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Deliverable “Final report about socio-economic impact”

Sub-action C1.2 “Socio-economic impact reporting”

LIFE PROJECT Soil4Wine

SOIL⁴
WINE

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1. Introduction

The project has the potential to generate several positive effects on local economy and local population, as well as on the economy and population of other wine producing areas in Italy and other European countries. The most important effects can be summarized as follows:

1. Increased resilience of farms producing wine grapes
2. Increased resilience of companies involved in the local wine chain
3. Increased resilience of local economy and social cohesion in rural areas
4. Positive environmental effects in terms of:
 - a. Improved soil management and carbon sequestration
 - b. Increase water infiltration and increase groundwater stocks
 - c. Preservation and improvement of the hydrogeological stability
 - d. Preserved and improved landscape
 - e. Increase biodiversity conservation
5. Possibility to promote the use of payment of ecosystem services
6. Possibility to spread the same approach in other similar areas.

In this report, we present and discuss the main results obtained in this project with reference to the socio-economic impacts. Of course, only few data that are currently can provide a statistical support to the actual effects of the project. According to the conclusions of sub-action B.4.2., the implementation of new soil management techniques requires an economic support through an explicit and effective PES; without these payments, it will be quite difficult to promote the adoption of new techniques. For this reason, most of the socio economic impact will depend upon the effective implementation of these PES after the end of the project.

2. Expected main socio-economic impacts

2.1. Increased resilience of farms producing wine grape

The use of the new DSS for viticulture developed in this project, and the implementation of new soil management practices promoted by the project have the potential of optimizing costs and economic benefits connected with production (both in terms of quantity and quality) in viticulture and in these areas. Moreover, the and more importantly, the possibility to develop and apply effectively new PES, could significantly increase the resilience of farms involved in production of wine grapes in these areas since they are suffering because of low income. One of the main reasons for this difficult situation is due to the lack of young farmers involved in this sector. This situation is generating a sort of vicious circle: low income is not attracting young farmers, the absence of young, prepared and skilled young farmers do not promote the diffusion of new technological tools and new marketing approaches.

For this reason, the project is expected to play a very positive and effective role in breaking this negative circle by showing how a new technology may help in managing both soil and crop in a new and more efficient way, preserving the soil and the environment and, at the same time, improving economic results. This effect is particularly important in these areas characterized by hills and low mountains, and a weak economic and social structure. The positive effects of the project, therefore, is expected to increase the willingness of young farmers to continue and develop farming these areas (and to help generational change). The low values of agricultural land in these areas, due to the recent evolution of the Common Agricultural Policy and to low profitability of agricultural activity (viticulture, pasture, cereals), could represent also a positive aspects for young farmers. This economic condition may lower economic barriers to entry in what could become a more promising economic activity.

Statistical data available show that the wine grape sector in the area is still in a quite critical condition; in the period 2017-2019 the amount of land cultivated with wine grape is decreasing in the province of Piacenza (-10%) and quite stable in the province of Parma (where the hectares are only 826 vs 4.789 of Piacenza). The loss of competitiveness and therefore of interest for (young) farmers is quite clear also considering that in Emilia-Romagna region the cultivated area is stable and that in Italy is overall increasing. The evolution in terms of production of grape is even more evident since in the provinces of Piacenza and Parma the average yields are lower than in the rest of the region and the country.

This data clearly show that the wine grape sector in the area without specific support could face further reduction with increasing negative implications on farmers and on the entire local wine value chain. In order to modify this trend, is therefore absolutely important that PES are actually and effectively applied, so that farmers can find enough economic incentive to introduce innovations in soil and crop management, also using the new DSS. This change could create the right incentive for young and well-prepared farmers to come back or remain in the sector with the potential of breaking the vicious circle that is now driving the sector towards a progressive reduction.

Table 1: Evolution of cultivated area, grape and wine production in the pilot area from 2017 to 2019.

Units		Piacenza	Parma	Emilia-Romagna	ITALIA	
<i>Total cultivated area</i>	<i>ha</i>	2017	5.323	787	53.456	650.251
		2018	4.877	826	53.277	652.978
		2019	4.789	826	53.357	652.577
<i>% variation 2019/2017</i>		-10,0%	5,0%	-0,2%	0,4%	
<i>Production area</i>	<i>ha</i>	2017	5.163	781	50.126	629.191
		2018	4.754	822	49.767	629.205
		2019	4.789	822	50.099	632.560
<i>% variation 2019/2017</i>		-7,2%	5,2%	-0,1%	0,5%	
<i>Total production of grape</i>	<i>100 kg</i>	2017	497.000	131.798	7.634.508	63.839.960
		2018	467.029	88.175	10.127.901	75.774.953
		2019	397.487	84.666	8.801.374	70.709.295
<i>% variation 2019/2017</i>		-20,0%	-35,8%	15,3%	10,8%	
<i>Harvested production</i>	<i>100 kg</i>	2017	427.144	131.798	7.565.334	63.080.451
		2018	467.029	88.175	10.127.901	74.855.357
		2019	397.487	84.666	8.801.374	69.999.651
<i>% variation 2019/2017</i>		-6,9%	-35,8%	16,3%	11,0%	
<i>Total wine production</i>	<i>hl</i>	2017	312.686	92.774	5.457.014	45.180.854
		2018	410.000	45.899	7.339.834	54.149.829
		2019	298.115	63.500	6.379.654	49.220.610
<i>% variation 2019/2017</i>		-4,7%	-31,6%	16,9%	8,9%	

Source: our elaboration of ISTAT data.

2.2. Increased resilience of companies of the local wine chain

Moreover, resilience of viticulture in these areas is also expected to generate an increased resilience of all companies involved, directly or indirectly, in the local wine chain and therefore resilience of local economy. On the other hand, the development of wine companies and other companies involved in the wine chain (e.g. sales of factor of production for the agricultural and wine activity, services for farms and wine companies) can be jeopardized by the dramatic decrease of grape production due to the reduced attractiveness of viticulture.

In order to estimate the impact of viticulture on local economy, we have estimated the amount of production costs both for wine grape production and wine production, that is spent and paid to local companies and professionals.

The estimated cost of vineyard is, on average, € 6,137 per hectare, 57% of which is spent for agronomic operations, 20% for labor costs, 8% for further seasonal workforce, 2% for agronomic consultancy, 5% for the purchase of fuels, and 8% for the purchase of agro-chemicals, respectively 6% for pesticides and 2% for fertilizers. According to the respondents (farmers involved in the project), 99% of purchases made for the 2017–2018 campaign, directly linked to the vineyard, took place on the provincial territory in which the farm is located (Piacenza or Parma province). All categories of costs are directly sourced in the local territory, except for the limited amount spent for agronomic consultancy that is sourced for one-half outside the Province.

To determine the unit cost of production for the wine production, the most important aspect to be taken into account is the average production yields. In general, the production yield is highly diversified, depending on wine cultivars and place where the grape-growing activity is located (plain, hills or mountain areas). Data suggests that small-scale activities of the S4W sample are almost as efficient as other regional quality wine productions. With reference to the costs related to the winemaking phase, the survey showed that the unit cost (72€ per hectoliter) is determined for 56% merely to processing activity. The cost incurred for bottles (19%) and corks (14%) is significant, followed by the ones for the labels (3%) and for marketing activities (3%). With reference to the amount spent in the province in which the wineries are located, the result is equal to 89%, with reference to a unit cost of € 0.72 per liter (grape excluded).

All production costs have been identified in order to quantify the economic activation generated on the local territory by these small-scale activities, and thus highlighting the positive impact on the local economy. The results of the qualitative survey have proved to be in line with the official data, but unlike the latter, the survey managed to capture specific peculiarities related to the very small and small wineries and their economic impact on the territory. The results show that the “activation” effect of vine-growing activity on the local economy can be estimated equal to 38,8 million of €; the activation of wine-making activity is slightly lower, being equal to 27,6 millions of €, and costs for other (administrative) services are equal to 2,1 millions of €. Therefore the total estimated impact of viticulture in these two provinces (i.e. about 5.600 ha) in terms of direct economic activation at the local level, is equal to 68,5 millions of € (i.e. 12.232 € per ha).

Another relevant data is the one referred to competitiveness of the local wine chain on the international markets. This information has been obtained from the analysis of the evolution of wine export from the two provinces (table 2) for the period 2016–2018 (the last three years available).

Wine export from the province of Piacenza, both in terms of value and quantity, has been increasing from 2016 to 2017, and then decreasing in the next year. The evidence, from this point of view, is mixed even if the difference between 2016 and 2018 is positive and seems to show a positive trend (+32% in terms of value, + 39% in terms of quantity). However it is interesting to notice that the average unit value of export of wine from this province is quite low (1,91-2,02 €/kg) and apparently slightly decreasing in this period of time (-5%).

Wine export from the province of Parma, in the same period, has been increasing in terms of quantity (+6,0%) but decreasing in value (-5,8%) because of the strong decrease (-11,1%) in the average unit value (i.e. a sort of an average export price).

In absolute value, Piacenza export is around 13 million of € (in 2018), while wine export from Parma is less than 3 million of € (2018); however while the unit value of Piacenza export is on average below 2 €/kg, the one of Parma is decreasing but still above 4 €/kg, i.e. more than twice as high.

Interestingly, wine export from Emilia-Romagna region in the same period has been steadily increasing in terms of value, and the same has been true also for national export; in both cases also the average unit value of export is very different but steadily increasing.

We can notice that even if the wine sector in different parts of the country has very different characteristics, also from the economic point of view, the evolution in the province of Parma and Piacenza seems to be negative with respect to the unit value, while the same index for the Region and the whole country is positive.

Therefore, if on one side the economic impact of viticulture on the local economy is very strong, without drastic and positive changes the trend seems to be quite negative for the pilot area.

Table 2: Total wine export from the pilot area from 2016 to 2018

Origin	Year	Value mio €	Quantity 000 t	Unit value €/kg
Piacenza	2016	9,678	4,799	2,02
Piacenza	2017	13,407	7,029	1,91
Piacenza	2018	12,776	6,670	1,92
	% var. 2018/16	32,0%	39,0%	-5,0%
Parma	2016	3,158	0,674	4,69
Parma	2017	2,417	0,544	4,45
Parma	2018	2,976	0,714	4,17
	% var. 2018/16	-5,8%	6,0%	-11,1%
Emilia Romagna	2016	292,4	341,8	0,86
Emilia Romagna	2017	325,1	366,4	0,89
Emilia Romagna	2018	327,0	278,6	1,17
	% var. 2018/16	11,8%	-18,5%	37,2%
ITALIA	2016	5.782,4	2.198,0	2,63
ITALIA	2017	6.167,5	2.285,3	2,70
ITALIA	2018	6.367,8	2.104,9	3,03
	% var. 2018/16	10,1%	-4,2%	15,0%

2.3. Increased resilience of local economy and social cohesion in rural areas

As described before, especially in the areas interested by the project, the wine chain is playing an important role in the local economy, not only directly but also indirectly. In fact, viticulture, especially in hilly and mountainous areas like the one interested by this project, beside the strong direct economic effect, can play a major role in improving landscape and environmental management, therefore increasing the attractiveness from a touristic point of view and the quality of life in general. Areas that are socially and economically vital are more attractive for people coming for summer holidays in second houses in these areas, or for short visits.

For the same reasons, the project can also generate some positive effects on social cohesion and social stability in rural areas involved. A more economically vital local society is of critical importance for a vital and long-lasting social environment. Rural areas interested by the project are characterized by ageing

population even more than the overall society, and their social resilience is by far the most important issue for their future. The possibility to attract young people or to keep the few ones that can be successfully employed in the local economy is of critical importance. For this reason the project could provide a more positive and attractive economic environment, in an improved natural environment, able to support a more vital rural society.

2.4. Positive environmental effects

Local population (and not only) will also benefit from the environmental point of view due to the improved soil and crop management for many reasons. For example, improved soil management has positive effect not only for farmers but also for the local community. The use of a DSS tool could help farmers in reducing the application of agro-chemicals in a potentially agro-chemical intensive crop like wine grape. And this reduction will benefit not only direct users but also the local community, to a different extent. Soil erosion, landslides, hydrogeological instability in the hilly and mountainous areas interested directly by the project are perhaps the most important environmental issues. In the last decades, extreme meteorological events (very big and prolonged thunderstorm and heavy rains) have generated impressive negative effects in terms of huge landslides and soil erosion in the very same area involved in the project. For this reason, any positive effect in terms of accurate management of agricultural soils is not only welcomed by the inhabitants of the areas, but also by all people leaving downstream in the same valley. Moreover, this factor is clearly perceived by the entire population.

Viticulture is one of the most important provider of wonderful agricultural landscape all over Europe and in the pilot area; moreover, agricultural landscape, in this area, is one of the most attractive aspects for rural tourism, together with local gastronomy and enology. Finally, another positive environmental effect generated by the project is the preservation of animal and vegetal biodiversity that on one side represent and signal a better living environment and on the other side may also represent a resource for green tourism.

With reference to main results obtained in sub-action B.4.3 the average value of all ecosystem services provided by one hectare of vineyard cultivated using the new soil management approach based on permanent grass cover, is equal to 1.457 €/ha (table 3).

Table 3. Estimated value of ecosystem services provided by vineyard with permanent grass cover.

Ecosystem service	Average estimated unit value (€/ha)
Protection from soil erosion	700
Water infiltration (in groundwater)	600
Carbon sequestration	44
Biodiversity	61
Landscape	52
Total	1.457

If we consider that in the two provinces in 2019 there were 5.611 hectares of vineyard, the total estimated value of the potential ecosystem services reaches almost 8,2 millions of euro. But, even more relevant, the average economic value of the 5 estimated ES per hectare is equal to about 20% of the average value of total sales per hectare. It is important to notice, however, that this estimation is NOT considering also the relevant value of the landscape beauty of the vineyard itself, but only the improvement of this value due to

the presence of a permanent grass cover. Quite reasonably, considering also this aspect, the total economic value of all ES of a vineyard, can easily reach 2.000 €/ha.

2.5. Possibility to promote the use of Payment of Ecosystem Services

Finally, as explained in the deliverable about PES feasibility study, the project can also contribute to an effective implementation of payments scheme for ecosystem services.

The project has clearly shown that viticulture may generate some negative effects on the environment (e.g. pollution due to over or misuse of agro-chemicals), but still it is always neglected that it may also generate a large number of very important positive ecosystem services for which it is not paid for, at least up to now. The increased awareness of this asymmetry, but especially the monetary quantification of these positive effects generated (or potentially so) by viticulture when managed in a modern efficient and environmentally friendly way, provide a strong tool for environmental protection.

The opportunity to apply the new PES presented in this project, possibly connected also with new agricultural policy measures focused on these ES, have the potential to reverse completely the negative trend for the wine sector in the pilot area, with very important implication on the quality of the environment in these rural areas (hills and mountains).

As shown before, the potential total value of all ES services provided by an appropriate management of the vineyard, supported also by new technological tools like the new DSS, is equal at least to 20% of the value of total sales. Quite clearly, an increase of total revenues of this size can make a huge difference for farmers, and could easily reverse the attitude of young farmers with respect to this sector.

2.6. Possibility to spread the same approach in similar areas

Many (if not all) of the negative aspects characterizing the area where the project has been developed, are replicated in other hilly and mountainous areas where viticulture still plays (or at least could play) a role, both in Italy and in other European regions (e.g. Alpine regions).

Therefore, the possibility to spread the same positive effects on other similar areas is quite evident and the project itself has created many opportunities for dissemination of these results in other areas.

Since HORTA principally, but also all the other project partners, have an already established good network with wine stakeholders around all Italy and also in other EU Countries, after the end of the project it is reasonable to think that the success of the project could help different regions in experimenting and implementing the tools and the approach demonstrated by the project itself. This has been already demonstrating during the testing of the new DSS with living labs across EU (sub-action B3.5).

3. List of socio-economic indicators for future monitoring activity

As explained above, many of the socio-economic effects of the project, both in the pilot area and elsewhere, will have the possibility to emerge more clearly after the end of the project mainly connected with the hopefully increasing diffusion of the new DSS and of different and effective PES schemes.

According to the results, the implementation of the DSS has its own difficulties in the pilot area, mainly because of the small size of the farms, of the age of the farmers (they are quite old) and of the education level and propensity to introduce technological innovations.

Therefore, in order to evaluate the long lasting effects of the projects, we suggest monitoring the following socio-economic variables:

1. Evolution of the hectares cultivated with wine grape in the pilot area
2. Quantity of wine produced in the pilot area

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3. N° and percentage of young farmers (< 40 years old) and young employees in the wine grape sector
4. Number of hectares of vineyard cultivated using the new DSS
5. Hectares of vineyard cultivated in the pilot area using one of the new tested system for soil management
6. Application of PES schemes (number of hectares of vineyard in the area benefitting from some PES
7. Evolution of wine export from the pilot area (provinces of Piacenza and Parma)
8. Changes in number of tourists spending nights in the pilot area and in particular in farmhouses.

4. Appendix: Socio-economic impact: comment to the values of socio-economic indicators

Due to the nature of the project, we could not expect to obtain nor to measure real effects on the local economy “during” the project: first of all because of the very limited size of the pilot areas. Results of the test have been made available at the end of the project and therefore the opportunity of implementing these results and obtain the expected socio-economic effects should be evaluated at during the after-life period of the project. According to the conclusions of *Sub-action B4.2.*, the implementation of new soil management techniques requires an economic support through actual and effective PESs; without these payments, it will be quite difficult to promote the adoption of new techniques. For this reason, most of the socio economic impact will depend upon the effective implementation of these PESs after the end of the project.

However, with reference to the list of socio-economic indicators presented in Milestone C1, at the end of the research we have been able to develop the following evaluations (see table below).

	Socio-economic indicators	Actual value	Trend
1	N° of (total) farms in the pilot area	10,635	-1.60%
2	Turnover of the farms in the pilot area for the last 3 years (€/ha)	6,100	stable
3	N° employees of the farms in the pilot area (labor units)	570	-5%
4	UAA (Utilized Agricultural Area) of the farms in the pilot area (ha)	5,703	-7.40%
5	Export rate of wine in the last 3 years (export/production)	16.0%	3.1%
6	Investments for sustainable practices in the last 3 years (percentage of total production cost)	2.0%	4%
7	Investments for training in the last 3 years (percentage of total production cost)	1.0%	2%
8	N° employees with environmental protection practices knowledge (percentage of total employees)	10%	20%
9	N° employees with age under 30 years	2,3-3%	stable
10	Surface (Ha) dedicated to sustainable production (i.e. organic)	999	+8-10%
11	Sales volume of sustainable products (i.e. organic) in 100 kg of grape	65,894	+6-12%

With reference to the evolution of the number of farmers and farms, it is well known that the trend is decreasing, both with reference to the total number of farms and farmers and with reference to the number of farms and farmers cultivating vines. The total number of active farms (source: Chamber of Commerce) in the pilot area (Provinces of Parma and Piacenza) in 2018 is 10.635, and the compound annual growth rate (CAGR) is -1.6%. The estimated number of farms with vines in the same year is about 2800 units. Even in this case the estimated CAGR, at the national level, is about -1.5%. These values are not

necessarily negative since the average size of these farms is still too low to allow most of them to survive. Therefore, we can consider these structural changes as not negative, *per se*. What is more relevant with respect to the present analysis is the evolution of the Utilized Agricultural Area dedicated to vines in the pilot provinces. This data (index 4) is even more negative: in the period 2015-2018 there has been a reduction of the UAA for vines that decreased to 5.703 hectares, and the trend for the next few years is decreasing (CAGR= -7,4%). As explained previously, this is the reason why the present project is so relevant for this area: without and effective implementation of new technologies (DSS) and without the implementation of effective PESs, it will be very difficult to stop this decreasing trend. In this case we must expect with strong negative effects on the local economy and on the environment (due to the high risk of abandonment of land in hilly areas). And among negative effects there will be also a decrease in the number of employees (indicator 3).

Some positive trends are also present: the average turnover per hectare seem to be stable in the last few years since yields and price variability tend to compensate each other. But this data is the result of a quite dichotomous evolution: there are grape growers who are improving their competitiveness, in particular when they are able to implement sustainable practices like organic production, and there are others, more traditional ones, who are fighting to survive. From this point of view the positive evolution of wine export from the pilot area (index 5) is important: the share of exported wine has reached 16% of local production, and the last three years there has been an increase by 3,1% points. This has been due to an increase of export of +16,2% in terms of quantity and +10,8% in terms of value.

On the other hand also the number of hectares of organic vines has been increasing in the last three years, reaching 999 hectares in 2018 in the pilot area, equal to 18,5% of total vines. The trend is steadily increasing. Therefore, also the amount of organic grape produced in the pilot area has been increasing and is expected to continue to increase (indicator 10 and 11).

The other indicators are showing the difficult condition characterizing the socio-economic scenario in the area of the pilot action: the level of investments for sustainable practices (organic production excluded) and for training in the last three years have been very low and because of similar reasons (economic and competitive pressure) (see indicators 6 and 7), but increasing. Also the number of employees with a knowledge of environmental practices is very low but, again, increasing (indicator 8). Up to this moment, these trends are positive mainly because they are pulled by the development of demand for organic production and by new opportunities available on the final market (increasing demand for “sustainable” products”). The availability of new tools, like the DSS tested in this project, and new PESs, could play a very positive role in the near future in supporting further developments in this direction.

The effectiveness in the implementation of PESs and in diffusion of DSS and new more sustainable soil management techniques will play, in the near future, a key role in supporting the socio-economic development of the wine grape sector and a better soil management in vineyards with positive effects on the rural environment.