular the **Commission regulation no. 876/2008** referred to the new COM in olive oil, as it intends to realize programmes of action aiming to promote a sustainable and quality olive cultivation. These programmes are addressed to operators organizations which are acknowledged by the new legislation. Every three years they will have to propose an **activity plan** concerning at least one of these domains:

- monitoring and administrative management of the olive oil industry;
- improvement of the environmental impact of olive cultivation;
- improvement of olive cultivation quality;
- traceability system, certification and quality protection;
- information spreading about the activities of producers organisations.

## **2. Agroquality's approach to traceability**

The main objective of this document is to outline a model for an Electronic Record and to provide through it some Guidelines to optimize the extra virgin olive oil production, transformation and commercialization parameters, as well as to safeguard consumer's purchasing of a product which is now an object of many counterfeit attempts.

**ECR** - Electronic Record of Cultivation - is a tool aiming to support farmers in the application of good cultivation practices as required by current certification systems.

Thanks to the ECR system, producers involved in the Agroquality project will have the possibility to access to all the currently existing tools for olive cultivation, which are able to provide all the technical knowledge they need in order to make sure that the best production criteria are respected during all the chain stages and a high-quality standard product is subsequently obtained.

*Consumers safeguard is linked to the quality and the origin of the agricultural products they purchase; modern consumers are willing to spend more money in order to get the best products. Olive oil quality depends on its variety and origin, and on the cultivation and storage methods adopted.*

The objective of a **traceability system** is to record as many data as possible during every stage of cultivation, production and storage. The more detailed the recording of cultivation and production methods and conditions, the more complete is the traceability system. Another benefit of these systems is their simplicity, reliability and efficiency, as they can be easily adopted and applied by the interested parties (farmers, processors, traders, etc.) .

**The ECR system of the Agroquality project will be able to incorporate all tools and methods guaranteeing that the Good Praxis of the different phases of olive oil cultivation, production and storage are applied.** This system will provide suggestions about the pedo-climatic conditions of the reference area and will be accessible to a wide range of users, including farmers, traders and consumers.

Production and traceability systems requiring a manual recording of data do not respect the characteristics mentioned above and they often do not link properly cultivation and production data.

ECR will be the basis for the development of a **special software** that will facilitate the acquisition of data about the production process and will provide the necessary information for the following phases (transformation and commercialization).

This system will allow the interested parties to easily find in the Internet some descriptive reports and information about olive oil (origin, agricultural activity, quality, etc.).

In cooperation with the Agroquality project leader - the Technological Education Institute of Epirus (TEI) -, the Italian partner - Municipality of Lecce - will test the ECR system on three pilot companies (which have been selected from a representative sample of mapped companies) in order to verify how reliable, accurate and efficient it is and to correct its weaknesses.

**The Electronic Cultivation Record (ECR) will be a fundamental element of the platform that the Agroquality project aims to propose. In fact, it is the connecting link between the GIS system geospatial information, the existing rules, the agronomic knowledge and know-how, the cultivation practices, the single producer and the finished product.**

Record contents can be divided into two main categories:

## 1. GENERIC CHARACTERISTICS OF REPOSITORY

Includes all the agronomic knowledge in terms of classifications, cultivation practices, fertilizers, pesticide and chemical products use, biological practices, harvest systems, irrigation systems, etc.

## 2. SINGLE CULTIVATIONS DATA

Includes all the specific information about involved companies, especially:

- Statics data (localisation, company ID, ground characteristics and composition, etc.)
- Rapidly changing information (climate, soil humidity, parasites, cultivation activities), that is, information subject to change during every cultivation period.

## 3. Olive tree and cultivation methods in Apulia

### 3.1 Classification of olive oil

The virgin olive oil has two important features that characterize it from the other vegetable oils, making it very refined: **it grows out of a fruit; it is edible immediately after the production if the raw material is good**. But, although the first feature depends on a natural phenomenon, the second one is due to the fact that virgin oil is extracted from olives only by mechanical means.

The virgin olive oil is extracted through some appropriate equipments activated from physical forces that permit the separation of the different stages that represent the complex vegetable process.

The olive oil proceeds from the squeezing out of a fruit – the European ‘olea’ – represented by an oval drupe with a middleweight of approximately 1-3 gr., depending on the different types.

The principal constituents of this above mentioned fruit are: water (35-50%), oil (15-35%) and solid materials (cellulose and other carbohydrates, proteins, etc) that represent the 25-40% of its weight.

The olive oil is constituted mostly by glycerides of oleic acid (70-85%) and by palmitin acid (10-18%), linoleic acid (7-12%) and 'stearico' acid (1-3%), together with a small amount of other glycerides, lecithin, waxen and resinous material, smelling terpenes; the chlorophyll and the carotenes give it the characteristic yellow-green color.

The proportion of the different glycerides changes according the maturation degree of olives and the climate in which the plant grows.

#### CHEMICAL COMPOSITION OF THE OLIVE OIL

<b><i>Water and other impurities</i></b>	da 0 a 0,5%
<b><i>Specific weight</i></b>	a 15° 0,915-0,919
<b><i>Number of iodine</i></b>	79-88
<b><i>Saponification number</i></b>	187-195
<b><i>Refractive index at 25 ° C</i></b>	1,4665-1,4679
<b><i>Not saponifiables substances</i></b>	0,60-1,20%

Tab. 1: Chemical composition of the olive oil

Systems of olive harvesting have a profound effect on the quality of the oil derived from it. In most cases, especially with large trees (the average is 5 meters but they may even reach 12mt), the olives, as they mature, fall to the ground and are then collected to be minced.

**The level of freshness and integrity of the olives** is then varied according to the days that can pass between the fall of the first ones and the last ones, a more "acid" oil should result.

In the areas of oil production, oil that is at a very low grade of acidity (the most valuable oils), the collection is made by hand, directly from the plant, but only performed in some family context and olive cultivations of modest size (up to 50 plants).

Most of the olives, therefore, today **are mechanically harvested**, with considerable positive effects both from the economic point of view and from the qualitative point of view.

The mechanical practice, in fact, requires less time than the traditional manual practice and allows you to program the collection when the olives are in the right ripening or in the veraison (when the olive is half green and half black). Furthermore, with the modern mechanical harvesting, you should no longer wait for the olives to fall nor to be picked up from the ground, thus affecting the quality of the oil.

**The acidity is a parameter that indicates the percentage of oleic acid in an oil and is the main indicator of quality.**

The higher its value, the poorer is the quality of the product. The acidity is a direct consequence of the release of fatty acids due to the hydrolysis of glycerides, and is a quality parameter defined only by means of laboratory analysis. It is the parameter that allows to evaluate the possible changes in the olives and the oil obtained from them suffer during the collection, transport and transformation process. In addition, its assessment allows the product classification of the oils. The determination of acidity is carried out in the laboratory and is a simple analysis that now almost all mills can run independently.

The degree of acidity of an oil is strongly conditioned by the state of health, of the olives, by the collection technology, by the time of storage, by the transformation technology adopted (eg. High temperatures of kneading) and by the care put by the operators in the treatment and in the storage of the product.

It can be classified as **extra virgin olive oil when there is an oil free acid content of less than 0.8 g / l.**

On the base of the quality of olives, their freshness and integrity, the degree of acidity and processing, olive oils are classified as follows:

**1°: Extra virgin olive oil:**

*"Superior category, of olive oil, obtained directly from olives and only by mechanical means."* Virgin olive oil has a free acidity, expressed as oleic acid, of not more than 0.8 g per 100 g, and other characteristics which correspond to those fixed for this category.

**2°: Virgin olive oil:**

*"Olive oil obtained directly from olives and solely by mechanical means."* Virgin olive oil has a free acidity, expressed as oleic acid, of not more than 2 grams per 100 grams and characteristics which correspond to those fixed for this category.

**3°: Olive oil - Composed of refined olive oils and virgin olive oils:**

*"Oil containing exclusively olive oils that have undergone a refining process and oils obtained directly from olives."* Olive oil obtained by blending refined olive oil and virgin olive oil different from "lampante oil", with a free acidity content, expressed as oleic acid, of not more than 1 gram per 100 grams, and other characteristics which correspond to those laid for this category. It is the result of the mixing between a ground oil, which has undergone a chemical process that is aimed at the elimination of chemical and organoleptic defects, and a virgin oil. The law does not require a minimum quantity of virgin olive oil that should be in the mixture, it is usually a minimum, just enough to give color, smell and taste to the oil that results on the whole quite 'flat'.

**4°: Olive-pomace oil:**

*"Oil containing exclusively oils derived from the treating the product, obtained after the extraction of the oil and oils obtained directly from olives "or" oil containing exclusively oils obtained by processing olive pomace oil and oils obtained directly from olives".*

Oil obtained by blending refined olive-pomace oil and virgin olive oil other different from lampante oil with a free acidity content, expressed as oleic acid, of not more than 1 gram per 100 grams, and other characteristics which correspond to those laid for this category.

### **3.2 The plant**

The cultivated olive tree (*Olea europea*) belongs to the big family of *Oleaceae*, consisting of 30 genera, including *Ligustrum*, *Syringa* and *Fraxinus*, and 600 species.

It is then divided into two subspecies:

- *Olea europaea oleaster* Hoffm Et Lk (wild olive): a small size plant with thorny branches and small thinner-fleshed fruits
- *Olea europaea sativa* Hoffm Et Lk (cultivated olive tree).

Olive tree is a rustic species with a strong root system which is able to extend over a wide volume of ground. Plant size depends on the cultivars and the pedoclimatic conditions during its cultivation. Height may vary from 2,5 to 15 metres.

In young plants the trunk is cylindrical with circular section. After a few years, it develops a twisted conformation; the neck starts to enlarge due to the development of the egg cells, until reaching the shape of a truncated cone. Some longitudinal relieves similar to ropes run from the neck throughout the trunk.

Trunk has different adventitious or latent buds, so, if there is a lack of balance between roots and crown, adventitious branches, suckers and epicormic shoots are generated. The main branches are inserted in the trunk. Their number and distribution vary depending on the breeding method that is adopted; secondary and tertiary branches develop from there. Wood branches are more vigorous than fruit branches.

### **3.3 Distribution range and climate limitations**

Distribution range is determined:

- **by the history of the species:** climate changes during the latest geological periods
- **by the current ecological factors:** site characteristics, annual temperatures progress, absolute minimum temperatures, summer aridity duration, light intensity, light annual and daily distribution.

From a purely agronomic perspective, olive tree needs a mild weather, with no extremes in temperature variation and minimum temperature no lower than -5°C. Therefore, a maritime climate or the climate of Central and Southern Mediterranean are suitable for olive tree cultivation. Mountains higher than 800 meters above the level of the sea are not advisable.

### **3.4 Phenological phases**

The phenological stages of the olive tree are the following:

PHENOLOGICAL PHASES	MONTH
Autogenic induction	February
Meristematic differentiation	March
Olive blossom formation - blossoming (buds opening)	April/May
Fruit set	June
Physiological drop (due to bugs or to the plant characteristics. It lasts 20 to 30 days, depending on the weather)	June
Drupe growth	July
Pit hardening	August
Veraison (in early or late cultivars this stage occurs in a different period)	September/November
Commercial maturation and Harvest (in early or late cultivars this stage occurs in a different period)	September/December

**Tab. 2** Phenological phases of olive tree

Fruits and shoots grow simultaneously, provoking a high consumption of metabolites. During the high production period (on-crop year), as fruits are preferential translocation centres compared to shoots, plants tend to generate shorter shoots provided with shorter internodes, which are unlikely to bear fruits on the next year (off-crop year)

This is one of the reasons why the olive tree production tends to be alternating.

Alternation is more or less evident depending on the *cultivar*, the hydric and nutritional conditions of the cultivation, the pruning intensity, etc.

Following these considerations, olive grower may act on the agronomic aspects involved in the alternation in order to reduce its frequency. Olives mature between September and December. The suitable moment for olive harvest depends on the position and exposure of the olive grove and on the meteorological and climatic factors that influenced the crop year.

With a traditional cultivation an olive tree may produce from 20 to a maximum of 150 kg

of drupes per year.

Fruits quality is determined by the following chemical composition:

ELEMENT	% ON FRESH WEIGHT
Water	50 - 75
Lipids (oil)	9 – 30
Reducing soluble sugars	2 – 6
Non-reducing soluble sugars	0.1 - 0.3
Proteins	1 – 3
Fibers	1 – 4
Ashes	0.6 – 1
Other elements	6 – 10

**Tab. 3** Chemical composition of olive fruit

### 3.5 Pedological environment

It is important to specify that "environment" influences the plant in an "indirect" way.

The suitable environments for the development of a proper olive tree cultivation have normally the following characteristics:

- Altimetry: hilly soils no higher than 500 meters above the level of the sea;
- Slope: less than 15-18%;
- Exposure: grounds exposed to South and South-West are preferred;
- Grounds: Grounds with insufficient depth, vadose zone lower than 50-70 cm, clay percentage over 40%, excessive acidity or pH values lower than 6 are excluded. The most suitable one is the clayey and calcareous ground, as it is rich in organic substance, but olive tree can also adapt to other grounds. Furthermore, olive tree is a friend of calcium (as this plant loves absorbing calcium), so it cannot be

cultivated in highly acid grounds (pH values lower than 5) unless it is possible to correct it through abundant liming operations.

In addition to what explained above, the following table shows which are the optimal pedologic parameters rates for olive tree cultivation.

PEDOLOGIC PARAMETERS	OPTIMAL RATES
Convenient trunk depth	40 – 50
Drainage	Good
PH	6.5 - 8.5
Active limestone (%)	10 – 15
Salinity (mS/cm)	< 5
Ashes	0.6 - 1
Other elements	6 - 10

**Tab.4** Optimal pedological parameters rates for olive tree cultivation

### 3.6 Climatic environment

Climatic conditions, especially the minimum temperatures tendency in winter, are the main abridging factor for the cultivation spread. Plant sensibility to different levels of temperature varies depending on the phenological phases variation.

Table 5 shows the different phenological phases and the minimum temperatures they need in order to avoid that their process is slowedowned or undermined.

The entity of damages caused by the absolute minimum temperature vary depending on the duration of the thermic fall and the intrinsic (vegetative stage) and the extrinsic (humidity, exposure, etc.) conditions of the plants.

However, it is opportune to consider that a cold weather causes the first damages when the minimum temperatures start to fall under -7 or -8 °C and this decrease is repeated

during 8 to 10 days. Temperatures lower than -10 or -12 °C can cause very serious damages even in a few hours.

This species is also very demanding for light, so it is advisable to expose them to South and South-West, applying breeding and pruning methods which are able to allow them to intercept properly the radiant energy.

PHENOLOGICAL PHASE	MINIMUM TEMPERATURE
From olive blossom formation to blossoming	10°C
Flowering start - Fruit set	15°C
Fruit set – Potting	20°C
Veraison – Maturation	15°C
Maturation - Harvest end	5°C
Fine raccolta – Olive Pressing	- 5°C

**Tab.5** Phenological phases and minimum temperatures needed for olive tree cultivation

### 3.7 Crown management

Pruning is a fundamental operation in olive grove management, as it may influence significantly the production process start, the productivity and the cultivation costs. Modern methods of cultivation aim to reach substantial high quality products at the lowest possible cost and to manage cultivation in an environment-friendly way, guaranteeing sustainability in time. They need to optimise resources during the productive cycle of the olive grove.

Pruning consists in removing a part o the plant, normally a portion of the crown including branches and leaves which are considered no longer useful for a proper tree management.

Pruning is performed with the intention to avoid the domination of a part of the plant

over the others and to optimise the contribution of every single portion on the production and the performance of cultivation techniques.

In order to improve the pruning management and to apply specific and efficient interventions, it is useful to be aware of the actions that pruning exerts on leaves exposure to light, on assimilates production and on the fruit-bearing stage.

- Pruning improves leaves and fruits exposure to light:

Leaves synthesize assimilates which are needed to foment plant functions and have to be enough in number until they reach the proper surface area, that is when they develop shoots; they reach early their whole efficiency, when the blade exceeds 50% of the final area, and are active until they stay on the plant. Leaves are able to adapt to light conditions in which they grow or find themselves after pruning, when the light penetration on the foliage increases, improving leaves and fruits exposure; furthermore, pruning, fruits and shoots constantly growing stimulate leaves to achieve higher photosynthesis rates.

Pruning reduces leaf surface, which is regained during the vegetation period.

Therefore, it is necessary not only to provide optimal conditions of fecundity and water availability but also to offer to leaves a reasonable space arrangement in order to make sure that the widest possible leaf surface is exposed to light. Pruning and breeding allow to reach these conditions: this happens through cutting the right crown quantity when pruning, as it makes sure that even leaves in the less advantageous position are sufficiently exposed to light; concerning breeding, through the shoots and leaves setting in the space, with the help of a supporting structure or a frame to be reduced as much as possible.

- Pruning influences shoots growth and carbohydrates reserves:

After the cut, all plants organs are informed to activate all the processes that are needed in order to replace the missing parts and restore balance between crown and roots. Pruning promotes the circulatory system development, activates the transport of nutrients and increases crown growth.

The high production of new shoots causes a reserves reduction, concerning particularly

carbohydrates stored in the structural parts of the plant. Pruned plants start accumulating starch later than not pruned plants but at the end of summer both types reach the same nutrients quantity.

After pruning, tree shows a reduced amount of growth, but instead of developing a high number of old limbs and consumed branches, growth concentrates on a lower number of more vigorous shoots. Indeed, if a part of the crown is removed, the remaining portions have temporary access to a higher provision of reserve substances accumulated in the root system and also to water, mineral substances and hormones produced by roots, so a lower number of more vigorous shoots develop. Therefore, when pruning is done during young age, that is when plant is highly vigorous, it makes shoots even stronger and delays fruit-bearing; if performed during the adult age, pruning may improve fruit-bearing if it invigorates weak branches.

- Pruning controls fruit-bearing

Pruning reduces production in young plants, because it stimulates furthermore the vegetative activity, which is already intensive. However, pruning performs a reducing action depending on shoots growth level during flower buds differentiation and fruit set stages, as an active shoots growth reduces nitrogen, water, hormones and enzymes produced by pruning; if available, these elements stimulate fruits formation and growth.

In adult plants, which have a slight development, pruning increases shoots vigour, stimulates flowers formation and increases fruit set and development stages.

Wood, mixed and fruit branches of the plant need to develop in a balanced way in order to perform a stable fruit-bearing process; however, fruits exert an energetic attraction on nutrients, so they reduce shoots growth, flower buds differentiation and tree reserves, depending mainly on their number.

Lack of nutrients and excessively vigorous shoots growing during a long period of the year prevent flower buds differentiation, as apexes, which are in continuous activity, attract the synthesized nutrients.

A medium intensity pruning stimulates a moderate shoots growth, which stops on time, allowing plant accumulation of carbohydrates, fruits nutrition and flower buds

differentiation. Relation between crown and roots needs to stay constant in order to avoid paralysing the complimentary resources that both systems need to grow.

- Pruning, resistance to cold and plant health:

Pruning increases sensibility to cold, as it:

- 1) lengthens growth and reduces the maturation of the tissues,
- 2) reduces leaf surface and reserves quantity,
- 3) stops the dormancy period,
- 4) facilitates ice formation in cells located closely to the damages produced by cuts performed before the temperatures fall.

Through cuts, pruning increases fungi and bacteria infection possibility but it also facilitates parasites control, as it opens the crown in order to allow them to be treated.

### **3.8 Breeding methods**

The role of breeding methods is to expand the olive tree crown, depending on the vigour that the pedoclimatic conditions allow leaves to reach, and to arrange the leaf system into the space in order to allow a good illumination. This way, the chosen breeding method facilitates fruit-bearing and may be controlled through pruning, otherwise it is easy to incur in excessive vigour and shading, which are the cause of unsatisfactory productions.

Olive tree reacts to the most energetic treatments thanks to the several adventitious buds that are in the coppice and in the limbs. Therefore, it tolerates many different breeding methods. However, the more the breeding methods differ from the natural aspect of vegetation, the less efficient they are, as continuous and massive pruning is needed; this reduces the plant productivity.

Therefore, the ideal method is the one that respects the natural bearing and allows a high productive efficiency in terms of photosynthetically active leaf surface.

With a geometric exemplification, the different methods are grouped as follows:

1. vase forms (polyconic vase, reversed vase, shrub vase)

2. globe forms
  3. vertical axis forms (monocone, vertical axis)
  4. wall forms (espalier).
- 
1. **Vase:** It is widely used for olive tree cultivation. It has several variations involving mainly the limbs inclination and the vegetation arrangement around them. However, the main common point of vase forms is that they arrange vegetation in several distanced axis, allowing the olive tree to expand in a wider volume and, therefore, to exploit a better illumination.
  2. **Globe:** Crown takes the shape of a sphere. 3 to 5 main limbs arrange the vegetation equally inside the crown volume. It is employed in warm climates with high illumination intensity in order to protect limbs from possible damages caused by high temperatures, as it prevents sun radiations from hitting directly the bark.
  3. **Monocone:** Olive tree has a central emergent axis and is covered by side limbs of increasing length from the top to the bottom. The trunk is reduced or long depending on whether the harvest is performed manually or mechanically. Dwelled olive tree is fixed on a 2,5 meters tall stake and is allowed to grow spontaneously until it reaches the desired level, just thinning out the top. Strong shoots or shoots developing inside the trunk forming an acute angle need to be removed as soon as they show. Limbs located around the central axis insert forming a wide angle. Productive pruning concentrates on them, thinning out and replacing consumed limbs. In brief, monocone is a limb of a polyconic vase.
  4. **Escalier:** It allows to breed the olive tree in a flattened form in order to guarantee a good illumination and facilitate the cultivation treatments. It consists of a main axis and on limbs arranged on more platforms, normally one or two. In the nursery, plant is alternatively deprived of half of its side and base branches. On the third year a vigorous plant is obtained; it has well developed side branches, two of which are used in the first structure. Productive pruning consists in removing epicormic shoots, thinning branches, replacing consumed limbs and bending vigorous branches.

In **Apulia**, especially in Salento, **Policon vase** is the most exploited breeding method.

### 3.9 Fertilization

Fertilisation aims to optimize plant development and production through the external supply of fertilizers, in order to integrate the availability of nutrients inside the ground, as they have to remain unaltered in time. Therefore, the role of fertilization is to restore the elements that plant absorbs from the soil, to increase the availability of the insufficient ones and to remove redundancies in order to satisfy tree's necessities.

Fertilization needs to be based on the good exploitation of fertilizers in order to preserve the environment in a better way and to maximize profits; however, fertilizers are now available at good prices, so they are a very important tool for the increasing of production, which is vital for farmers.

Fertilization has always been based on the restoring of mineral substances that have been removed from the ground, on the critical percentage of every element inside the leaves - detected through leaf analysis - and on the need for an adequate balance between nutrients. Nowadays, together with these criteria, vital production processes are generally promoted. Therefore, nutrients influencing the critical phases of the production process need to be inside the ground, to be absorbed by the roots and to be moved to the exploitation centres.

Normally, farmers tend to practice fertilization in a rather **empirical** way and to follow the advises that companies selling fertilizers give to them; the consequence is that they do not always obtain the best results or they use products that are too expensive compared to the benefits that they offer. Therefore, it is important to evaluate the contribution of fertilizers taking into consideration some specific criteria: ground composition, plant parts analysis, removals and vegetative and reproductive responses. These criteria allow to effectively determine fertilizers contribution, but a constant revision is necessary in order to improve their efficiency.

Plant exploits mineral elements to perform a high synthesis of the assimilates that are needed for production purposes. Therefore, a continuous procurement is needed

depending:

- on nutrients availability inside the ground,
- on soil physical properties (weaving, structure, depth),
- on chemical properties (pH, mineral and organic elements),
- on temperature,
- on hydric conditions
- and mainly on plant functionality.

### 3.10 Ground management

Ground management is included in the techniques that farmer have at their disposal to improve development conditions and olive tree productivity. The purpose of these techniques is to preserve nutritional resources, water and soil fecundity and to put them at the exclusive disposal of cultivated plants.

Soil have to preserve a specific structure in order to allow root development to reach the maximum volume; therefore, soil needs to be aired, to have a good availability of water and mineral elements, not to be subject to erosion nor water stagnation and to facilitate the application of cultivation techniques. It has to preserve olive tree functionality mainly during development critical periods and fruit-bearing stage.

A problem about fertilization that is often discussed is whether the ground needs to be treated or not and - if it stays untreated - whether to **leave it grassy or weeded**. Indeed, ground management influences undoubtedly the fecundity and fertilization methods that need to be adopted.

**If treated, ground** allows to implement organic fertilizers - the phosphorus-potassium fertilizers - and to ventilate the surface layer; however, just a few roots will be able to grow there, as roots are removed during treatments, and transiting vehicles cause a high tamping in both the superficial and deep zones under high humidity conditions.

If **ground stays firm**, that is unploughed, it offers a better resistance to tamping and

porosity will be more balanced and better arranged throughout the horizon.

The roots of herbaceous plants are "in charge" of implementing phosphorus-potassium fertilizers, as they germinate in the surface layer, absorb mineral elements and grow transporting fertilizers deep down.

In order to facilitate this process, it is possible to perform a **weeding** at the end of the winter using desiccant and systemic products (for instance glyphosate); doing so, a competition between olive tree and herbaceous plants for getting the nutrients is avoided and a better reserve of mineral and organic substances derived from the disintegration of roots is guaranteed, especially during flower blossoming period.

Subsequently, a new growth of greensward may be allowed. If necessary, it is possible to control it through mowing, to be performed at the end of springtime or in autumn, making sure to leave plant remains on the ground.

However, **special treatments** (e.g. subsoiling of the central row) are always recommendable every two years because the olive tree species is highly sensitive to vernal pool and, more generally, to badly ventilated grounds.

The weaknesses of a **complete** or monitored **grassing** consists in the higher evapotranspiration that this activity provokes, so this technique may be conveniently applied in all the environments where at least 650 to 800 mm of rain fall every year.

In very arid environments the most suitable options are a complete grassing or the traditional treatments.

It is also important to consider the removals due to a possible greensward growth when calculating fertilization, and in particular the nitrogen units to administer.

Factors that influence ground management choices are not limited to the evaluations mentioned above; they also include a deeper analysis of chemical factors involved.

**Ground redox potential** is an essential aspect that allows a good growth of plants; it depends on the chemical characteristics of colloids inside the plant and on the ground ventilation conditions. It is important to clarify that a too high ventilation, together with a lack of organic substances causes a high oxidation level in the existing elements; this provokes the immobilization of important nutrients.

For instance, if a ground rich in iron salts is excessively ventilated, iron incurs in an oxidation to  $Fe^{3+}$ , which precipitates with phosphates; this reaction reduces significantly the phosphorus quantities, even in the grounds where this element is normally available. The incidence of this phenomenon is reduced when calcium is available in good quantity, as it relegates phosphorus in more soluble dicalcium and tricalcium phosphates.

In fact, farmers and technicians may need to cope with a ground analysis detecting a sufficient value of phosphorus (analysis do not reveal how much phosphorus is available or collapsed) but also a hardly understandable lack of vegetative balance.

Similar eventualities may be expected also for other elements combinations, demonstrating how hard it is to obtain an excellent ground balance.

### **3.11 Irrigation**

Olive tree is resistant to aridity: it prefers arid environments and cannot stand excessive humidity, except during spring, when the vegetative activity reaches its maximum levels. Chalky and dry grounds are the most suitable ones but a good production may be also obtained in clayey grounds, if they are well drained, and in sandy ones, if they are sufficiently irrigated.

Indeed, olive tree species is able to take an evident advance from water addition obtained through micro irrigation systems.

In Mediterranean areas, where olive trees are widespread, water is often a factor that reduces the possibility to obtain higher standards of quantity and quality products. In order to obtain a kilo of organic substance, olive tree needs approximately 250 litres of water; considering that every plant (through branches, leaves, fruits and roots) produces a total of 35 kilos of organic substances, it is possible to determine that every plant needs around 8,750 litres of water per season. If we divide this quantity by 7 (the total number of months during which plant performs its vegetative activity, going from March-April to September-October), we will have a daily need average rate of 42 Lt of water per plant (8,750 Lt : 210 days).

Rainfalls and water reserve generated in winter and spring satisfy this need in many areas

during the months of May, June and September; on the contrary, when rainfalls are sporadic or almost absent and the soil reserve is almost depleted, like it happens in July or August, olive tree is highly exposed to hydric stress eventualities. Furthermore, during this period high temperatures increase noticeably plants evapotranspiration levels; this generates an increase on the daily hydric need, exceeding significantly the average rate of 42 litres per plant.

Moreover, the **warmest months** in which a deficit in the hydric contribution is registered correspond to the fruit set stage and to the period of formation, growth and maturation of the fruitlets; during these stages, an "emergency" irrigation is needed in order to encourage higher profits preserving and improving the qualitative characteristics.

Benefits that an irrigation system is able to produce are multiple: they reduce the productive alternation phenomenon eventuality, increases the average production, encourages vegetation development, allows to reduce the need for pruning and arrangement thickening. Moreover, it helps to intensify the sensory profiles of oil.

Concerning **installation solutions** and exploited materials, there are many possibilities.

The traditional system involves the utilisation of **autocompensating drippers** (4 to 8 l/h) inserted on the polyethylene tube at a distance that varies depending on the type of installation and the characteristics of the ground.

The most innovative system consists in the exploitation of a **dripping wing** with a combined autocompensating dripper settled in previously determined distances and a flow rate of 1.6, 2.3 and 3.5 l/h, which have to be evaluated individually, depending on the type of the ground in which they are operating and on the installation arrangement; this wing may be placed on the ground depending on the kind of soil management that has been envisaged.

Pipe laying is another way to apply drip systems with dripping wing.

**Subirrigation or SDI** (standing for Subsurface Drip Irrigation) consists in the laying of a wing on a depth varying from 30 to 40 cm and at a distance from the trunk varying from 50 to 120 cm. Laying depth depends on the position of the active root system of the olive tree.

Subirrigation offers several advantages including the reduction of weeds, as the ground stays less wet in the surface; the consequence is a cut of weeding costs. Moreover, the actual wetting of the root system allows to optimize **fertirrigation**, to reduce ground compaction in terms of sprinkling keeping the same structure.

**Implementing the installation down the ground**, eventual mechanical damages due to people, farm machinery, equipments, field operators, or vandalisms may be avoided; it is also possible to simplify the operation of the farm machinery working on the field, reducing the manpower, as no annual sediment nor recovery operations are needed, and increasing irrigation equipment lifetime, as the light of the sun is exactly the main antagonist of polyethylene.

### 3.12 Diseases

As any other living being, olive tree is exposed to illness. Many are the reasons that can modify the normal physiology of the olive tree.

Diseases reasons can be divided into two main groups:

- **non parasitic:**

They are due to disadvantageous environmental conditions (temperature excesses, frost, excessive humidity, wind, hail).

Excoriations caused to the bark by hail, wind, poles for olives beating down, etc. can be sanitised with copper based products.

- **parasitic:**

*Parasitic diseases* depend on the action of *animal or plant organisms* which are able to live at plants expenses, detracting their nourishment or modifying their functions.

**Plant parasites:**

- Olive knot (*Pseudomonas savastanoi*)



- Peacock's eye (Cycloconium Oleagineum)
- Sooty mold (Antennaria Oleophila)
- Wood-decay fungus (Formes fulvus Oleae)

Parasitic diseases of olive tree in Italy are about twenty, but only the ones mentioned above are significant in the cultivation area of taggiasca olives, as some specific climatic or ground conditions may facilitate or obstruct their development.

**Fungi** are the main plant parasites.

They affect mainly the tree and, although less fast than animal parasites attack, may cause more damages or, in some cases, even the death of the tree.

**Animal parasites:**

- Olive fruit fly (Bactrocera oleae - name given by Gmelin - or Dacus oleae)
- Olive Moth (Prays oleae)
- Margaronia (Palpita unionalis - name given by Hübner - or Margaronia unionalis)
- Olive beetle or "murettu" (Phloeotribus scarabeoides)
- Scale insects.

Insects are much more numerous than other animal parasites species damaging olive trees; over 70 more or less dangerous species have been identified.

However, not all animal parasites have the same importance nor cause the same damages in all regions.

Growers tend to prefer to fight against the olive fruit fly, because they underestimate or are not aware of the effects of the other parasites, which may be significant, although less visible, mainly on the new shoots, as this may compromise the fruit-bearing process in the following years.

### **3.13 Harvest**

Olive harvest is the final stage of the plant vegetative cycle. It is possibly the most delicate operation, as it may influence the oil quality. Olive growers know which is the right maturation level of the olives and are aware that this will influence oil quantity and quality.

Local olive varieties are harvested at the beginning of November (beginning of drupes maturation) and in late December (advanced maturation). Local olive growers make use of different harvest methods, depending on the olive grove type and ground and plant characteristics.

In the traditional harvest system, still in use until recently in the farmlands of Salento, mature olives used to fall spontaneously or pushed by the wind and to reach the ground in emplacements settled at the feet of the plant; they were then manually assembled with the help of brooms, sorted in order to remove dirt and leaves and finally moved to the oil mill for the olive pressing. This technique was replaced a few years ago by the insertion of facilitating machineries such as mechanic sweeper, which may be provided with a harvester basket, and sorters. These machineries reduce significantly costs and times of this hard operation.

In some regions of Apulia and Salento harvest is performed manually taking the olives one by one directly from the plant. This is the best way to obtain a quality product.

On the other hand, **beating down and brushing** allow olives to fall thanks to the effect of poles beating trunks or specific brushes passing through plants. Olives fall on specific nets placed on the ground and then moved for pressing.

Modern olive cultivation takes great advantage from machineries facilitating the harvest such as **shakers**, which provoke olives fall by causing a vibration on plant trunk and branches. Olives may be picked up in mid-air (umbrellas) or from the ground through specific nets placed on the soil. Transfer to oil mill is performed through powerful aspirators which convey olives on specific harvest carts.

Another possible harvest method takes advantage from small shakers that operators carry on their backs; these shakers provoke less energetic vibrations compared to big shakers.

These small machines accelerate significantly the harvest process and allow a lower

mechanic plant stimulation, as they can work on the smallest and more flexible plant branches.

#### **4. The main Certification systems applied to the reference area**

The product certification olive oil, in general, consists of a legal act issued in written form by the authority, or entity that has jurisdiction to certify a fact, a condition, a right.

The prestige and competence of the certifying authority give an added value to the certification obtained; being certified with an accredited institution means reliability and credibility at the international level both for the companies, and for the final consumer, as it gives guarantees to companies that obtain a document of effectiveness, recognition and world validity, and to the final consumer about the different varieties, the safety and the objective value of the product.

The certification is revealed to the customer through a registered trademark, in order to enhance the product and protect it against tampering.

**The main certifications for extra virgin olive oil in Italy are: certification PDO, PGI and B.I.O..**

##### **P.D.O.**

The certification PDO, Protected Designation of Origin, comes from a Community policy to protect and enhance the quality products with certification of origin. This ensures consumers about the authenticity and origin of what is placed on the national and international market, but also to stimulate the operators of the various food sectors to invest in productions of merit, that takes into account the environmental heritage of each country.

The extra virgin olive oil is guaranteed and marketed with the P.D.O in implementation of Reg. CE n.2081/92. EU legislation wanted to protect "food and agricultural products whose characteristics are essentially or exclusively due to the geographical environment, including natural and human factors, and whose production, processing and preparation

are developed at the place of origin."

### **P. G. I.**

The certification PGI, Protected Geographical Indication, indicates an origin mark that is attributed to those agricultural products and foodstuffs for which a given quality, reputation or other characteristics, depend on their geographical origin and whose production, transformation and / or processing takes place in a defined geographic area.

To obtain the PGI, then, at least one phase of the production process must take place in a particular area. Who produces PGI must adhere to strict production rules laid down in the rules of production, and compliance with these rules is guaranteed by a specific control body.

### **The oils P.D.O. and P.G.I. recognized throughout the European Union are 116.**

The number of Italian olive oils with a protected designation of origin has risen to 43, nearly 40% of all quality oils in the EU. Were added, in fact, three designations: "Vulture" on 13/01/2012, "Terre auronche" on 22/12/2011 and "Seggiano" on 14/12/2011.

More distant there are the products of other countries suited to olive growing such as Greece, with 27 awards, and Spain, with 26 total awards in the class fats and oils, and about 18 referred only to olive oil.

Among the Italian provinces with more recognition of PDO and PGI oils there are those of Trapani and Siena.

The sector of P.D.O. and P.G.I. oils presents a number of awards rather high, but this amount is not matched by an equally strong level of certified production.

In 2010, according to data Ismea-Qualivita, the certified production has reached about 10,500 tons, showing a substantial stability compared to the levels reached in 2009 (+0.7%).

In addition, the certified production of PDO and PGI oils has a very low weight (around 2%), compared to the total production of olive oil and the potential production of these oils.

This is all due to the persistence of those difficulties which have always characterized the

supply chain of the oil with the designation of origin, such as the fragmentation of production reality, the lack, in some cases, of a supply management, the lack of coordination between public and private actors within the sector and the lack of adequate tools to face competition from foreign products.

### **ORGANIC (BIO)**

It is said "organically grown" a product that was produced in accordance with the rules contained in Reg. CE n. 2092/91 and subsequent amendments and additions. These rules fix the farm management from a technical and agronomic point of view. The company has, for example:

- to take measures to maintain or increase the fertility and biological activity of the soil;
- to implement a preventive struggle with adversity, especially by choosing species and varieties that have proved best suited to specific environmental conditions that company;
- to implement a protection of natural enemies of pests of agricultural crops (eg maintaining or introducing natural hedges);
- if necessary, to use only pesticides, fertilizers and soil improvers indicated in the Regulation.

The task of monitoring the effective implementation of the biological method in accordance with the provisions is entrusted to Private inspection bodies, specially authorized by the Ministry of Agriculture.

The company, once taken the decision to adopt the organic production method, choose, using a form, any of the above mentioned control bodies and shall simultaneously send the communication of the choice to the region where the production unit falls. In recent years the olive farming, particularly oil, has had a remarkable growth in both number of workers and enterprises, both for the increase in area planted, both for what concerns the success of organic products on the market . This leads us to state that for the extra virgin organic olive oil, as well as for other products, we can start to talk about a product with its own personality and with the appropriate peculiarities to position itself on the market beyond the niche.

The success of such products, of course, passes through adequate policies. Among other things, the olive is easily convertible to organic cultivation as it is characterized by an agroecosystem extremely adapted to different Italian environments and that does not require, contrary to other productions, major innovations.

According to the latest data compiled by the SINAB, National Information System on organic farming, for the year 2010, 13% of the land under organic agriculture are the prerogative of olive, with 140,748 hectares, of which 44,171 in conversion.

Bringing the analysis to a territorial level, it emerges that the distribution of the organic olive surface reflects the data reported for the total national organic UAA (Utilised Agricultural Area).

Also in this case, in fact, the organic olive surface is concentrated to more than 70% in the southern areas, in particular in Calabria (31%), in Puglia (30%) and in the islands, where stands for importance, the data of the Sicily (12.5%).

## **5. Towards the development of an electronic record for cultivations (ECR)**

As described in Chapter 2 of this document , the project Agroquality intends to propose a model of **Cultivation Electronic Record (ECR)** which can be a support for operators in the sector, particularly for farmers, which can guarantee the best farming practices provided by the current system certification of crops of olive oil.

Before detailing the ECR, it was necessary to carry out the preliminary actions such as:

- 1.** Identification of needs, the structure and expertise in accounting records ( the information is collected in the output: 3.1.2 and 4.1.2 Analysis ex ante that contains the results of the questionnaires of the sample companies mapped ) .
- 2.** Examination of current solutions ( systems of handwriting , electronic systems, manual records and automatic).
- 3.** Analytical definition of the model and the characteristics of the cultivation of Electronic Record (ECR).

In this context, operators and organizations in the field of production of olive oil will be

invited, during the implementation of the project Agroquality, to participate in the proceeding and to comment on the proposed model.

### **5.1 Project stakeholders**

In order to enrich and complete the description of the model ECR, numerous stakeholders in the sector, both local and national will be involved.

Among the organizations that Municipality of Lecce is going to contact:

#### **MiPAAF - MINISTRY OF AGRICULTURE FORESTRY AND FOOD**

<http://www.politicheagricole.it>



#### **Establishment and tasks**

The Ministry of Agriculture, Food and Forestry, established in 1946, subject to organizational reforms several times, most recently by DPR n. 41 of 14/2/2012, processes and coordinates the lines of agricultural, forestry, agri-food and fisheries at the national, European and international.

#### **Structure**

The Ministry has the following organizational structure: Department of European and International Policy and Rural Development (DIPEISR divided into two Directorates-General), Department of competitive policies, quality agri-food and fisheries sectors (DIQPI - divided into three Directorates-General), Department of central Inspectorate for protecting the quality of food products and repression of Fraud (ICQRF - divided into two Directorates-General), the State Forestry Corps (CFS), "Carabinieri" Agriculture and Food, Department of Maritime Fisheries Body of the Harbour.

#### **Related entities**

MiPAAF relies on the support of important organizations: the Agency for Agricultural Payments (AGEA); Buonitalia SpA, the Council for Research and Experimentation in Agriculture (CRA), the National Institute of Agricultural Economics (INEA), the Institute of

Agricultural and Food Services market (ISMEA), the National Research Institute for Food and Nutrition (INRAN), the Risi, the Agribusiness Development Institute SpA (ISA) and the Agency for the Development of the Horse Industry (ACES).

⇒ **APUGLIA REGION**

<http://www.regione.puglia.it/>



The thematic area related to agriculture and food illustrates the activities that ensures the Region of Puglia in agriculture, leading sector for the economic development of the territory, and implementing interventions, respecting the environment and the natural landscape, for entrepreneurship, the typical agricultural production, the rural tourism, nutrition education , training , research and innovation.

The model of regional agricultural development aims to combine competitiveness, including through the diversification of production , with the economic and environmental sustainability. It is , therefore , a model that, precisely because of its transversal nature , arises from the protagonist at both national and Community level.

The potential beneficial effect of remittances from the EU Funds is relevant: through the new programming it will allow better opportunities for development in the agri-food sector.

In the thematic sections, important topics such as : organic farming , animal husbandry, land reform, arboreal and herbaceous production , compliance, etc.

**CHAMBER OF COMMERCE, INDUSTRY, AGRICULTURE ARTS  
AND CRAFTS OF LECCE**

<http://www.le.camcom.gov.it/>



The Chamber of Commerce of Lecce is an independent public body , a structure with a historical tradition , an economic orientation and a management culture, which has, in the province of Lecce, functions of general interest to the business system taking care of the development within the local economy , as enshrined in article 1 of law 580 29.12.93, reordering authorities Chamber of Commerce.

It consults and service, providing the training and upgrading of entrepreneurs executives and managers of companies. It anticipates in initiatives designed to increase its production, modernizing the provincial economic apparatus, to include in circuits merchant wider local production and to equip the territory of the necessary infrastructure.

The Chamber of Commerce records and certifies the main events in the life of any business in the province of Lecce ; it cares the general interests of the productive system , promotes the development of local transparency and regulation of the market, the link with the government and it is the point of reference for all the services needed by the business fabric, from certification to promotion of the economic and technological development.

The Chamber of Commerce of Lecce is the supervisory body authorized under Article 14 of Law 526/99 for the food product to Protected Designation of Origin ( PDO henceforth ) "**Extra Virgin Olive Oil Terra d'Otranto**", it has established guidelines for all of the controls to which the production process and the product must be submitted so that the oil can be identified as PDO " Extra Virgin Olive Oil Terra d'Otranto".

⇒ **THE CONSORTIUM FOR THE PROTECTION OF EXTRA VIRGIN OLIVE OIL**

<http://www.oliodopterradotrant.it>



It aims the protection, promotion, enhancement and supervision (especially in marketing) of Extra Virgin Olive Oil DOP "Terra d'Otranto", and consumer information and general care of the interests related to the same denomination. It is an irreplaceable point of reference for all those involved in the certification ( growers , mills and packers ), and especially for consumers and end users , providing the first a competent assistance during the production process and other quality, origin and traceability documentation of the finished product.

The decisive factor appears to be the mandatory supervisory activities carried out mainly on the product as sold or offered at the sites of use ( restaurants, canteens , or as an ingredient in other food products).

The surveillance program is drawn up annually by the Inspectorate for Quality Control and Repression of Fraud (ICQRF) of the Ministry of Agriculture, Food and Forestry (MiPAAF). It is also performed in " collaborating" with that of other Consortiums of various protected designations of origin (PDO oils not only) in order to invest large commercial territories.

The Consortium acts a preliminary verification and approval of the labels used and the distribution of marks ( stamps DOP) required on each package put on the market . The oil regularly certified DOP Terra d'Otranto is recognized , for each case , by signs used interchangeably and numbered to identify each package.

⇒ **CODILE**

<http://www.codile.it/>



Consortium of Defense and Enhancement of Agricultural Production Environment and Rural Territory of the province of Lecce ( CO.DI.LE. ) was established by Law 364 of 25 May 1970, a law that gives life to the National Solidarity Fund . This Fund is operational tool to prevent and to help agricultural enterprises in financial difficulties because of natural disasters or exceptional adverse weather events affecting harvests and cause damage to production facilities or infrastructure related to agricultural activity.

The CO.DI.LE. recognized by Ministerial Decree MAF n . 165 of 22.1.1974 is a non-profit organization under the supervision and protection of the Puglia Region (art. 4 regional law n. 9 of 02.03.1982 ).

The Consortium associates currently about 3,846 farms and provides assistance in agricultural and agro-meteorological particular plant disease.

The CO.DI.LE. regularly meets with farmers , in order to update them on the latest knowledge of biological and epidemiological pest plant , as well as on the most effective strategies to control them, according to the environmental impact of chemical in agriculture.

Through its magazine **AGRISALENTO**, drawn up in collaboration with the Association of

Regional Consortia for the Defense of Puglia and the Regional Department of Agriculture , and its **weather bulletin** published weekly on the site [www.codile.it](http://www.codile.it), provides farmers with local weather forecast in the medium term, the update on the phytosanitary situation of the main crops and the related programs of integrated pest management.

Furthermore, in collaboration with ASSOCODI Puglia, the CO.DI.LE, in addition to managing a Laboratory of Clinical Analysis at the CNR in Bari, coordinates and manages over 40 pilot fields also through a GIS platform and sms alert system of.

⇒ **COLDIRETTI LECCE**

<http://www.lecce.coldiretti.it>



Coldiretti is an organization deeply rooted in the country , consisting of 18 regional federations , 98 provincial federations , 765 local offices and 9,812 peripheral sections. The presence on the territory is accompanied by the consolidated representation that makes Coldiretti the main Agricultural Organization at the national level and among the first in Europe. Among the members Coldiretti to include more than 568,000 farms, which account for 52 % of those registered with the Chambers of Commerce.

Coldiretti is a social force that represents agricultural enterprises and promotes agriculture as an economic resource, human and environmental exposure.

Its goals: to provide business opportunities for agricultural development in a context of full integration of agriculture with the economic and social interests of the country. Its strategy : to choose the system of consultation , the hub of any modern economic democracy, in all the places of political - economic comparison: with the government, with local authorities , with the EU institutions.

Its agenda is divided into two projects : Enterprise Green , addressed to the competitive growth of agricultural enterprises, Campagna Amica, to build a dialogue between producers and consumers in the age of globalization.

Its strength is hundreds of thousands of farms who believe in all this.

⇒ **COPAGRI LECCE - CONFEDERATION OF AGRICULTURAL PRODUCERS**

<http://www.copagri.it/>



The COPAGRI is a professional agricultural organization.

It organizes all types of agricultural enterprise operating in Italy , self-employed agriculture and agricultural producers and individual members, with the primary objective to protect the interests of economic, professional and social value of the sector through various profiles .

The COPAGRI was born as coordination of professional organizations in 1991 to turn into Confederation in 1995 , when it is recognized in the National Council for Economy and Labour ( CNEL ) , as an organization representing farmers, and the Ministry of Labour as representation of national importance and, therefore, authorized to maintain the Register of enterprise on behalf of the member farmers.

The federal government has been on the national territory into 19 regions and 98 provinces and has over 300 thousand members.

COPAGRI adhere to economic structures, associations and service engaged in various sectors. In addition to these tools the federal government has set up an specific technical assistance in the areas of agricultural extension, training, service tax, benefit and administrative and accounting.

In accordance with the law on assistance to agricultural producers, the federal government has established the Center for Agricultural Assistance (CAA COPAGRI).

⇒ **A.I.P.O - ITALIAN ASSOCIATION OF OLIVE PRODUCERS**

<http://www.aipo.it/>



The AIPO is a consortium, formed as a union between national associations of producers of olives, whose members include a number of other associations and provincial organizations of olive oil producers. AIPO, in order to enhance the production of olive oil and its members, identifies rational

techniques aimed at improving quality and carries out market research on the promotion and marketing.

AIPO ensures traceability throughout the entire chain of production of olive oil, also monitors compliance with the regulations of production regional, national and Community. This is to ensure the authenticity and provenance of its own oils and olives. AIPO also provides, in the name and on behalf of its members, storage and marketing of olive oil at national, European and international level, both to enhance the product, which to promote their consumption.

⇒ **UNAPROL ITALIAN OLIVE CONSORTIUM**

<http://www.unaprol.it>



The UNAPROL was founded in 1966 as the National Union of Associations of producers of olives with the tasks of management and provision of Community aid to the production of olive oil and table olives.

The UNAPROL has always been the most consistent and representative association of the olive sector in national and Community level , and it has about 550 thousand olive producers, territorially represented by 81 provincial associations.

Its social aim is to help structural weaknesses in the area of olive oil market, as well as to enhance the production also represented through participation in the activities of Community and national significance in terms of quality improvement, environmental impact, traceability and certification of production. The UNAPROL, in fact, has always operated in accordance with the policies of the common agricultural policy and national level, supporting the objectives of protection and enhancement of the quality of olive oil. Its main activities are:

- the identification of rational production techniques and environmentally friendly;
- improving the quality and quantity of the product;
- Concentration and storage of the offer;
- marketing at national and international level;

- assistance and coordination of the activities of the associated organizations ;
- enhancement and promotion of quality and consumption through the adoption of traceability systems and product certification;
- the implementation of projects and programs operating nationally and internationally.

## **5.2 Cultivation management software**

All certification systems , such as organic farming and integrated management , establish an obligation for the farmer to retain records which are often written by hand (such as the country notebook), although there are numerous software specific.

The compilation and updating of the country notebook are final acts of a series of choices to make and rules to be respect , imposed by the European Union and by the national legislature.

The country Notebook is the name of the "**register of processing operations**" in accordance with Article 42, paragraph 3 of the Decree of the President of the Republic no 290 of 2001.

Farmers must keep **for a year**, all purchase invoices for **pesticides** and the copy of the forms of purchasing products classified as **very toxic, toxic and harmful** (former first and second class).

The register of processing operations carried out ( with the obligation of record within 30 days after the Treatment ) must be signed and kept for 1 year. The purpose of the register is to enable the monitoring of the use of pesticides by empowering farmers also to avoid excesses and misuse or hazardous to the health of consumers and the environment . Among the major software supports to farmers in Italy there is **Imagine Line**, which is a Network offering software products , services, online communication and databases for companies.

For Imagine Line, experienced programmers in software development and communication projects work via the Internet, journalists and editors specialize in web writing, technicians engaged in the creation and updating of databases for the primary

sector, communication and marketing consultants in the agricultural sector. Inside there is a set of databases and a variety of services to support the farmer comprising among other laws, decrees and regulations for agriculture, as well as data relating to the revision of the European agro drugs.

### Image Line Network

 <p><a href="#"><u>AgroNotizie</u></a> Weekly Web magazine The news for agriculture</p>	 <p><a href="#"><u>AgricolturaOnWeb</u></a> Daily Web magazine quotidiano – New technologies communicate the ground</p>	 <p><a href="#"><u>Giornate Fitopatologiche</u></a> Conference proceedings - Search in agriculture, crop protection, defense and weeding</p>
 <p><a href="#"><u>MeteoGest</u></a> Weather for agriculture</p>	 <p><a href="#"><u>Fitogest</u></a> The search engine of agrochemicals</p>	 <p><a href="#"><u>Fertilgest</u></a> The search engine of fertilizers</p>
 <p><a href="#"><u>Biolgest</u></a> The search engine of the technical instruments for organic agriculture</p>	 <p><a href="#"><u>Macgest</u></a> Agricultural machinery, with a click</p>	 <p><a href="#"><u>Plantgest</u></a> The search engine of the fruit varieties</p>
 <p><a href="#"><u>Lexgest</u></a> Laws, decrees, regulations for agriculture: search engine and database</p>	 <p><a href="#"><u>Fitorev</u></a> Pesticides - The European review of pesticides</p>	 <p><a href="#"><u>Quaderno di campagna</u></a> The software to manage your farm</p>
 <p><a href="#"><u>Agriforum</u></a> The Forum for Agriculture and operators in the agricultural sector</p>	 <p><a href="#"><u>Area Clienti</u></a> Web-application confidential client companies to Image Line Network</p>	 <p><a href="#"><u>ImageLineNetwork</u></a> The site of the network and community of Image Line</p>

**Fig. 1** Network Image Line

**QUADERNO DI CAMPAGNA**

**DATI ANAGRAFICI DELL'AZIENDA**

COGNOME O RAGIONE SOCIALE

NOME

SESSO

DATA DI NASCITA

giorno

mese

anno

COMUNE DI NASCITA

PROV.

CODICE FISCALE

P.IVA

DOMICILIO O SEDE LEGALE

INDIRIZZO E NUMERO CIVICO

COMUNE

PROV.

**UBICAZIONE AZIENDA (solo se diverso dal domicilio o sede legale)**

INDIRIZZO E NUMERO CIVICO

COMUNE

PROV.

**RAPPRESENTANTE LEGALE (solo se il titolare è persona giuridica)**

COGNOME O RAGIONE SOCIALE

NOME

SESSO

DATA DI NASCITA

giorno

mese

anno

COMUNE

PROV.

FIRMA DEL TITOLARE DELL'AZIENDA \_\_\_\_\_

[illegible]

### Fig. 2 Notebook Campaign

## 6. AGROQUALITY ECR

### 6.1 Potential users of ECR

The basic question is: why develop an ECR and who may be interested in using it?

The ECR in its simplest form, is an **electronic magazine** that the farmer uses to record all data and activities related to the production.

One of the main aspects that must be addressed in the design phase of an ECR regards the potential user of the system, if it is in a position to adopt, use, support and contribute to the improvement of this instrument.

Potential users may be:

**Farmers:** for this target, the basic question is whether they are aware of the need to adopt an **Electronic Record of Cultivation** and if they are ready to use it.

**The agronomists and experts of olive growing:** this group will have significant benefits from the application of ECR, especially with respect to the reporting function of the system.

**The public and private certification bodies:** these bodies have a significant need for access to electronic records containing detailed information and monitored.

**Stakeholders involved in the manufacture and market of olive oil:** the stakeholders related to the olive oil sector, have more and more clear the need for such electronic registration systems and valuable information that they provide.

**Consumers:** The question is whether they are willing to pay more for a product that is well documented with regard to its origin and the path from production to consumption or whether they prefer a product that does not provide this information.

The Agroquality project, thanks to the re-elaboration of data collected through the ex ante analysis of the territory and the mapping carried out on a sample of 20 companies (3.1.2), allowed the selection of three typical cases relating to three companies agricultural which indicated a willingness to apply the method ECR in order to provide a series of data and information useful for testing and fine- tuning of the model .

The **three pilot cases** (identified and detailed in Chapter 8 of this document) are companies with the right potential to apply the ECR, with good production results ( both in terms of the quantity and quality ), and show that they can improve more and more.

## **6.2 Information from questionnaires' statistical analysis regarding Agroquality ECR's modules and their connections**

**Agroquality** project has provided, in order to achieve the stated objectives, the administration of a questionnaire consisting of two main, one that collects agro cultural aspects (Agro) and that relating to information technology (IT).

The search, conducted through the administration of questionnaires, has allowed the collection of useful information that represented the fundamental basic-data for a optimal realization of WP3 and WP4 the actions.

The project team of the Municipality of Lecce decided to map the olive oil producers in Salento using the following methodology:

- desk analysis
- interviews with experts and workers in the sector
- determination of the sample of producers according to specific requirements
- interviews and questionnaires submitted to the sample producers.

The questionnaires are addressed to farmers and private individuals which are related to the production process in the agricultural sector and specifically with the chain of production, processing and trading of table olives and olive oil.

The questions aim at recording data which concern productive, trading and transport issues as well as subjects related to the use of information technology and communications tools in the sector.

Thus, it was decided to adopt a **best practices-oriented approach**: consider and share the experiences among the olive oil producers of a specific area who are willing to collaborate on the Agroquality project in order to compare a series of characteristics

concerning in brief:

- cultivation and production techniques
- marketing and transport techniques
- tools and machinery
- use of the modern information technology.

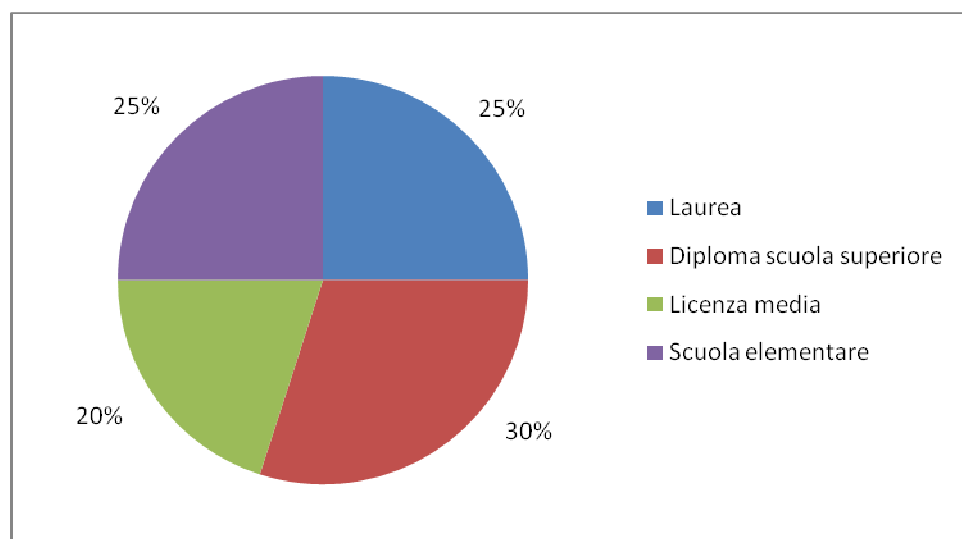
Following some information obtained from the questionnaires:

**Farmer's sex**

Età	Numero	%
Dai 24 ai 35 anni	4	0,20%
Dai 35 ai 50 anni	4	0,20%
Dai 50 ai 65 anni	7	0,35%
Dai 65 ai 73 anni	5	0,25%

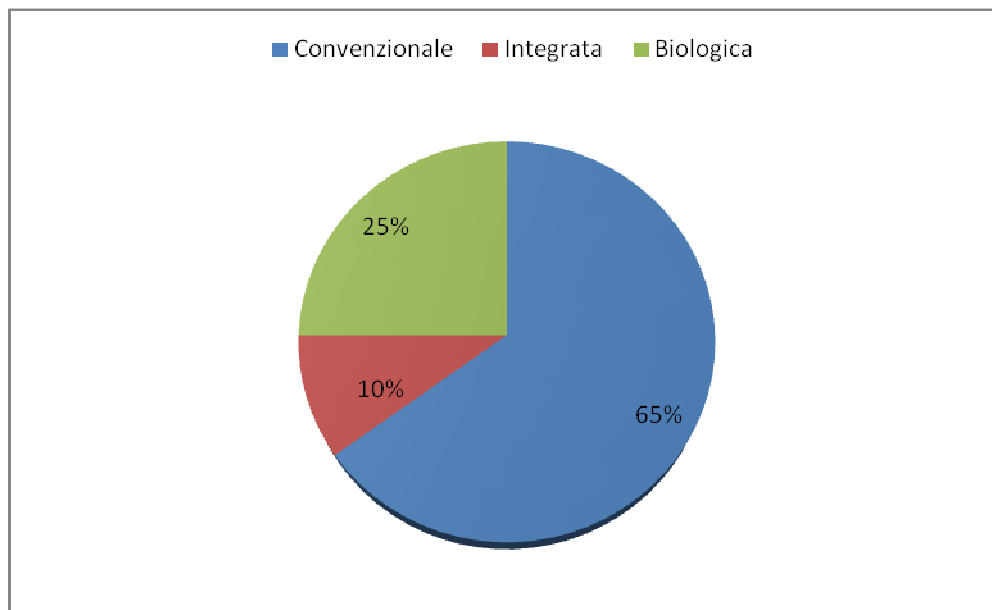
**Tab.6:** Farmer's sex

**Farmer's level education**



**Pie chart 1:** Farmer's level education

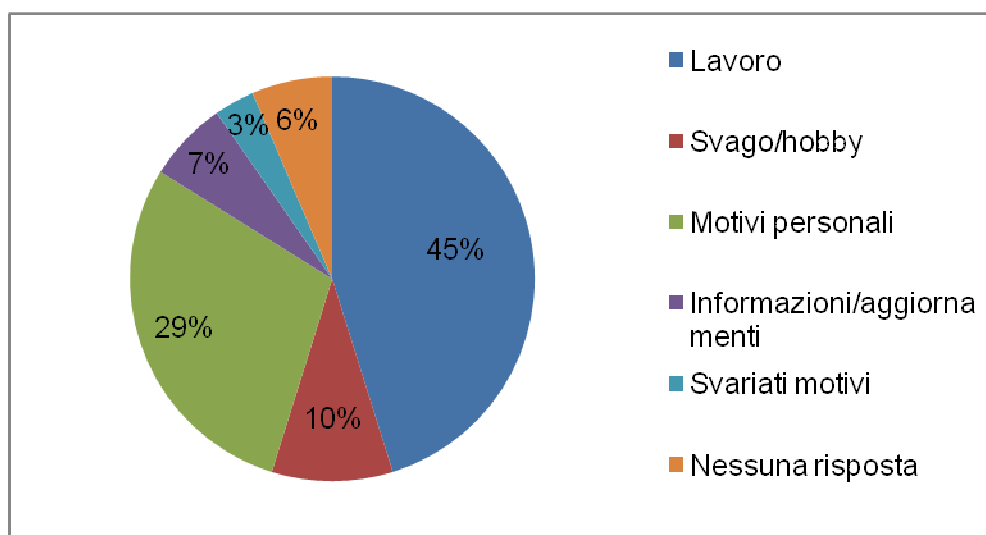
### Type of cultivation



**Pie chart 2:** Type of cultivation

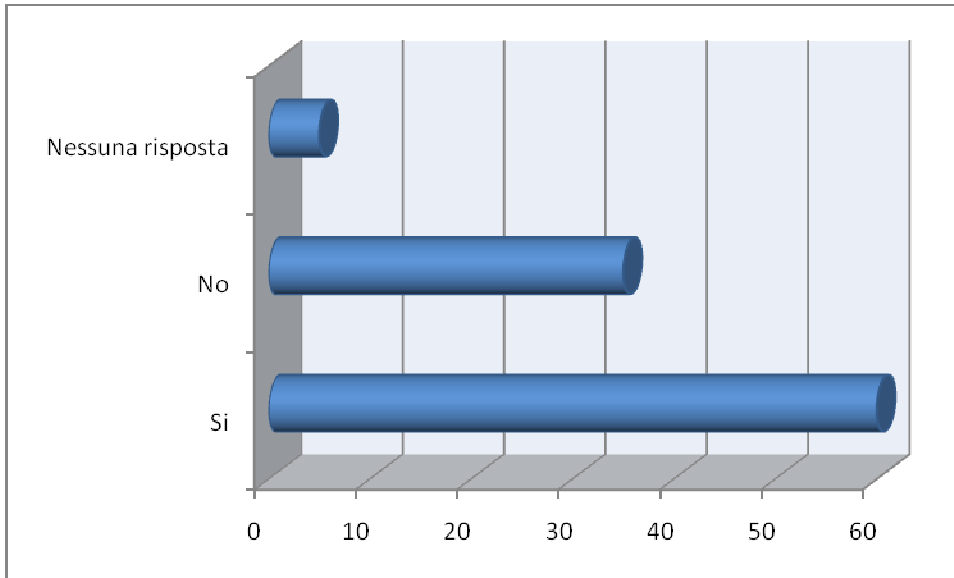
All the interviewees have declared that have a PC; almost all, to exclusion of two of them, are good in his use and almost all use internet.

### Why di you use internet?



**Pie chart 3:** Why do you use internet?

### **Farmer's interest to register electronically his cultivation**



**Bar graph 1:** Farmer's interest to register electronically his cultivation

## **7. GIS - Maps and spatial Report**

### **7.1 General description the development model of GIS**

The implementation of the GIS system plays a significant role in the platform Agroquality .

The objective that we wanted to achieve with the GIS is the geo - correlation , and therefore the correlation in the data space available, in order to ensure a useful and intuitive interaction of the end user, a storage and effective management of structured data and an efficient spatial query .

The GIS will provide geographical information of the context in which they related , at the same time , a set of data that will provide a framework of knowledge , in terms of location and quality characteristics of product and process, for each phase : cultivation, production, storage, of a part of companies representative of the different oil realities in Salento, and a production of high and very high quality .

This will be possible thanks to an interaction between GIS and the ECR system , which will allow the association between geographic map and data contained in the ECR Record .

The information, relating to the companies involved, will refer to :

- Localization of companies

Through the GIS system will be able to easily locate on map companies taken into account in the project and each will see the land on which production takes place.

**In order to delineate the land of production, starting from the cadastral information (Municipality, sheet and particles) relative to the 10 companies selected in the mapped sample, it has been possible to trace the coordinates of the perimeter of such particles and thus to their representation in the system GIS.**

- General Characteristics of the Repository

the set of agronomic knowledge in terms of classification, cultivation practices, use of fertilizers, pesticides, chemicals, organic practices, collection systems, irrigation systems, etc.

- Data of individual crops

- Static data (for example, location, company ID, characteristics and composition of the soil);
- Changing data (for example, climate, soil moisture, pests, cultivation activities), information that can generally change in each cultivation period.

The first step towards the construction of the GIS system was the identification and collection of data and then processing them.

The project team of the Municipality of Lecce, in agreement with the Lead partner, in order to find the geo-spatial information useful for the implementation of the Record ECR, began its work by starting from the identification and collection of data through a qualitative research based on visits and meetings with producers of the sample directly from their farms.

This kind of research has allowed the collection of general information concerning the characteristics of the plots and of detailed information concerning the growing techniques. This information are present in the ECR - Electronic Record of Crops, and therefore also directly accessible via the GIS.

## 7.2 Information sources

The GIS system will contain a lot of different information and data, such as land use maps , cadastral maps , orthophotos, satellite images , Excel tables, and more, the system arranges for layers or layer , integrated and superimposed in a single geographic reference system.

The team collected data in order to build representative information of the territorial context and more specifically of the corporate examined. In this direction, it has been supporting by the Region of Puglia , which , for some years , is equipped with a Geographic Information System (GIS) that aims to respond to the needs expressed by local authorities by providing a unique, official and shared information base , and all the operational tools needed to support the processes of planning.

Through the Geographic Information System of the Region of Puglia, with reference to the territory of the Province of Lecce , the team has acquired the availability of:

### ➤ **digital orthophoto 2010**

acquired with a digital camera in the period April -August 2010 with the following specifications:

- pixels : 50 cm
- scale 1:10,000
- file format : . ecw
- reference system : UTM zone 33N



According to the Agreement for cooperation in the geotopocartographic field signed between the **Region of Puglia** and **AGEA** (Agency for Agricultural Payments), the orthophoto is made available via the SIT, through consultation services and WMS services.

Therefore, the Municipality of Lecce, in order to have the cartographic product, has entered into a special agreement with the Region of Puglia for there-use of orthophoto 2010 on the territory of the Province of Lecce.

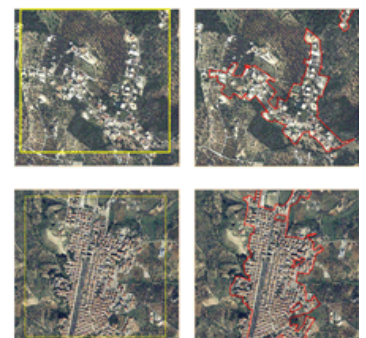
➤ **The thematic map of ground use.**

The card for the ground use is derived from the orthophotos with pixels of 50 cm, made from airplane flight from 2006 to 2007, with the following geometrical characteristics:

- Scale 1:5.000
- minimum areal bile 2,500 square meters
- reference system UTM - WGS84, zone 33.

As for the thematic content, the ground use map is compliant with the standard defined at European level with the specifications of the CORINE *Land Cover* (with extension level IV) and involves the characterization of the Legend in 69 classes.

I Livello	II Livello	III Livello	IV Livello
1 Superfici artificiali	1.1 Insediamento residenziale	1.1.1 Insediamento continuo	<div>1.1.1.1 Tessuto residenziale continuo, antico e denso</div> <div>1.1.1.2 Tessuto residenziale continuo, denso più recente, basso</div> <div>1.1.1.3 Tessuto residenziale continuo, denso più recente, alto</div>
		1.1.2 Insediamento discontinuo	<div>1.1.2.1 Tessuto residenziale discontinuo</div> <div>1.1.2.2 Tessuto residenziale rado e nucleiforme</div> <div>1.1.2.3 Tessuto residenziale sparso</div>



Other sources:

➤ **ISTAT (National Statistics Institute), for the administrative boundaries of the Province of Lecce.**

The National Statistics Institute is a public research body. Present in the country since

1926, it is the leading producer of official statistics in support of citizens and public decision-makers. It works independently and in continuous interaction with the academic and scientific world. In preparation for the censuses of 2011, Istat releases the administrative boundaries at 1 January 2011, as information at national level. The administrative boundaries are composed of three hierarchical levels with national coverage, respectively, regions, provinces and municipalities.

The data is in shapefile format, public format for exchanging data in GIS, and are released into the reference system ED\_1950\_UTM Zone 32.

➤ **Environmental Portal of the Puglia Region, for the collection of data relating to areas under nature protection (SIC, ZPS, protected areas)**

These are all areas in which the age-old human presence and its traditional activities have allowed the maintenance of a balance between human activities and nature. To agricultural areas, for example, are linked to many plant and animal species which are rare and endangered and their survival is necessary for the continuation and enhancement of traditional activities, such as grazing or non-intensive agriculture.

In addition, through the protection and enhancement of natural protected areas, concrete initiatives to protect nature can be launched in order to rationalize the management of the territory and its resources.

### **7.3 Companies and points of interest**

In the process of collecting and processing of the geo-referencing data the Agroquality project has collected other information about possible areas of interest for stakeholders and end-users , compared to the reference sector .

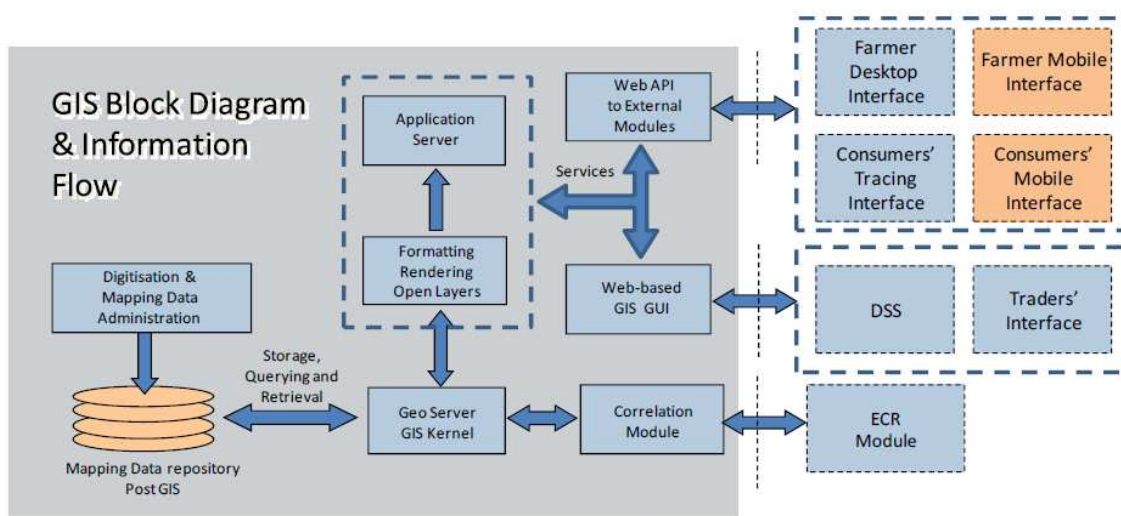
Each of the points of interest has been located on the map through the geospatial coordinates, with a brief description for each of the points of interest.

The working group, through a desk analysis and research based on interviews with witnesses to the olive oil sector in Puglia and in Salento, has identified a sample of about 75 points of interest including:

- Institutions and organizations
- Historical and touristic landmarks
- Points of interest related to receptivity.

In attachment, the list of points of interest

The different layers of information has been integrated and overlapping in a single geographic reference system (GIS) directly managed by the Lead Partner, that will have the following structure:



## 8. Initial Cultivation Data Identification: three pilot cases

### 8.1 First pilot case - SILVIA COPPOLA NARDO' (LE)

Questionnaire n. 1 of 2/05/2012

#### GENERAL FARMER, LAND FIELDS AND INFRASTRUCTURE DATA

Residence: **Guagnano (LE)**

Educational level: **Laurea in Economia e Commercio**

Foreign language: **English**

Olive farmer as main profession (income from olive cultivation >50% of the agricultural income): **YES**

Leader of agricultural exploitation: **YES**

New farmer: **NO**

Insurance organisation: **NA**

Area (ha) of personal olive tree land parcels: **NA**

Area (ha) of family olive tree land parcels: **1.2 ha**

Area (ha) of rented tree land parcels: **0 ha**

Number of trees in personal olive tree land parcels: **NA**

Number of trees in family olive tree land parcels: **n. 220**

Number of trees in rented olive tree land parcels: **n. 0**

Owner of agricultural car: **YES**

Owner of arboricultural tractor: **NO**

Other olive cultivation machinery: **Classifier mechanical for olives**

EU/state economic assistance: **YES**

Organic or integrated management or conventional cultivation: **Conventional and Organic**

Are you familiar with the term quality certification "? **YES**

Do you know what POD (protected designation of origin) product means?: **YES**

Do you know what PGI (protected geographical indication) products means?: **YES**

Do you know what ISO is?: **YES**

Do you know what HACCP is?: **YES**

Do you know what OSDE (integrated information system for agricultural exploitations management) is?: **NO**

Do you know the factors that affect the quality of your products?: **very good**

Would you be interested in quantifying and prove the quality of your products?: **YES a lot**

If yes, how much would you dedicate to this?: **The time required**

Would you be interested in keeping a cultivation record? **YES**

Would you place common label with other farmers to your product?: **NO**

By which way are you informed about developments and recent discoveries regarding cultivation, packaging, storing, processing and transportation of your products?: **I'm interested in the new processing technologies**

By which way are you informed about developments and recent discoveries regarding olive sector?

LITERATURE: **YES**; RICERCHÉ INTERNET: **A lot**; QUESTIONS TO EXPERTS: **Just a bit**;  
QUESTIONS TO RELEVANT PUBLIC AUTHORITY/COOPERATION: **YES, Agricultural Inspectorship**

How familiar are you with the use of PC? **YES**

Do you own a PC?: **YES**

Do you use the internet?: **YES**

#### DATA REGARDING LAND PARCELS AND CULTIVATION TECHNIQUES

The company Silvia Coppola of Nardo (LE) owns a plot of land of about 9.45 ha and the mean number of trees is 1.800 while the mean tree density is 190,5 trees/ha. All the trees are of Nociaria variety. The mean age of trees is 25 years.

Some facts regarding the olive trees:

Planting year: **1998**

Years until full production: **10**

Years to depreciation: **15**

The fields are flat. The soil is a medium texture and a soil analysis has been made.

Some cultivation yield facts are given bellow:

Orientation production (table olive - olive oil, other products i.e. olive paste): **olive oil**

Quality Certification: (IM: Integrated Management, OC: Organic Culture, Other) **BIO**

Table olive production (mean per year, tn): **NO**

Olive oil production (mean per year, tn): **40kg** of oil

Acidity of produced olive oil (mean value): **0,2**

General quality of the produced olive oil: **Extra Virgin**

Extracting percentage: kg of olive oil / kg of olives: **13%l**

#### DATA REGARDING CULTIVATION TECHNIQUES

The company respects the Biological production parameters. Details regarding cultivation activities and relevant cost are available at the questionnaire.

#### DATA REGARDING TRADING

The Extra Virgin oil is sold in bulk for bottling; mean 50Q.li/year (price 2011: **3,5/l**, 2010: **3,5/l**). The mean economic yield per ha is estimated to **1.500,00€/ha/year**

DATA REGARDING COLLABORATION DISPOSSION

Is the farmer disposed for further collaboration in the framework of the project?: **YES**

Which is her opinion regarding the future of olive cultivation at the region?: **Optimistic for those who remain on the market.**

Advantages of the region regarding olive cultivation: **Flat terrain and uniformity of the implant.**

Disadvantages of the region regarding olive cultivation: **Climate changes with impacts on production.**

What do you think that you can do for the improvement of the efficiency of olive cultivation: **Push the mechanization.**

What do you think that public and private organisations can do for the improvement of the efficiency of olive cultivation: **To contribute to the production of quality.**

Interest regarding vertical development of the exploitation by founding olive mill: **NO. The company is in fact a complete chain with the activities of her husband.**

Interest regarding vertical development of the exploitation by founding olive oil packaging unit: **NO. It 'actually existing.**

Interest regarding vertical development of the exploitation by founding processing and packaging unit for table olives: **NO**

Has she submitted any investment proposal regarding the exploitation? **NO**

Has she materialised any investment project regarding the exploitation? **YES**

Which quantity of the produced olive oil per year has trading problems: **There is no problem**

Interest for exportation of the exploitation products (olive oil): **YES**

Interest for exportation of the exploitation products (table olive): **YES**

Interest for the certification of the exploitation as P.D.O., P.G.I., ORGANIC-BIO: **YES**

Interest of the farmer for cooperation or support for the trading of the products: **YES**

## 8.2 Second pilot case - MASSIMILIANO NICOLACI VEGLIE (LE)

Questionnaire n. 2 of 11/06/2012

### GENERAL FARMER, LAND FIELDS AND INFRASTRUCTURE DATA

Residence: **Veglie (LE)**

Educational level: **higher diploma**

Foreign language: **no one**

Olive farmer as main profession (income from olive cultivation >50% of the agricultural income): **YES**

Leader of agricultural exploitation: **YES**

New farmer: **NO**

Insurance organisation: **NA**

Area (ha) of personal olive tree land parcels: **NA**

Area (ha) of family olive tree land parcels: **NA**

Area (ha) of rented tree land parcels: **NA**

Number of trees in personal olive tree land parcels: **NA**

Number of trees in family olive tree land parcels: **n. 305**

Number of trees in rented olive tree land parcels: **n. 200**

Owner of agricultural car: **YES**

Owner of arboricultural tractor: **YES**

Other olive cultivation machinery: **Classifier / sorter mechanical olives**

EU/state economic assistance: **YES**

Organic or integrated management or conventional cultivation: **Integrated Management**

Are you familiar with the term quality certification? **YES**

Do you know what POD (protected designation of origin) product means: **YES**

Do you know what PGI (protected geographical indication) products means?: **YES**

Do you know what ISO is?: **YES**

Do you know what HACCP is?: **YES**

Do you know what OSDE is?: **NO**

Do you know the factors that affect the quality of your products?: **Very well**

Would you be interested in quantifying and prove the quality of your products?: **YES. I**

**already had recognized earlier awards about the high quality of my PDO and conventional oils.**

If yes, how much would you dedicate to this?: **The time required**

Would you be interested in keeping a cultivation record? **YES a lot**

Would you place common label with other farmers to your product?: **NO**

By which way are you informed about developments and recent discoveries regarding cultivation, packaging, storing, processing and transportation of your products?: **Enough**

By which way are you informed about developments and recent discoveries regarding olive sector?

LITERATURE: **YES**; RICERCH INTERNET: **YES**; QUESTIONS TO EXPERTS: **A lot**; QUESTIONS TO RELEVANT PUBLIC AUTHORITY/COOPERATION: **YES, Many Associations and CAA**

How familiar are you with the use of PC? **Enough**

Do you own a PC?: **YES**

Do you use the internet: **YES**

#### DATA REGARDING LAND PARCELS AND CULTIVATION TECHNIQUES

The company Massimiliano Nuzzaci of Veglie (LE) owns a plot of land with 77,5 trees/ha mean tree density. All the trees are of Ogliarola and Cellina variety. The mean age of trees is 70 years.

Some facts regarding the olive trees:

Planting year: **1940**

Years until full production: **10**

Years to depreciation: **15**

The fields are flat. The soil is sandy with rocks below and a soil analysis has been made 15 years ago. There isn't an irrigation system in the fields while the company is equipped with a power supply network. The fields are about 5km away from the farmers residence.

Some cultivation yield facts are given bellow:

Orientation production (table olive - olive oil, other products i.e. olive paste): **olive oil**

Quality Certification: (IM: Integrated Management, OC: Organic Culture, Other) **IM**

Table olive production (mean per year, tn): **NO**

Olive oil production (mean per year, tn): **25kg** of oil

Acidity of produced olive oil (mean value): **0,2 – 0,6**

General quality of the produced olive oil: **Extra Virgin**

Extracting percentage: kg of olive oil / kg of olives: **12%**

#### DATA REGARDING CULTIVATION TECHNIQUES

The company respects the IM production parameters. Details regarding cultivation activities and relevant cost are available at the questionnaire.

#### DATA REGARDING TRADING

The Extra Virgin oil is sold retail to the final consumer for PDO 500 Kg and 2,500 Kg for conventional oil (price 2011: **8/1**, 2010: **8/1**). The mean economic yield per ha is estimated to **3.076,00 €/ha/year**

#### DATA REGARDING COLLABORATION DISPOSSION

Is the farmer disposed for further collaboration in the framework of the project?: **YES**

Which is her opinion regarding the future of olive cultivation at the region?: **I believe in the recovery of the sector.**

Advantages of the region regarding olive cultivation: **Considerable number of tourists in the summer and the consequent increase in sales.**

Disadvantages of the region regarding olive cultivation: **No one.**

What do you think that you can do for the improvement of the efficiency of olive cultivation: **Increase the mechanization.**

What do you think that public and private organisations can do for the improvement of the efficiency of olive cultivation: **NA.**

Interest regarding vertical development of the exploitation by founding olive mill: **NO.**

Interest regarding vertical development of the exploitation by founding olive oil packaging unit: **NO.**

Interest regarding vertical development of the exploitation by founding processing and packaging unit for table olives: **NO**

Has she submitted any investment proposal regarding the exploitation? **NO**

Has she materialised any investment project regarding the exploitation? **NO**

Which quantity of the produced olive oil per year has trading problems: **No one**

Interest for exportation of the exploitation products (olive oil): **YES**

Interest for exportation of the exploitation products (table olive): **YES**

Interest for the certification of the exploitation as P.D.O., P.G.I., ORGANIC-BIO: **YES**

Interest of the farmer for cooperation or support for the trading of the products: **NA**

### **8.3 Third pilot case - ELENA GEORGOPULOS CASTRÌ (LE)**

Questionnaire n. 11 of 25/09/2012

#### GENERAL FARMER, LAND FIELDS AND INFRASTRUCTURE DATA

Residence: **Castri (LE)**

Educational level: **higher diploma**

Foreign language: **English**

Olive farmer as main profession (income from olive cultivation >50% of the agricultural income): **YES**

Leader of agricultural exploitation: **YES**

New farmer: **NO**

Insurance organisation: **NA**

Area (ha) of personal olive tree land parcels: **n. 130 ha**

Area (ha) of family olive tree land parcels: **NA**

Area (ha) of rented tree land parcels: **NA**

Number of trees in personal olive tree land parcels: **NA**

Number of trees in family olive tree land parcels: **n. 17.800 of olive tree and 2.496 of table oil tree**

Number of trees in rented olive tree land parcels: **n. 0**

Owner of agricultural car: **YES**

Owner of arboricultural tractor: **YES n. 5**

Other olive cultivation machinery: **Shakers olives / atomizers / flail**

EU/state economic assistance: **YES**

Organic or integrated management or conventional cultivation: **Integrated Management**

Are you familiar with the term quality certification? **YES**

Do you know what POD (protected designation of origin) product means: **YES**

Do you know what PGI (protected geographical indication) products means?: **YES**

Do you know what ISO is?: **YES**

Do you know what HACCP is?: **YES**

Do you know what OSDE is?: **NO**

Do you know the factors that affect the quality of your products?: **YES**

Would you be interested in quantifying and prove the quality of your products?: **YES.**

If yes, how much would you dedicate to this?: **A lot**

Would you be interested in keeping a cultivation record? **YES a lot**

Would you place common label with other farmers to your product?: **YES**

By which way are you informed about developments and recent discoveries regarding cultivation, packaging, storing, processing and transportation of your products?: **enough**

By which way are you informed about developments and recent discoveries regarding olive sector?

LITERATURE: **YES**; RICERCHES INTERNET: **YES**; QUESTIONS TO EXPERTS: **YES**; QUESTIONS TO RELEVANT PUBLIC AUTHORITY/COOPERATION: **YES**

How familiar are you with the use of PC? **YES**

Do you own a PC?: **YES**

Do you use the internet: **YES**

#### DATA REGARDING LAND PARCELS AND CULTIVATION TECHNIQUES

The company Elena Georgopoulos of Castrì (LE) owns a plot of land with 156 trees/ha mean tree density. All the trees are of Cellina, Ogliarola, Leccino and Kalamata variety. The mean age of trees is 20 years.

Some facts regarding the olive trees:

Planting year: **NA**

Years until full production: **10/20**

Years to depreciation: **15**

The fields are flat. The soil is The soil is a medium consistency at times tuff and live rock and a soil analysis has been made 14 years ago. There is an irrigation system in the fields and the company is equipped with a power supply network. The fields are about 10km away from the farmers residence.

Some cultivation yield facts are given bellow:

Orientation production (table olive - olive oil, other products i.e. olive paste): **olive oil, table olive, olive paste**

Quality Certification: (IM: Integrated Management, OC: Organic Culture, Other) **NO**

Table olive production (mean per year, tn): **13.000kg**

Olive oil production (mean per year, tn): **43.000 Kg**

Acidity of produced olive oil (mean value): **0,2 – 0,3**

General quality of the produced olive oil: **Extra Virgin (90%) and lampante oil (10%)**

Extracting percentage: kg of olive oil / kg of olives: **12%l**

#### DATA REGARDING CULTIVATION TECHNIQUES

The company respects the IM production parameters. Details regarding cultivation activities and relevant cost are available at the questionnaire.

#### DATA REGARDING TRADING

Sale of table olives (PDO) to cooperatives and companies, on average 9.750kg/year (2011 price: 70 € /q.le - 6,825€ / lt).

Sale of extra virgin olive oil wholesale cooperatives and companies, about 90% of production. The rest of olive oil bottled production and packaged olives is sold in the farm shop and other stores in the province of Lecce.

The mean economic yield per ha is estimated to **2.500,00 €/ha/year**

#### DATA REGARDING COLLABORATION DISPOSSION

Is the farmer disposed for further collaboration in the framework of the project?: **YES**

Which is her opinion regarding the future of olive cultivation at the region?: **We are able to continue because we try to constantly renew with an eye to the territory pursuing a product high-quality.**

Advantages of the region regarding olive cultivation: **Climate**

Disadvantages of the region regarding olive cultivation: **Presence of phytophagous which require treatment in the pursuit of quality. The location of the territory outside the main markets.**

What do you think that you can do for the improvement of the efficiency of olive cultivation: **I already do the best for the cultivation**

What do you think that public and private organisations can do for the improvement of the efficiency of olive cultivation: **I do not believe in their intervention**

Interest regarding vertical development of the exploitation by founding olive mill: **YES**

Interest regarding vertical development of the exploitation by founding olive oil packaging unit: **We have already made**

Interest regarding vertical development of the exploitation by founding processing and packaging unit for table olives: **YES**

Has she submitted any investment proposal regarding the exploitation? **YES**

Has she materialised any investment project regarding the exploitation? **NO**

Which quantity of the produced olive oil per year has trading problems: **No one**

Interest for exportation of the exploitation products (olive oil): **YES**

Interest for exportation of the exploitation products (table olive): **YES**

Interest for the certification of the exploitation as P.D.O., P.G.I., ORGANIC-BIO: **NO**

Interest of the farmer for cooperation or support for the trading of the products: **YES**