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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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### **WORK PACKAGE 5 – ACTION 5.3**

#### **Deliverable Title: 5.3.2. - Assessment of farms achievements with regard to environmental and agronomic aspects**

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## Summary

|   |    |
|---|----|
| 1. Premises .....   | 3  |
| 2. Overview of the “state of the art” of pilot companies.....                 | 4  |
| 2.1 Azienda Agricola Silvia Coppola.....                                      | 4  |
| 2.2 Azienda Agricola LA DUCHESSA di Nicolaci Massimiliano .....               | 9  |
| 2.3 Azienda Agricola Georgopoulos .....                                       | 11 |
| 3 Evaluation of principal items emerging from “state of art” monitoring ..... | 16 |
| 4 Conclusions.....  | 21 |

## **1. Premises**

The final aim of the project, which is a model of the total management of olive growing in order to:

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

Model would be based on a novel platform in which a special purpose Geographical Information System (GIS) will integrate the first Electronic Cultivation Record for olives.

The goal of Deliverable 5.3.2 is to assess, having in mind the progress of the model and the ECR development, the farms performance with respect to the crucial criteria were selected, such as:

- a) environmental sustainability (environmental impacts from cultivation activities, impacts on water, soil, energy, air, wildlife etc.);
- b) financial sustainability (farm budget and competency):
- c) degree of compliance with the integrated management protocol and the relevant expert advices.

Therefore this Deliverable will be a final analysis of the “state of the art” of the project at the level of the producers and the operators involved in the project and those who can be involved in the future.

In this direction, the analysis was developed within 3 steps

1. An overview on the “state of art” of the 3 pilot companies.
2. A synoptic table evaluating single items with respect to crucial criteria established for this Deliverable.
3. Final Conclusions

## **2. Overview of the “state of the art” of pilot companies**

The intent of this Deliverable would be to consider these monitored companies not as representative of the whole population of olive oil producer, but as sources of items and elements to be analysed, relevant to successively propose adaptation of the model of integrated management.

The 3 Pilot companies are:

1. Azienda Agricola Silvia Coppola;
2. Azienda Agricola LA DUCHESSA di Nicolaci Massimiliano;
3. Azienda Agricola Georgopoulos.

### **2.1 Azienda Agricola Silvia Coppola**

The Azienda Agricola is part of a total property, owned by the husband of Mrs Coppola, which spans at 70 hectares of olive trees, distributed in 2 different areas, one in Guagnano and the other in Nardò.

The property is almost all in plain, as almost all properties in the area, and the principal cultivars cultivated are distributed like this:

- 42 ha has Leccina and Frantoio;
- 21 ha has Cellina and Ogliarola;
- 7 ha has Picholine and Nociara.

The average plants' age is around 25 years, excluding pre-existent Cellina and Ogliarola, typical trees of the area, normally more than 70-year aged and very attractive from a landscape point of view.

The planting pattern can be considered as intensive, with an average distance between plants of 6x6 and 5x6 meters, which means around 250 and 300 plants per hectare.

Even the ancient olive trees, traditionally extensive plantations, have been transformed into intensive, putting Leccino young plants between the rows and lowering the tail of aged trees.

This solution, even if it is very important to guarantee a rentable yield per hectare, does not contribute to preserve the typical attractiveness of ancient trees: the way to preserve the ancient olive plant within the company profitability is to pursue alternative sources of revenues, which can come, for example, from tourism.

The quantities produced in the whole property is around 300.000 kg.

Regarding the disease of the plants, the principal recent worry in Salento is actually the “*Xylella fastidiosa*”, a bacterium which is dangerously threatening Olive cultivation, but also Almonds and “*Quercus*” different species, which starts from burning the leaves and can bring to a rapid deterioration of the plant up to death in 3 to 5 years.

The illness is still object of study, especially trying to discover vector of the bacteria; actually it is localized only in the area of Salento, and there is a very recent decision of European Community, dated 13 February 2014 (2014/87/UE), aimed to prevent diffusion of the bacterium.

Also leprosy (*Colletotrichum gloeosporioides*) in the last 3 years is spreading, probably due also of the growing of organic producers and, for someone, also the fact that the government has prohibited to burn rest of pruning, which would help to hinder the contamination.

The soil structure in the property present a prevalence of clay and tough soil, which was responding well to the hard drought that was registered this year. Anyway there is quite a difference between the 2 areas, because Guagnano soil is normally tougher and more difficult to handle than Nardò one.

With regards to farming operations, it is important to notice that the company owns most of the machinery, which, generally speaking, gives the chance to:

- better organizing the work;
- reducing exercise costs;
- better control efficiency and efficacy of the operations.

For example, the owner can better differentiate the operation between the 2 different areas, with respect to differences of soil texture and structure.

The farm has no water and no irrigation system.

This company shows a relevant environment care and follows an organic producing system for 50 on the total 70 has of the property. In this direction weeds control is based on weed chopping and then ploughing along the boundaries and in the middle to reduce the risk of fire propagation.

The pruning is only for renewal and it is almost every 4 years.

The harvest is made mostly through a picking machine which is based on a cylindrical brush, which is directed into the olive tree and orientated between the branches for fruit removal. During the 'brushing' process, the flexible fingers shake in an alternating motion causing the fruit to fall from the branch. The movement of the brush on this innovative, patented fruit removal head can be adjusted based on tree type and collection time, limiting loss of leaves and small branches. It can harvest up to 4 trees from one fixed position.



This machine is particularly helpful for the early harvest, because it avoids the damage that normal shaker machine can do when the tree is still in the full vegetative period.

The early harvest is a strategic choice of the owner. Indeed it is possible to state that early harvest, in particular in the time of veraison of the olive, is the only way to produce quality which, on the contrary, cannot be guaranteed by natural fall of olive, as it is traditionally used.

The relevant elements of the early harvest can be resumed in this way:

- oil yield is reduced: the manager registered around 8% of oil yield, which is quite a low rate. In the area of Bari this rate gets up to 16-18%, but it has also to be considered that the area is irrigated.
- The costs for collection are higher, especially if compared to the natural dropping of olives from the plant.
- Problem of organization of “right in time” of harvesting.
- On the other hand, it is possible to reduce treatments to fly (*Dacus Oleae*).

The owner organize also harvest in late November and in some case do treatments with copper to keep the fruit in the plant as much as possible.

In late November, the plant stops its vegetative activity and you can harvest with shaker machinery without damaging the bolo or the branches.

In any case it is really important to reduce as much as possible the time gap between harvest and milling and to control the temperature of olives, keeping it as low as possible.

Regarding oil milling, the property owns also its mill, which actually processes around 1,300,000 Kg of olive, with a cold extraction system, which guarantees the high quality standard of the final product.

In the last period it has been registered a growing up of number of very little producers that brings low quantities of olives to the mill. This occurs because of the growing trend of “0-km” consumption, i.e. people that go and buy directly from small producers: it is important to pay attention to this trend, especially for the reason that it is very difficult to put those little farmers inside any quality control system.

The mill is organized in distinguishing different lines for early harvest and for ground olives (olives harvested in the ground from natural fall).

Silos are differentiated for cultivars. Some silos have nitrogen, to better preserve the oil from oxidation, especially for cultivars more sensible to this problem, like Cellina and Ogliarola.

Actually the owner is not anymore directly involved in the management of the mill, because he decided to rent it.

In this regard, a consideration has to be taken regarding the fact that the farmer owns the mill; even if this would guarantee a perfect control of the whole quality chain process, some important elements have to be taken into account:

- A normal company of the olive oil industry in Salento is a family company, which means that it has to deal with a management concentrated in one or at least really few persons.
- The management of the mill requests specific competencies, which are quite different from competencies of the olive oil farmer.
- The time that has to be spent in managing the mill is simultaneous to the period of harvest, which is a very delicate period for the farmer management activities.
- If it is true that the milling process is an important step towards quality making, it is important that this phase is developed by a specialized structure, and it is also the phase that, more than the other phases of the chains, can be industrialized.

In conclusion, considering all this factors, it can be assumed that the best solution is that farmers do not afford the milling process, delegating this to specialized structures. Indeed this is the prevalent situation of the area, where most of the producers, also the bigger ones, delegate milling process to cooperative like Nuova Generazione, or Cooperativa Sant' Anna, and so on.

Nevertheless it becomes strategic to control and handle the storage and the bottling of olive oil, which is the last important step of the quality chain. In this direction the trend of medium size companies, like the one we will see later, Azienda Agricola



Georgopulos, are strategically moving towards investing in little olive oil warehouses, with bottling facilities, which becomes also an attractive selling point.

About branding and certification, the final product has been assigned to a 16 months' shelf life.

Despite the fact that the 50 hectares are registered as organic, the company does not use organic label, because of the extra costs this would involve.

They are no longer registered in the PDO Certification because the costs are too high for the real value added this brand gives to final product.

Prices of own branded products are:

- Olive Oil Single Cultivar Cellina : € 7.5/ 0.75 lt
- Olive Oil Single Cultivar Ogliarola : € 7.5/ 0.75 lt
- Blend : € 6.5/ 0.75 lt

The marketing strategies of Single Cultivar looks to be a relevant marketing trend in all olive oil market, giving evidence to the relation of the cultivar to the territory.

The company has its own web site, which is actually under construction.

They are almost completing a restaurant in the same production area. The structure looks really attractive and well harmonized with the mill and the farm, and it could be an interesting vector for promoting the production. But on the other way and, probably with more effective and profitable results, it is a good chance to take advantage of the farm, the mill and the fascination of the rural tradition, together with the quality of the product, to promote alternative and parallel tourist activity.

## **2.2      *Azienda Agricola LA DUCHESSA di Nicolaci Massimiliano***

The family company includes different kind of products and activities, including an agritourism activity. While Massimo Nicolaci and his brother are involved mostly in oil

production and in managing the restaurant, the parents are more concentrated in the fruit and vegetable production and also itinerant direct sale. It is relevant to notice the coexistence of two levels of business attitude within the same family company, the traditional way of the parents, with the modern and innovative one of sons.

The olives production is concentrated in 7 has, with 300 plants of Cellina and Ogliarola, 70 years old aged.

2 years ago they started 2 hectares of intensive cultivation of Leccina and Frantoio, around 500 plants.

The soil structure is sandy in top of stones, which means good drainage and roots can breathe better, normally less acidity for final product.

The weed control is made with herbicides, mostly Roundup. The company is not registered in a biological system.

The harvest is from late October until middle of November, in advance, mostly with beaters. Until March, they still harvest in the ground from old cultivars.

They do not own a mill, so they bring their olives to the mill of Azienda Agricola Silvia Coppola we were talking above.

The production is of around 350 bottles, 200 bottles of PDO Terre d'Otranto and 150 bottles of Single Cultivar brand.

The price is € 8/ 0.75 lt. According to the opinion of this company, the PDO brand gives a 2 € gap compared to the non PDO olive oil.

The two sons of the family manage a rural tourism activity, selling the PDO oil in there.

According to Mr Nicolaci, the problem for quality is more on marketing and selling it at the right price, than making it. He strongly believes in the PDO branding as a tool that can become effective for the future.

Regarding quality value added, he makes the example of the Company Forestaforte, which experimented the night harvest to keep the temperature of olives harvested as low as possible. To this event has been given also a relevant evidence in the media. Actually this company gets to a 12 € / bottle selling price.

### **2.3      *Azienda Agricola Georgopoulos***

The family company is owned by Mr Georgopoulos, who is a Greek living in Italy since a long time. The farm broaden in a 160 has own property, all irrigated, mostly flat or with slight slopes. Together with the farm, Mr Georgopoulos have also a selling point in the little town of Castri, and now he is going to start this year with a warehouse in the centre of town, where he will store olive oil, bottled it and sell it directly in the shop inside the new structure.

The principal cultivars of the farm are:

- The old cultivars Ogliarola and Cellina, mostly secular ones, really attractive from an environment and landscape point of view.
- Cultivar Koroneiki, which is a Greek Cultivar imported by Mr. Georgopoulos: it is a plant that produce in little bunches with production in clusters, with 3-9 fruits per bunch. It is an incredibly high vegetative activity plant, and large yield of olive per plant too, so that in October – November plants look like willows, because of the exceeding charge of fruits brings down the branches. The fruit is hard to drop down, so harvest can be delayed up to December, with shaker machine first and then with beaters, usually used by workers coming from India, who are specialized in this kind of work. The plant age is from 2 to 6 years.



- Cultivar Kalamata, which is a cultivar highly widespread in Greece, is used for table olive production. It is an olive very resistant to shocks and injuries. The plants age is from 2 to 6 years.
- Cultivar Leccino, a common cultivar of the area.
- Some plants of Conservolea of Amfissa , which are black round olives originate from Greek, basically cultivated as table olives.

The distribution of principal cultivars along the property is not always in homogeneous parcels, because in many cases the need of modernizing the pre-existent, in terms of changing cultivars or rationalizing the planting pattern, caused a mix of cultivars in the same parcel.

If we want to approximate a distribution of cultivar in the whole property we could resume it like this

- **Koroneiki:** 1,500 plants, in a prevalent 7x7 planting pattern, with about 200 trees per hectare.
- **Kalamata:** 2,500 plants in around 10 has, with a 7x7 planting pattern.
- **Leccino:** 5,000 plants in a 5.5x6, 5 planting pattern.
- **Ogliarola and Cellina:** 10,000 plants, of which around 2,000 plants, in around 10 has, have been planted in intensive planting pattern, while the remaining, mostly secular, mixed with the intensive. Most of the sparse ancient trees were interspersed with intensive, and constitute a burden for a rational use of the plantation. Many time the big sparse ancient plant can cause problems for a rational organization of the field and distribution of the plants. The owner would

find easier and more advantageous to sell the trees, but actually local government protects those trees for its landscape value and does not admit to remove them or transplant somewhere else.

Regarding the main diseases, *Leprosy* affected also this property, especially affecting Kalamata production, being the principal table olive. The problem of leprosy started 2 years ago. The owner treated fruits with Maxflint ( Tribulorina ), but it did not work very much, probably because too late. In Greece they do this treatment twice, and the intention of Mr Georgopoulos is to do so for next year.

Later on he treated again with copper, respecting the times of shortage (20 days), and it worked better.

About farming operations, the company owns most of the machinery, and this allows them to experiment new solutions for emerging problems.

For example, in this campaign Mr Georgopoulos experimented in a parcel to pass a new rolling tiller over the rest of pruning, with the intent of burying at a deep around 5 cm, also to prevent propagation of leprosy. The result was not positive for leprosy, but a good unexpected result was that the plants didn't suffer drought.

Regarding harvest, the company owns harvest machinery, including 3 shakers with inverted umbrella.

Periods of harvest, with respect of cultivar, are:

- **Leccino**: early October - sweet oil
- **Koroneiki and Kalamata**: between December and January, first with shakers, then with picker and brush to harvest what remains in the plant.
- **Cellina and Ogliarola**, from October up to November. The Cellina can also be harvested as table olive: traditionally olives were harvested in the day of

“Immacolata”, in December, and put in jars with only water and salt; those olives are called “capasa”.

The company brings olives to a close mill, Cooperativa Nuova Generazione in Martano. Mr Georgopoulos chose to concentrate company’s activity on production.

The mill has got a calibration machinery, which separates olives according to the size. This calibration is particularly used for Kalamata, Cellina and Leccina, because it can separate the bigger calibre for table olive and the smaller calibre for oil.

Also Kalamata under gauge can make oil, but not of a high quality.

This year has been registered a very low calibre.

About storage and packing, company is actually renting silos in the mill. Normally there is no need to use nitrogen in the silos, especially for Leccino and Koroneiki, which do not oxidize ever, while Cellina and Ogliarola are more sensible to oxidization.

For next reason the new storage, bottling structure with an exposition and selling point, will be ready. The company invested for this goal in an old establishment located in the centre, which was an ancient underground mill.

The total production of oil in 2012 has been of 80.000 kg. He still doesn’t have numbers of 2013, which are supposed to be much lower.

25% of total production is bottled, the rest is sold as oil, mostly in the area of Bari.

Table olives, are preserved in brine, but also with oil, vinegar and spices, according to a Greek recipe.

The company produce with his brand also black “pate”, with Cellina, Leccino and Ogliarola.

About brand and certifications, the company use only its own brand, no organic, neither PDO. The company abandoned the PDO Terre d' Otranto, because they didn't find any added value from this branding.

About prices:

- **Monovarietal Leccino**: 30 € / 5lt; 6 € / 0,75 lt.
- **Monovarietal Koroneiki**, which is branded "Delicate", because the name of cultivar is unknown): 30 € / 5lt; 6 € / 0,75 lt.
- **Blend of Cellina and Ogliarola**, which is branded "Classic": 30 € / 5l , 6 € / 0.75 lt

A relevant cultural note is the presence of ancient dry stone structures called "Furnieddu" or "Pagliara", old temporary housing for farmers.

### 3 Evaluation of principal items emerging from “state of art” monitoring

The following table resumes relevant monitored elements, evaluated in relation to the impact they have on the crucial criteria established for the Deliverable 5.3.1., i.e.:

- Impact on environmental sustainability
- Impact on financial sustainability
- Impact on degree of compliance with the integrated management protocol

| RELEVANT ELEMENTS  | IMPACT ON ENVIRONMENTAL SUSTAINABILITY  | IMPACT ON FINANCIAL SUSTAINABILITY  | IMPACT ON DEGREE OF COMPLIANCE WITH THE INTEGRATED MANAGEMENT PROTOCOL   |
|--|---|---|--|
| Trend towards more intensive planting patterns, adapting also old plants to the system, by reducing distances (planting new plants in between 2 old plants) and also reducing old plants' dimension. | <b>NEGATIVE IMPACT</b><br><br>Not preserving typical traditional landscape of the area. | <b>POSITIVE IMPACT</b><br><br>More efficient organizations of all farming operations, improvements of yields. | <b>MIDDLE IMPACT</b><br><br>Improving efficiency contrasts with the needs to preserve landscape identity, as a value added of an integrated management protocol.<br><br>The opportunity is to preserve some specific limited areas to the maintenance of old trees and to map those areas. |



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| Weeds control based on weed shredding and then ploughing to the boundaries and in the middle to reduce the risk of fire propagation.   | <b>POSITIVE IMPACT</b><br>By reducing use of herbicide.   | <b>NEGATIVE IMPACT</b><br>Herbicides are more economic and more effective too.         | <b>POSITIVE IMPACT</b><br>Reducing herbicides is an element to be considered.   |
| New threat of “Xylella fastidiosa”, a bacterium which can kill the whole plant and risks to widespread in the area of Salento.   | <b>NEGATIVE IMPACT</b>  | <b>NEGATIVE IMPACT</b>   | <b>POSITIVE IMPACT</b><br>The common threat can be an opportunity to develop common strategy and give importance to a common protocol |
| Az.Agr. Georgopoulos experimented in a parcel to pass a new rolling tiller over the rest of pruning, with the intent of burying at a deep around 5 cm, also with the intent of preventing propagation of leprosy. The result was not positive for leprosy, but a good unexpected result was that the plants suffered less drought. | <b>MEDIUM IMPACT</b><br>The intervention is environment friendly in terms of reducing use of herbicides, but not in terms of defend soil structure integrity. | <b>MEDIUM IMPACT</b><br>It depends also on the ownership of machinery.                 | <b>POSITIVE IMPACT</b><br>This tests are crucial to feed the integrated managing system and to share the results.                     |
| Ownership of machinery by the farmers, which means reducing exercise costs and better controlling efficiency and efficacy of the farming operations.   | <b>MEDIUM IMPACT</b><br>The chance to better planning and organizing farming operations.  | <b>POSITIVE IMPACT</b><br>If the investment in machinery fits with economies of scale. | <b>MEDIUM IMPACT</b><br>In an integrated system it becomes strategic to share investment in machinery and coordinate the use of       |

|   |  |  |   |
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|   |  |  | machinery in different farms  |
| Harvest: the use of machinery with a cylindrical brush, with flexible fingers, limiting loss of leaves and small branches.  | <b>NO IMPACT</b>   | <b>POSITIVE IMPACT</b><br>Saving cost for manpower, optimizing harvest organization, always if the investment fits to economies of scale.  | <b>POSITIVE IMPACT</b><br>Important to permit to anticipate harvest and to guarantee high quality standards. Also in this case is important to think in an integrated system sharing investment and use of the machinery. |
| Growing trend of small farmers milling oil  | <b>POSITIVE IMPACT</b><br>This trend comes out from a growing of km 0 consumption: people that goes and buy olive oil directly from little farmer. | <b>NEGATIVE IMPACT</b><br>Little farm has no chance to be rentable, unless it is able to produce high price olive oil. In most of the cases the farmer has different sources of revenue. | <b>NEGATIVE IMPACT</b><br>It is very difficult to fits many little farmers inside an integrated management and quality control system.<br>Moreover it is difficult to improve the professionalism in the sector.          |
| The farm investing in a warehouse for olive oil storage and bottling, together with an exposition and selling point, using an establishment located in the centre of town, which was an ancient underground mill. | <b>POSITIVE IMPACT</b><br>Especially for the opportunity of recuperating ancient establishments.   | <b>POSITIVE IMPACT</b><br>More efficiency in storage and bottling, with cost saving, plus positive marketing opportunities.  | <b>POSITIVE IMPACT</b><br>Good opportunity to make a map of ancient structures and establishment to recuperate. Together with a map of points of sales of quality products.   |

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| <p>Night picking of olives. The case of Company Forestaforte, which experimented the night harvest to keep the temperature of olives harvested.</p> <p>This company gets to a 12 € / bt selling price.</p> | <p><b>POSITIVE IMPACT</b></p> <p>Valorisation of the attractiveness of environment and landscape, linked to the quality of the product.</p> | <p><b>POSITIVE IMPACT</b></p> <p>Positive in term of quality and also marketing impact.</p>   | <p><b>POSITIVE IMPACT</b></p> <p>The linkage of the rural attractiveness and the quality of the products as a value added opportunity.</p>  |
| <p>The company does not use organic label or PDO label, because the extra costs these certifications involves do not guarantees comparable added value in the selling product.</p>                         | <p><b>NEGATIVE IMPACT</b></p> <p>Impact on reducing organic and PDO productions.</p>  | <p><b>NEGATIVE IMPACT</b></p> <p>Losing the chance of value added that can come from PDO or organic branding.</p>                                     | <p><b>POSITIVE IMPACT</b></p> <p>The biggest opportunity to establish an integrated marketing strategy for a "territory brand".</p>   |
| <p>The Single Cultivar branding looks to be a relevant marketing trend in all olive oil market, giving evidence to the linkage of the cultivar to the "territory".</p>                                     | <p><b>NO IMPACT</b></p>   | <p><b>MEDIUM IMPACT</b></p> <p>Differentiating the portfolio of products and exalting quality can give higher value added.</p>                        | <p><b>POSITIVE IMPACT</b></p> <p>Within the integrated marketing strategy it is important to differentiate the kind of oil and give evidence to the cultivar, which reinforces the linkage to the territory</p> |
| <p>A restaurant in the same location of the mill and the farm, well harmonized with the ancient and rural atmosphere</p>   | <p><b>POSITIVE IMPACT</b></p> <p>Promoting rural tourism and welcoming</p>  | <p><b>POSITIVE IMPACT</b></p> <p>The fascination of the rural tradition, together with the quality of the product, to promote the product itself,</p> | <p><b>POSITIVE IMPACT</b></p> <p>Again the opportunity of including in the integrating management a map where the product is present, shops,</p>  |

|   |  |   |   |
|---|--|---|---|
|   |  | but also alternative and parallel tourist activity. | restaurants or accommodation sites.   |
| Last year the company chose to sell olive as table olives to the mill, as they could realize money easier and sooner. | <b>NO IMPACT</b>   | <b>NEGATIVE IMPACT</b>                              | <b>NEGATIVE IMPACT</b>  |
| Preserving the ancient dry stone structures , called “Furnieddu” or “Pagliara”, old temporary housing for farmers.    | <b>POSITIVE IMPACT</b><br>Preserving territory and history | <b>NEGATIVE IMPACT</b><br>Costs of maintenance.     | <b>POSITIVE IMPACT</b><br>Again, the linkage of the rural attractiveness and the quality of the products is the base for an integrated management system. |

## **4 Conclusions**

The table in the above chapter resumes the principal argument relevant for an integrated management system, and preparatory for the final suggestion for the re-calibration of the model evidenced in the Deliverable 5.4.2.