



AGENT-BASED SUPPORT TOOL FOR THE DEVELOPMENT OF AGRICULTURE POLICIES

D1.8 Use Case Participatory Research Actions



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Executive Summary

This deliverable presents the Participatory Research actions developed during the first 18 months of the AGRICORE Project, and the design and planning of Participatory Research activities to be developed during the coming months. This methodology has been developed as part of the first work package defined in the AGRICORE project, 'WP1 – Data Sources and Participatory Research'. AGRICORE is a research project proposing an innovative way to apply agent-based modelling to improve the capacities of policy-makers to evaluate the impact of agricultural-related measurements under and outside the framework of the Common Agricultural Policy. This project was funded by the European Commission as a result of the RUR-04-2018 call, part of the H2020 programme.

The first section of this deliverable introduces the situation of agriculture in the country or region of each one of the three use cases. This information is supported by socio-economic and environmental figures, and it is related to the objectives of each use case.

Section 2 lists the different types of information needed to build the use cases and their associated synthetic populations, model the policy instruments that affect them, and assess the latter's impact on the former. The requirements of the Agent-based Model (WP3) have also been considered.

The third section identifies that information presented in section 2, for which deficiencies have been detected either at an aggregate level or at an individual observation level. These data shortages consist either in a total lack of data or, even if such data exists, when its spatial, temporal, or class resolution is insufficient.

Section 4 covers the design of Participatory Research actions that are expected to fill the information gaps listed in section 3.

For each of these four sections, each subsection initially presents the concepts in a general way, and then a specific analysis is made for each one of the three use cases contemplated in the project.

Finally, the Conclusions section summarizes the findings of the deliverable regarding the definition of a generic methodology. It also proposes concrete actions to be taken in order to implement the designed Participatory Research campaigns.

Therefore, Deliverable 1.8 focuses on detecting information gaps specific to the use cases contemplated in the project proposal, as well as the design of the respective Participatory Research campaigns aimed at filling those gaps. This deliverable guides the implementation of the Participatory Research actions, corresponding to Task T7.3. The findings of the current task and those arising during the execution of Task 7.3 will heavily influence the design and development of the final generic systematic approach for filling information gaps, which will be reflected in the corresponding Deliverable 1.7.

Abbreviations

Abbreviation	Full name
ANCs	Areas facing natural or specific constraints explained
ARMA	The Agency for Restructuring and Modernisation of Agriculture (in Poland)
CAP	Common Agricultural Policy
EEEEA	Farm Structure Survey
ESCYRE	Spanish Survey on crop surfaces and yields
FEADER	European Agricultural Fund for Rural Development
FEAGA	European Agricultural Guarantee Fund
GDP	Gross Domestic Product
GHG	A greenhouse gas
INE	National Statistical Institute
LFA	Less Favoured Areas
LSU	The livestock units
NUTS	Nomenclature of Territorial Units for Statistics
NVZs	Nitrate Vulnerable Zones
RAMSAR	Convention on Wetlands of International Importance, especially as Waterfowl Habitants
RDP	Rural Development Program
SIGPAC	Geographical Information System for Agricultural Plots
SIPEA	Information System on Organic Production in Andalusia

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1 Introduction

The AGRICORE project proposes a novel tool for improving the current capacity to model the impact of policies dealing with agriculture by taking advantage of the latest progress in agent-based modelling [\[1\]](#) approaches and ICT. In the resulting Agent-Based Model (ABM), each farm is an agent, i.e., an autonomous decision-making entity which individually assesses its own context and makes decisions based on its current situation and expectations.

This modelling approach will make it possible to simulate the interactions between each farm and its environment (environmental surroundings, level of rural integration, services provided by the ecosystem, permitted uses of the land, etc.), both in terms of the availability of resources and services and the impact on the aforementioned components of the environment. The model will also make it possible to simulate interactions between different farms through the establishment of land exchange markets and through imitation/diffusion sub-models to simulate the gradual adoption of technologies, exploitation schemes and policy instruments. The AGRICORE tool must be able to allow the construction of case studies at different geographical scales, from regional (NUTS2) to European (NUTS0).

The econometric-based macroeconomic agricultural models (e.g. AGLINK-COSIMO, CAPRI, AGMEMOD, AROPAj, MAGNET) developed to model early Common Agricultural Policy (CAP) instruments, such as those included in the Pillar I, are sometimes not capable of representing many of the new policy instruments, capturing farm heterogeneity and addressing a finer geographical scale than the regional level. In response to these needs, agent-based modelling has been applied in the last years to tackle these modelling challenges within the agricultural sector [\[2\]](#) [\[3\]](#) [\[4\]](#). The main advantages of agent-based models of agricultural structures are the explicit modelling of farm interaction and the consideration of agrarian activities' spatial dimension [\[5\]](#).

However, the most developed and frequently used ABMs face some relevant drawbacks not effectively overcome yet and which have hindered their application for large-scale policy assessment so far. For instance, current ABMs are extremely time-consuming in terms of parameterisation and calibration; generally, the agents' models still lack some significant modelling features (such as accounting for risk and uncertainty, considering a long-term dynamic investment or integrating ecosystem services modelling); the use of current ABM environments is generally too complex and requires a strong computational science background; and they usually do not take full advantage of the latest progress in the ICT area to open up the simulation of realistic and large populations of interacting agents.

Therefore, the main objective of AGRICORE project is to develop a new generation of ABM tool as a means to overcome the challenges that are still hampering their capacity for improving the design of new policies and for performing the associated socio-economic and environmental impact assessments at various geographical and demographical scales.

To enable the implementation of agricultural models, whether agent-based or not, it is necessary to have information on the population and/or the productive sectors to be modelled. Such data can be extracted (totally or partially) from pre-existing biophysical (e.g., EcoCLIM), geographic (e.g., LUCAS), demographic (e.g. National Censuses) and economic (e.g. FADN) data sources. However, in most cases, there are data shortages that involve the detection of information gaps when building and/or parameterising and/or calibrating models. One of the possible strategies to fill these information gaps is the design and implementation of participatory research (PR) programs among the target population or sectors. There are many examples in the literature of the use of PR as a mechanism for the characterisation of productive practices [\[6\]](#) [\[7\]](#), modelling [\[8\]](#) [\[9\]](#) or impact assessment of practices and policies [\[10\]](#) [\[11\]](#) in the agricultural sector.

1.1 Presentation of use cases and justification of their relevance

1.1.1 Use Case #1: Regional Measurement (M11) Organic Farming in the field of olive exploitations in Andalusia (Spain)

The Andalusian Use Case will focus on the ex-ante (2018-2020) and ex-post (2014-2017) analysis of the impacts of a Regional Measurement (M11) Organic Farming in the field of olive exploitations in Andalusia, being this region the world leader on olive oil production [12].

Therefore, the agronomic cultivation of olive orchards is an element that shapes the territory of Andalusia. The continuous historical expansion of this agricultural system has marked the landscape, economy and culture of numerous zones of this Region. The territorial extension of the olive orchard and its mono-crop nature in many areas have conditioned and continue to condition the lifestyle of a significant part of the Andalusian population [13].

Andalusia has more than 1.5 million hectares, representing 14% of the world's olive orchard area [14]. Olive orchards occupy around 16% of the Andalusia's entire area, which constitutes around 45% of its total agricultural area (Data calculated from [15]).

Spain is one of the main producers of both olive oil and table olives, representing around 69% of olive oil production with respect to the European total, and 45% concerning the world total. As for table olives, Spain accounts for 77.5% of total European production, amounting to 19% of the world production (Data calculated from [16]). In the last reported campaigns (2018/2019 and 2019/2020), the average olive production in Andalusia stood at 5.8 million tonnes. The vast majority of these olives (92.7%) were used for the production of olive oil, resulting in an average of 1,112,091 tonnes of olive oil over the two campaigns; the rest of the olive production (7.3%) was destined for table olives, with an average of 428,740 tonnes over the two seasons (Data calculated from [15]). Within the overall national production, Andalusia predominates in terms of olive oil and table olive production, representing 76.2% and 57% of Spanish production, respectively (Data calculated from [15] and [16]).

Regarding the exports, Andalusia also leads them with 75.8% of the total national volume. Up to July of the 2019/2020 campaign, Andalusia exported a total of 714,721 tonnes of olive oil (worth approximately 1,771 million euros), which represented 79.6% of its total production. As for the table olive sector, exports exceeded 317,000 tonnes of prepared or preserved olives (worth more than 447 million euros) [17].

The contribution of the olive sector to the GDP is a value that has not been precisely calculated. Depending on the source, estimates place it between 0.27% and 0.6% of the national GDP, and around 1.6% of the Andalusian GDP [18].

From a social point of view, the olive sector in Andalusia is of fundamental importance. In the 2020-2021 campaign, there will be an estimate of 19.2 million day-wages associated with agricultural work in olive orchards for olive oil and 2.4 million day-wages associated with agrarian labour for table olives, of which more than 70% will be dedicated to harvesting [19] and [17]. According to the 2016 EEEA (Farm Structure Survey in Andalusia), the percentage of in-field female workers in the olive orchard sector was estimated at around 17% [19]. Finally, establishing the classification of farms owners by age range, 74.6% are over 44 years old, and 25.3% are over 64 years old, with only 0.1% representation of those under 44 years old. In terms of gender, around 80% are men, while the remaining 20% are women [20].

The expansion and intensification of olive growing have also produced negative environmental effects, although there is a general lack of quantitative information in this respect. In any case, the negative impacts in terms of soil erosion, overexploitation of water resources, diffuse water pollution, loss of biodiversity and deterioration of traditional landscapes are summarized hereafter.

The increase in the area of irrigated olive orchards in Andalusia in recent years indicates that a large part of current irrigation water consumption is due to new demand for this resource. According to data from ESYRCE (Spanish survey on crop surfaces and yields), olive orchard is the crop with the largest irrigated land area in Andalusia [21]. This demand is generating major environmental problems. The most direct consequence is the overexploitation of aquifers, which, in addition to economic damage to other irrigated crops, causes environmental damage because the drop in the water availability affects the associated ecosystem [20]. Another significant environmental problem associated with water resources is the diffuse pollution of rivers, reservoirs and aquifers due to the misuse of fertilisers and phytosanitary products. Nitrogen, as a macronutrient, is an essential protagonist used in the fertilisation of olive orchards. The use of excessive amounts of nitrates can lead to the acceleration of natural processes, arising a greenhouse effect almost 300 times greater than that due to olive orchard-related CO₂ emissions [20].

Furthermore, soil erosion represents one of the most critical and widespread environmental risks, often acting in a diffuse but constant manner. The loss of surface layers rich in nutrients and organic matter conditions the productive capacity of soils, limiting their ability to produce biomass, either for productive purposes or to support the natural environment. In Andalusia, low erosion areas predominate, with 47.2% of the total olive orchard area, followed by moderate erosion areas (29.7%), high erosion areas (11.8%) and very high erosion areas (11.2%) [20].

In response to the need to develop production schemes that combine profitable agricultural practices with environmental preservation, the olive orchard has experienced rapid growth of alternatives to 'conventional' production, such as integrated production and organic production. During the last decade, the area of organic olive orchards in Andalusia has increased progressively, reaching 79,761 ha in 2019, representing 5 % of the total area of oil-olive orchards in Andalusia. The production of organic olive oil reached 17,150 tonnes in 2020. For the current 2020/21 campaign, organic olive oil production is estimated to be around 24,540 tonnes, which would represent an increase of 43.1% compared to 2019/20 [19].

With regard to production costs, in 2017, the Studies and Statistics Service of the Regional Ministry of Agriculture, Fisheries and Rural Development of Andalusian carried out an estimate of the average costs of cultivation by type of olive farm, taking data from the 2015/2016 campaign. The study took into account all the tasks along the cultivation itinerary, the labour force, the required seasonable actions, the opportunity cost of the time required, the costs of inputs used, the costs of machinery maintenance, depreciation, taxes, etc. This study shows that, in conventional olive orchards, the average total costs per hectare range between 1,388 and 2,758 €/ha depending on the type of farm (these types are defined according to the Andalusian Olive Plan), with an average total cost between 1.75 and 2.89 € per kg of produced oil. However, in organic olive orchards, the average total costs range from 597 to 1,075 €/ha, while the average olive oil production costs vary between 3.00 to 6.79 €/kg of oil. Labour wages account for between 43.4% and 53.5% of total costs in conventional olive orchards, while they represent between 49.9% and 69.9% in organic olive orchards [22].

A study carried out in a specific region of Andalusia on the difference in the olive growing sustainability in conventional and organic farms revealed significant differences corresponding to an unequal performance of the economic, social and environmental functions. Of the relevant indicators considered in the analysis, 58% reflected that the organic system is more sustainable, most of them economic and environmental factors. In comparison, the remaining 42% reflected that the most sustainable system is conventional production, related to the socio-cultural dimension and dependence on public support [23]. The same study also showed that, when weighing the importance of CAP subsidies in the breakdown of the total income of olive farms, they account for an average of 6% more on organic farms with respect to non-organic farms. This fact clearly demonstrates the importance of CAP support for organic olive farms in Andalusia. Consequently, the results obtained through this participatory research

actions on olive growing in Andalusia are of great interest for future reforms of the common agricultural policy, aiming to provide incentives for producers to opt for a sustainable production system that best meets social needs.

1.1.2 Use Case #2: Poland National Measure M10.1: Agri-environment-climate commitments in Poland

Among several different EU programs and projects, one related to the agricultural field is Agri-Climate-Environmental-Action directed at farmers to motivate them to undertake such activities that can help achieve assumed objectives and integrated economic and climate-environmental goals simultaneously. Different RDP actions are to improve the state of the environment and climate conditions, guaranteeing farmers a competitive advantage for their enterprises. Such actions are closely connected to widely understood eco-services that quantify, measure and allow for achieving many environmentally friendly goals.

The research's main problem is focused on the case of high climatic risk in agricultural production and the low-quality soils (mainly sandy soils). The research scope will include Poland, which is a significant area of agricultural output in Europe. The research's main purpose is to develop methods and tools in the frame of RDP to ensure sustainable development of farms located in areas with special environmental values, including ecosystem services development and their essential meanings.

Poland covers six NUTS level 1 Regions (PL1-PL6) with a total area of 312 696 km² of which 51.2% is rural, and further 39.5% is intermediate. Regarding the Polish population, it is 38.43 million of which 39% live in rural areas. All Poland administrative regions are considered as less developed under article 2014/99/EU definition. Moreover, the country is one of the member states eligible for funding from the Cohesion Fund pursuant to Article 4.

As regards the Polish territory distribution, forests cover approximately 30% of the Polish territory, whereas the agricultural land is 15.9 million ha, of which 70.4% is sown area. Poland is one of the EU Member States with the largest number of farms, which amounts to 1428781 and an estimated 2,383 million persons working on farms [24]. Agricultural land area in good agricultural conditions is 14,55 million ha and the average area of agricultural land in an agricultural holding is 10.42 ha. This makes that Poland was among the EU Member States with the lowest average area per farm. Furthermore, there is a relatively high share of the population working in agriculture due to Polish agriculture's socio-economic structure, which small family farms dominate. The sown area of crop production in Poland in 2019 was as follow [24]: cereals 7.9 million ha (wheat - 2.5 million ha, triticale - 1.3 million ha, barley - 1.0 million ha, maize for grain - 0.6 million ha), industrial crops 1,1 million ha (rape and turnip rape – 1.0 million ha), feed crops - 1,1 million ha (maize for feed - 0,6 million ha), vegetables - 0,2 million ha. Agricultural land of organic farms in Poland in 2019 amounted to 0.5 mln ha, in which more than 75% are certified. The livestock units (LSU) in Poland in 2019 was about 10.0 million (Cattle – 46,4%, Pigs – 28%, Poultry 23,6% of total livestock units) [24].

The population age distribution in the rural area consists of 16,4% of people under 15 and 15,0% over 64 (in 2019). In Poland, soil quality influences the land's agricultural productivity, to the extent that 62.5% of agricultural land is classified as areas with natural constraints (ANC). Since the agriculture sector accounts for 10.7% of Poland's GHG (a greenhouse gas) emissions, farmers need practical tools to address these and other emissions stemming from intensive crop and livestock production. Approximately 19.4% of arable land in Poland faces various environmental challenges: 8.2% is particularly endangered by water and/or wind erosion, 3.6% experiences problems with low humus levels and 7.4% are defined as Nitrate Vulnerable Zones (areas that drain into waters polluted by nitrates).

Among many RDP actions, it is of great importance to underline that the M10 action budget allocated for the implementation of RDP 2014-2020 within Agri-Environmental-Climate-Action obtained the 4th largest amount of funds assigned in the overall RDP budget with a quota of 1366,7 million EUR among 17 different actions. M10 action has crucial meanings for Polish stakeholders mainly because of such a high share of agriculture in domestic GDP and due to the enormous potential of natural resources in Poland (i.e., wide areas of forestry) and significant parts of rural areas being located in zones of NATURE 2000. This is important not only for this country but also for Europe as a whole and the planet to sustain the natural environment for future generations.

[Figure 1](#) presents selected indicators of biodiversity and ecosystem services development in Poland in terms of assumptions, the Strategy for Sustainable Development of Rural Areas, Agriculture and Fisheries 2030 [\[25\]](#).

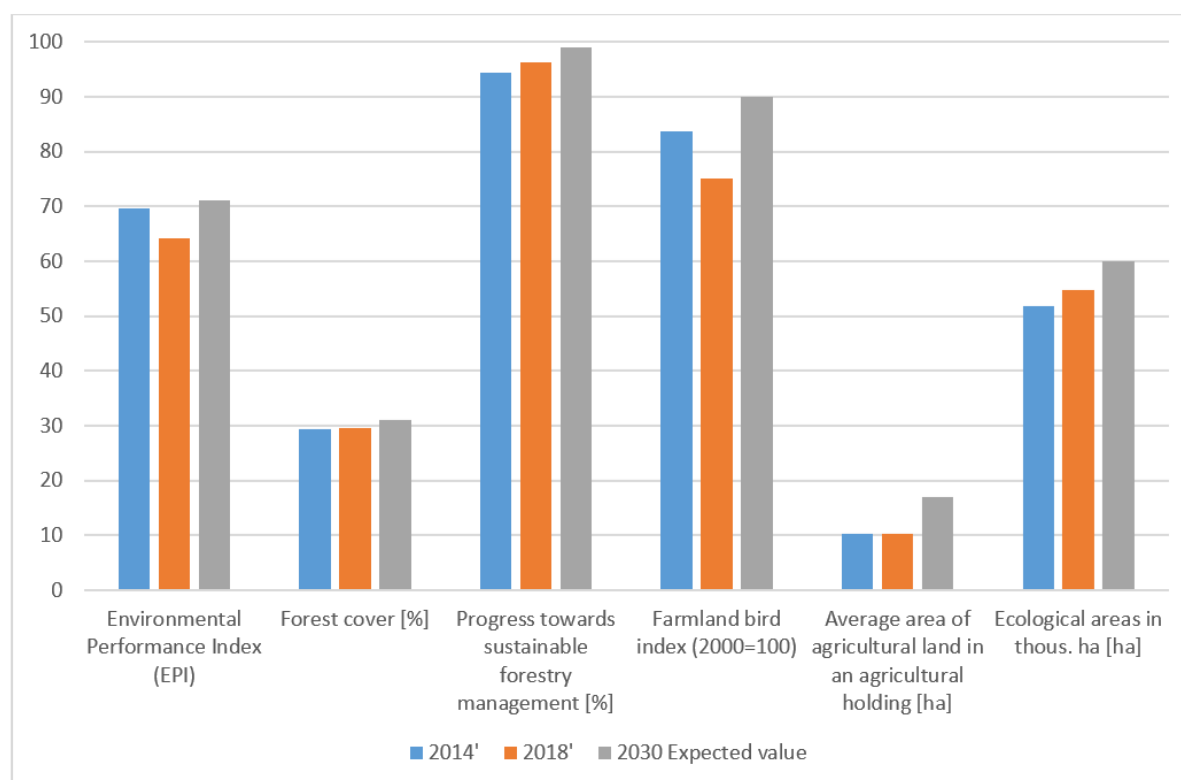


Figure 1. Selected indicators of biodiversity and ecosystem services development in Poland (Source: based on [\[25\]](#)).

The trends of changes in the values of indicators characterising the eco-services' development show still unsatisfactory results of implementing the instruments used so far. Therefore, further research into more effective tools increasing the potential for the development of eco-services and mitigating the negative effects of agricultural production impact on the environment is necessary.

Furthermore, surveys and interviews carried out among farmers and representatives of farmers in Poland confirmed that Polish agricultural producers are interested in participation in Agri-Climate-Environmental-Action. Nevertheless, they realise that there are still necessary improvements of such actions due to rapid changes in natural, technological and social conditions determining their decisions.

Hence, taking into account the circumstances mentioned above, one can conclude that researching on more efficient tools for making Agri-Climate-Environmental activities is justified.

1.1.3 Use Case #3: National measure 6.1: Business start-up aid for young farmers in Greece

Agriculture is a relevant sector for the Greek economy as it contributes 3.95% of Gross Value-Added (GVA) [26], ranking 9th among 64 sectors. Furthermore, it employs 3.93% of the total workforce [27] in Greece, ranking 7th. Therefore, agriculture is a significant industry for the Greek economy that provides primary inputs for other sectors such as Food & Beverage and can play a vital role in young people's employment.

Although the proportion of labour force in agriculture is continually decreasing, it remains high in Greece compared to the EU-28. More specifically, while 4.4% of the total labour force in the EU-28 is employed in agriculture, the corresponding percentage of Greeks stood at 11% in 2015 [28]. Interestingly, more detailed survey data show that the percentage of the farm managers aged over 55 years old in Greece exceeds 55% of the total, while young farm managers aged <35 years old reach less than 6% of the total farmers. However, it should be noted that the last two programming periods of new entrants' policy after 2000, as well as the early retirement, yielded satisfactory results [29].

The National Census of 2011 [30] reported 2.260.401 people between 20-40 years old available for work and eligible for the Young Farmers scheme; of these, 57% were male and 43% female. Almost ten years later, their population is more or less the same but younger people face unemployment threats. Despite the fact that 53% of people 20-44 have completed middle education and 34% have a University degree and above [31], the national average unemployment rate in 2019 was 17.3%. Younger groups report higher rates ranging from 12.6% for people 30-44 to 22.8% for 25-29 people and a record 32.7% unemployment rate for people aged 20-24. To this extent, Measure 6.1 can stimulate entrepreneurship, generate jobs and provide income for unemployed, deprived social groups.

Nonetheless, Agriculture is a source-intensive sector and generates greenhouse gases [32] such as nitrous oxide and methane. The impact of N₂O on climate change is approximately 298 times more potent than Carbon dioxide (CO₂) and Agriculture is the main generator (use of nitrates fertilisers), accounting for 78.2% of the total N₂O emissions in 2017. Methane (CH₄) is the second-largest emission factor and is approximately 25 times more potent than Carbon dioxide (CO₂). The main sources of methane emissions are Agriculture, mainly Livestock, and Waste management, accounting for 45.2% of the total CH₄ emissions in 2017.

Regarding Measure 6.1, the official EU policy documents define as "young farmer" a farmer under 35 years of age and as a "new entrant" someone who intends to break into farming. According to [33], a new entrant to agriculture is a person or organization who acquires farmland for the first time through succession, purchase, or contractual agreement. Young farmers registered in the past as agricultural entrepreneurs cannot be regarded as "new entrants" [34]. "New farmers" could be defined as a group that includes young farmers (under 35 or 40 years old) who are also new entrants in agriculture. In the current programming period 2014-2020, beneficiaries of the new entrants' scheme must be less than 40 years old, must be the head of an agricultural holding for the first time and should also have occupational skills for submitting and implementing a business plan for the development of their farming activity [29].

The scarce presence of young farmers is considered one of the main weak points in European agriculture competitiveness. The lack of young farmers puts at risk the sector's survival due to an inadequate rate of generational turnover in the sector [35]. New farmers can bring new skills and energy, as well as more professional management, to the farming sector. Against the context of an ageing agricultural labour force, the future of the farming profession must be ensured [36]. Young farmers – and new entrants to farming – are needed to take over and modernize rural activities and businesses. The CAP, specifically Rural Development Policy, can create an enabling environment for the current and the next generations of farmers. It provides the key that can help

unlock the access to finance, land, and knowledge that the new generations require when setting up their businesses.

2 Information required for the completion of the AGRICORE Project use cases

2.1 Information needed to assign values to agent attributes

To build any use case, regardless of the selected geographical or economic scale, it will be necessary to generate a population of agents that will constitute the simulation objects. This population of agents will represent a certain real target population, delimited by its spatial and/or demographic and/or economic and/or productive characteristics. In the case of AGRICORE, instead of constructing the agents as exact copies of real individuals (farms), the approach adopted is based on a process of synthetic population generation (SPG) of agents. This synthetic population is a population with: i) as many agents as individuals in the real population; ii) the value of the attributes of each synthetic agent does not coincide with those of any of the real individuals; iii) but the probability distribution of each attribute among the global synthetic population coincides with the respective probability distribution of the same attribute among the real global population.

Therefore, in order to build a synthetic population that mimics a real population corresponding to a generic use case, it is necessary to have individual and aggregated information of the real target population for each and every one of the attributes that make up the structure of the agent. Thus, the more available characteristics (attributes) and the larger the available sample size of the data, the better the mimic will be.

This structure is one of the main decisions when building an ABM. The selection of some attributes (and the consequent exclusion of others) will be determined by the minimum set of them that allow the simulation of the state of the individual throughout the time. As one central part of the simulation consist of mimicking the production planning done by each farmer (normally at the beginning of each agricultural season), the selected attributes must be at least those required to solve the optimization problem associated with operational planning.

On the mathematic level, this turns into that the attributes to be considered will be those that are included (or influence indirectly) in the equations that govern the dynamics of the exploitation's agent model, as well as the objective function of such exploitation. The determination of these equations is part of work package 3, dedicated to modelling, and is outside the scope of this deliverable. However, [Table 1](#) summarizes the attributes that have been selected for the complete definition of each agent, categorized according to their typology with respect to the model (inputs, outputs, states, disturbances, or parameters).

From a practical point of view, the data must be retrieved in a matrix format, where each column refers to an attribute and each row refers to a farmer. Two types of available data exist, either continuous or categorical measurements, e.g., production expressed in kilos/tons and returns expressed in euros are continuous measurements, while gender and type of crop (organic or conventional) are categorical.

The next step is to detect the statistically significant associations among the attributes and the direction of these relationships. The latter information is crucial to generate the synthetic population because the values of the agents are generated attribute by attribute in the specific order mandated by the direction of those relationships.

Table 1. Attributes of the objects which define each agent (Source: own elaboration).

Objects	Farm holding	Farm owner	Farm manager	Parcel	Crop	Livestock	Products	Economic financial module
Parameters	Number of owners	Age, gender, innovativity, risk aversion	Age, gender, innovativity, risk aversion	Coordinates, area, allowed uses Soil properties: number of layers, layer thickness, max. bulk density, clay, sand, silt, organic carbon	Age, type, cultivation standards	Type, breeding standards	Type	(re)investment propensity, size synergies, rate of interest, tax rates, WD_{min}
States	Economic size, structure, mechanisation level, regular workforce	-	-	Use Soil properties: vol. water content, bulk density, nitrate, erosion	Biomass level	Livestock units	Stocks	Assets, liabilities, equity
Agromanagement decisions	Workforce management, contracted machinery	-	-	Buy land, Sell land Rent land Lease land Soil properties: total amount of manure, ammonia amount, nitrate amount	Planting depth, residual harvest fraction, yield loss fraction, agrochemicals, mean tillage depth, transplanting, pruning, irrigation type, irrigation volume	Purchase livestock, sell livestock, breed livestock, slaughter livestock	Production level	Investment, loans, withdrawals
Disturbances	-	-	-	Land price Soil properties: meteorological conditions	Plagues, meteorological conditions	Unexpected deaths, meteorological conditions	Sale prices	Subsidies, taxes, input costs
Outputs	Socio-economic input, ecosystem services, environment impact	-	-	Rent	Yield	Yield	Revenue	Cash flow profit/loss balance sheet

2.2 Information on the process for the implementation of the respective policies for each use case

2.2.1 Use Case #1: Andalusia

2.2.1.1 Official Regulations: Reform 2013-2020

European regulation:

- Regulation UE 1305-2013. Relative to support rural development through The European Agricultural Fund for Rural Development [\[37\]](#).
- Regulation UE 1306-2013. Relative to funding, management and monitoring of the Common Agricultural Policy (CAP) [\[38\]](#).
- Regulation UE-1307-2013. Relative to establishing applicable regulation to the farmers' direct payments considering that support systems into the CAP [\[39\]](#).
- Regulation UE 1308-2013. Relative to founding the common market organization of the agricultural products [\[40\]](#).

Apply Spanish regulations:

- Royal Decree 1075/2014, 19 December. Relative to the application after 2015 of the direct payments to the agriculture, livestock and other sectors from grant, just as the management and monitoring of the direct and rural development payments [\[41\]](#).
- National Framework for Rural Development.

Apply Andalusian regulations:

- Regulation (CE) n° 834/2007 of the Council, 28 June 2007, on organic production and labelling of organic products [\[42\]](#).

This regulation provides the basis for the sustainable development of organic production methods while guaranteeing the effective functioning of the internal market, ensuring fair competition, the protection of consumer interests and consumer confidence. The regulation establishes common objectives and principles to underpin the rules it lays down concerning:

1. All stages of production, preparation and distribution of organic products and their controls
2. The use of indicators in labelling and advertising referring to organic production

Baseline.

Aid under Measure 11: Organic farming will only be granted for commitments that go impose higher requirements than the following mandatory standards:

1. Cross compliance.
2. Relevant minimum criteria and activities established in accordance with which, the maintenance of an agricultural area in a state suitable for grazing or cultivation without any preparatory action going beyond usual agricultural methods and machinery on the basis of criteria to be set by the Member States, based on a framework established by the Commission, and the carrying out of a minimum activity defined by the Member States, on agricultural areas naturally maintained in a state suitable for grazing or cultivation (Article 4(1)(ii) and (iii) of Regulation 1307/2013 on direct payments).
3. Minimum requirements for the use of fertilisers and plant protection products as well as other relevant mandatory requirements laid down in national legislation.

Since the establishment of Measure 11, several calls have been followed in order to request the corresponding agricultural subsidies.

2015 subsidies call [\[43\]](#)

1. In the application to participate in the regulated aid scheme, payment for the first year was requested at the same time as the application for the aid.
2. The total budget allocation for operations for Measure 11: Organic Farming (including the 5 years of commitment) was:
 - a. M11.1.2. Conversion to organic olive orchards: 14.458.104,00 €
 - b. M11.2.2. Maintenance of organic farming in olive orchards: 57.832.416,00 €

2018 subsidies call [\[44\]](#)

1. The call for subsidies for Measure 11 for Operation 11.2.2. (Maintenance of organic farming practices and methods in olive orchards) was launched in 2018 with a total budget allocation (including the 5 years of commitment): 6.000.000,00 €.

2020 subsidies call [\[45\]](#)

1. Extend by one year the period of commitment of aid for the following operations under Measure 11: Organic Farming:
 - a. M11.1.2. Conversion to organic olive orchards: 3.614.218,00 €
 - b. M11.2.2. Maintenance of organic farming in olive orchards: 9.344.682,00 €

2021 subsidies call [\[46\]](#)

1. Extend for a second year the period of commitment of aid for the following operations under Measure 11: Organic farming
 - a. M11.1.2. Conversion to organic olive orchards: 3.614.218,00 €
 - b. M11.2.2. Maintenance of organic farming in olive orchards: 9.344.682,00 €

The Rural Development Programme for Andalusia 2014-2020 (RDP) includes support for organic production under Measure 11: Organic farming, focusing on promoting environmentally friendly production systems. This aid supports a general system of agricultural management and food production that combines the best environmental practices and production in line with society's demand for products obtained from natural substances and processes.

Moreover, this measure supports both the conversion or transition from non-organic to organic production systems and the continuation in this production system of those organic operators who have chosen to produce quality products covered by Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products.

To this end, the following objectives provide an answer to the main problems of organic production in Andalusia:

1. Restoring, preserving and improving biodiversity (including Natura 2000 areas and areas with natural or other specific constraints), high nature value farming systems, as well as the condition of the European landscape
2. Improving water management, including fertiliser and pesticide management
3. Preventing soil erosion and improving soil management

2.2.1.1.1 Operations eligible under Measure 11 affecting the Andalusian Use Case, olive growing.

The operations subsidised under Measure 11 are Operation 11.1.2: Conversion to organic olive orchard practices, and Operation 11.2.2: Maintenance of organic farming practices and methods in olive orchards. Both contemplate actions in olive orchards and are programmed under the focus area 4A. The requirements that the olive farmers must meet to be beneficiaries of the subsidy, payments and commitments are described below.

Requirements of the beneficiaries.

1. Beneficiaries of aid under Measure 11 may be natural or legal persons, joint ventures or civil companies, who submit an application for aid or participation in the aid scheme for a given operation, and who are prepared to contract expressly and for the established period of five years. However, once this initial period has expired, annual extensions may be approved, up to a maximum of two years. The applicant olive farmers must meet the following requirements.
 - a. Be an active farmer.
 - b. Be the owner of the agricultural holding for which you are applying.
 - c. Be a natural or legal person, registered as an operator in the Information System on Organic Production in Andalusia (SIPEA) through an inspection body authorised for organic production in Andalusia under Regulation (EC) No 834/2007.
 - d. The agricultural holding for which aid is requested must be registered in the register of agricultural and forestry holdings in Andalusia established for this purpose.
 - e. The agricultural holding for which aid is requested must be registered in SIPEA through an authorised inspection body for organic production in Andalusia. In addition, its production system must comply with the rules laid down in Council Regulation (EC) No 834/2007.
 - f. Meet the conditions of eligibility described in [Annex 4-A](#).
2. Not have any debts of any other income under public law of the Andalusian Regional Government in the enforcement period.
3. Under no circumstances may associations that are subject to the grounds for prohibition obtain the status of beneficiaries of subsidies. Neither may associations whose administrative registration procedure has been suspended due to reasonable indications of criminal illegality be considered as beneficiaries.
4. Similarly, those foundations that have not complied with the obligation to present their accounts to the Protectorate within the established period may not receive subsidies or public aid from the Andalusian Regional Government Administration.

Units involved (only those affecting olive cultivation are represented)

1. Holders whose applications for aid or participation in the aid scheme for one of the planned operations are approved shall have their units committed, on which they must make the obligations concerned during the commitment period. For olive cultivation, the units committed for each operation shall be the hectares corresponding to the determined area of cultivation. In this case, any variety of olive tree may be committed.
2. Where the units committed relate to area, this is defined and fixed at the beginning of the commitment based on the SIGPAC references identified in the aid application or the aid

scheme, and may not be amended or replaced by other areas with the same or similar agronomic characteristics during the period of the commitment. This committed area will be delimited by means of a layer or cover generated from the graphic delimitation submitted with the aid application. It will only be possible to change its name through cadastral or SIGPAC changes.

3. SIGPAC enclosures owned by operators who have had their certification withdrawn by their control body are not eligible.
4. Units that have an existing commitment will not be eligible for a new application for aid or participation in the aid scheme for the same operation until they have completed five years of the multiannual commitment in order to avoid double financing.

Maximum financed amounts

1. Holders, whose applications for aid or participation in the aid scheme for the operations regulated in this Order are estimated, are determined a maximum financed amount to which they may apply each year. This amount is calculated by multiplying the units committed by the established unit amounts.
2. For reasons of economy of scale, the following criteria of degressivity shall be applied for the calculation of the maximum eligible amount corresponding to the application for aid ([Table 2](#)):

Table 2. Degressivity criteria according to strata (Source: based on [\[12\]](#)).

Area strata (ha)	Crop group (olive orchards)	% Amount Degressivity
Stratum 1	≤ 40 ha	100 %
Stratum 2	> 40 y ≤ 80 ha	60 %
Stratum 3	> 80 ha	30 %

If the budget available for a given call for applications does not allow all the applications submitted to be estimated, the order of priority for the granting of aid will be by premium instalments, as follows:

1. The determined eligible area of the cluster to which 100% of the premium corresponds (Stratum 1)
2. The determined eligible area of the cluster to which 60% of the premium corresponds (Stratum 2)
3. The determined eligible area of the cluster to which 30% of the premium corresponds (Stratum 3)

In the event that there is no budget available to cover the payment of aid for all the applications included in a given stratum, the selection of applications from that stratum will be made in accordance with the selection criteria set out in [Annex 4-B](#).

3. For conversion operations, the conversion premiums described in [Annex 4-D](#) shall apply. These conversion premiums shall apply to committed units that have not exceeded the crop's conversion years in question. In the case of conversion to organic olive-growing practices, the conversion period is three years. The number of years in which the amount of the conversion premium will be applied will depend on the years the enclosure is registered in SIPEA. Once the conversion period is over, the remaining years to complete the commitment period will be paid through the same operation, with the maintenance premiums. In the event of a change in the production orientation of the organic farm during the maintenance period, it is considered eligible if a reduction of the corresponding premium or its maintenance, in case of the change could have a favourable effect, are assumed.

Conversion and adaptation of commitments

1. The conversion of a commitment into another one may be authorised during the implementation period, provided that the following conditions are met.
 - a. The conversion is of significant benefit to the environment or animal welfare.
 - b. The existing commitment is significantly strengthened.
 - c. The approved rural development programme includes the new commitments concerned.
2. Adaptation of commitments may be authorised during the period in which they are in force, provided that such adaptation is duly justified, considering the achievement of the original commitment's objectives. The adapted commitment shall be honoured by the recipient for the remaining period of the original commitment. Adjustments may also take the form of an extension of the duration of the commitment.
3. The decision on the procedures for conversion and adjustment of commitments shall be taken by the person in charge of the Directorate-General for Agricultural Funds and shall be adopted and published within a maximum of six months. After this period, the interested parties may consider that their requests have been rejected due to administrative silence.

Changes to commitments

1. If the beneficiary reduces the hectares initially committed during the commitment period, this reduction may not exceed 20% of those hectares. Furthermore, under no circumstances may the reduction result in a number of hectares below the minimum set (in the case of olive orchards, 1 ha). If the reduction exceeds the 20% limit, it is considered non-compliance and will lead to the loss of the multiannual aid and the reimbursement of the amounts received with interest for late payment.
2. A reduction of less than 20% in the number of hectares committed compared to the initial ones shall be considered as a minor change, and therefore, the modification shall be accepted without the recovery of the amounts received for the hectares reduced.
3. Changing from eligible crops to valid non-eligible crops (grasses or pasture associated with organic farming) is not considered a change in commitment.
4. The resolution of the procedures for conversion and adaptation of commitments shall be the responsibility of the head of the Directorate-General for Agricultural Funds and shall be adopted and published within a maximum period of six months. Once this period has expired, the interested parties may consider that their applications have been rejected due to administrative silence.

Force majeure and exceptional circumstances

1. When, for reasons of force majeure or exceptional circumstances, the acquired commitments cannot be continued, the beneficiary or his/her rightful claimant shall notify the Directorate-General for Agricultural Funds in writing, attaching the relevant evidence, within fifteen working days of the date on which the beneficiary or his/her rightful claimant is in a position to do so.
2. The corresponding payment shall be withdrawn proportionally for the years in which the case of force majeure or exceptional circumstance occurred. The withdrawal shall concern only those parts of the commitment for which the additional costs or loss of profit did not occur before the force majeure or exceptional circumstance occurred.
3. No withdrawal shall be made regarding eligibility and other obligations, nor shall any administrative penalties be imposed.

Transfer of commitments

1. If, during the period of commitment, the beneficiary transfers all or part of his/her holding to a third party, the commitments made may be made by that person, subrogating him/her as the beneficiary for the remaining part of that period, or may lapse, without requiring any reimbursement for the period during which the commitment was effective.
2. Persons interested in acquiring the original holder's commitments shall submit a request for subrogation, together with the corresponding application for payment, within the period laid down for the submission of the Single Application. Once the subrogation has been authorised, the new holder of the file shall be notified, and the previous holder and the commitments made from the time of transfer of the holding shall be considered fully effective. However, where the transfer of the holding to a third party, in whole or in part, is not proven, the transferee beneficiary will continue to honour his commitments.
3. In the case of a partial transfer, a transfer module shall be established consisting of an average amount per unit committed, which was determined for the transferor taking into account all the payment groups and the degressivity applied in determining the maximum eligible amount. This transfer module should be considered, for both the transferor and the transferee, in determining the maximum eligible amount for each of them. In the event of successive transfers by the transferee, the following shall be taken into account:
 - a. If the transferee is new to the scheme, the maximum amount, committed units and average transfer amount for each year of the commitment period shall be those obtained after subrogation.
 - b. If the transferee is already in the scheme, his maximum amount shall be that resulting from subrogation plus those already committed and his average transfer amount for each year of the commitment period shall be calculated as the weighted average of the transfer amounts already allocated to him and the transfer amounts obtained after subrogation.
4. If, as a consequence of the holder's death, one or several files are affected by several heirs due to the participation of the inheritance, partial subrogations may be admitted in favour of each of them. It may be done provided that this condition is accredited and after demonstrating the compliance with the eligibility conditions corresponding to the operation for which subrogation is requested and the settlement with the Regional Treasury of the Inheritance and Gift Tax. Likewise, in cases where the subrogation occurs by lease or assignment, the contracts must be liquidated before the Regional Treasury Department for the Tax on Asset Transfers and Documented Legal Acts.
5. The resolution of the procedures of conversion and adaptation of commitments will correspond to the holder of the Directorate General of Agricultural Funds and will be adopted and published within a maximum period of 6 months. Once this period has expired, the interested parties may consider that their applications have been rejected due to administrative silence.

Call and procedure for approving applications for aid or participation in the aid scheme

1. Aid shall be granted on a competitive basis in accordance with the assessment criteria described in [Annex 4-B](#), and the aid that has obtained the highest assessment under the aforementioned criteria shall be awarded within the limit established in accordance with the available credit. Anyone who is excluded from the list of those admitted because they do not obtain sufficient points to be provisionally eligible, provided that they meet the requirements, will be placed on a list of alternates. Exceptionally, if the credit allocated in the call for applications is sufficient, it will not be necessary to establish an order of priority among the applications submitted that meet the specified requirements. For this purpose, the overall

amount per application for aid for the commitment period (5 years) is calculated by multiplying the maximum eligible amount determined above by 5.

2. Once the application for participation in the regulated aid scheme has been approved, beneficiaries must submit annual payment applications.

Payment requests

1. Applicants who obtain a favourable decision to participate in the aid scheme must submit an application for payment during each year in the defined commitment periods.
2. For each year, the calculation of the amount of the payment shall be made considering the result of applying the following factors.
 - a. The units declared in the payment application, which correspond to those committed in respect of the aid application.
 - b. The unit amounts of the premiums set out in [Annex 4-D](#) according to the declared eligible crop groups and taking into account the criteria for degressivity. In any case, the amount of payment shall be limited by the maximum eligible amount determined.
3. If a person who has obtained a favourable decision to participate in the aid scheme does not submit an application for payment during any year of the commitment period, he/she shall not be entitled to the payment of that year. However, the units committed shall be subject to administrative and on-the-spot checks under the Integrated Administration and Control System, and checks for verification of eligibility and commitments.
4. Failure to submit such an application for two years of commitment shall result in the loss of the aid. The beneficiary shall be required to repay the amounts received, plus default interest, as provided for in the case of grants, and shall be excluded from the programme for the operation or operations for which the corresponding payment request has not been submitted.

Administrative and on-the-ground inspections of the application for aid and payment.

1. Applications for aid or participation in the aid and payment scheme shall be subject to administrative and on-the-ground checks to verify compliance with the requirements and eligibility conditions.
2. Payment applications shall be subject to the administrative and on-the-ground checks necessary to verify compliance with the commitments set out in [Annex 4-A](#) for each operation.
3. An on-the-ground inspection plan shall be drawn up by the Directorate-General for Agricultural Funds, identifying the applications to be checked based on a risk analysis and their representativeness.
4. If, as a result of the checks carried out, irregularities are detected, they must be referred to with the documentation and justification deemed appropriate.

Annex 4-A

Eligibility Conditions and Commitments to be fulfilled during the whole commitment period

OPERATION 11.1.2. Conversion to organic olive orchard practices

Eligibility conditions: To have a minimum area of olive orchard eligible for the aid of 1.00 ha.

Commitments: the units committed must be certified in organic production as laid down in Regulation (EC) No 834/2007 and Regulation (EC) No 889/2008, thus laying down detailed rules for the application of Council Regulation (EC) No 834/2007, during the commitment period.

OPERATION 11.2.2. Maintenance of organic farming practices and methods in olive orchards

Eligibility conditions: Possession of a minimum eligible olive orchard area of 1.00 ha.

Commitments: the units committed must be certified in organic production as laid down in Regulation (EC) No 834/2007 and Regulation (EC) No 889/2008, thus laying down detailed rules for the application of Council Regulation (EC) No 834/2007, during the commitment period.

Annex 4-B

Selection Criteria

The selection criteria for establishing the order of preference for OPERATION 11.1.2 and 11.2.2 are as follows.

1. Percentage of the area determined in Natura 2000 Network. Those holders of holdings with a determined area in Natura 2000 areas will obtain the following score:
 - a. If the area of the holding in Natura 2000 Network is more than 50%: 3 points plus the percentage value of the area in Natura 2000 Network compared to the total holding area expressed as a decimal.
 - b. If the area of the holding in Natura 2000 Network does not exceed 50%: 1 point plus the percentage value of the area determined in Natura 2000 Network compared to the total holding area expressed as a decimal.
2. Percentage of the area identified in RAMSAR (Convention on Wetlands of International Importance, especially as Waterfowl Habitat) areas. Farmers with a determined area within RAMSAR areas will receive the following score:
 - a. If the area in RAMSAR zones exceeds 50%: 3 points plus the percentage value of the area in RAMSAR zones compared to the total holding area expressed as a decimal.
 - b. If the area in RAMSAR zones does not exceed 50%: 1 point plus the percentage value of the area in RAMSAR zones compared to the total holding area expressed as a decimal.
3. Percentage of the area determined in nitrate vulnerable zones. Operators with a determined area within nitrate vulnerable zones will be awarded the following score:
 - a. If the area of the farm in nitrate vulnerable zones exceeds 50%: 3 points plus the percentage value of the area in a nitrate vulnerable zone over the total holding area expressed as a decimal.
 - b. If the area of the farm in nitrate vulnerable zones does not exceed 50%: 1 point plus the percentage value of the area in zones vulnerable to nitrate pollution over the total holding area expressed as a decimal.
4. Average slope of the exploitation (calculated as the weighted average slope of all the enclosures that make it up).
 - a. More than 20% average slope: 3 points
 - b. Between 8% and 20% average slope: 2 points.
 - c. Up to 8% average slope: 1 point.

Annex 4-C

Crops and varieties eligible for operations under Measure 11 Organic farming

For operations 11.1.2 and 11.2.2 (Conversion to olive orchard practices and Maintenance of organic olive orchard practices and methods, respectively) the cultivation time can be either non-irrigated or irrigated and, any variety can be considered for support.

Annex 4-D

Unit amounts of premiums for operations under Measure 11 Organic farming

Operations 11.1.2. Conversion to organic olive orchard practices: 297,48 €/ha.

Operations 11.2.2. Maintenance of organic farming practices and methods in olive orchards: 247,90 €/ha

The inclusion and maintenance of olive agricultural holdings in the Andalusian Organic System require a strict and thoughtful process of certification. Despite the fact that this procedure will not be mimicked nor simulated by AGRICORE, all the details of the certification procedure are explained in the Appendix A.

2.2.2 Use Case #2: Poland

Among many RDP actions, the implementation of RDP 2014-2020 Agri-Environmental-Climate-Action in the framework of M10 measure obtained the 4th largest amount of money among all of the 17 different actions financed from the RDP budget with a quota of 1366,7 million EUR ([Figure 2](#)) [\[47\]](#)[\[48\]](#).

The number of farms being beneficiaries of the M10 action on average is 99,891 [\[49\]](#), which is 14,00% compared to the total number of market farms (746,000) [\[50\]](#), and 7,01 % compared to all farms in Poland (1,400,000) [\[51\]](#).

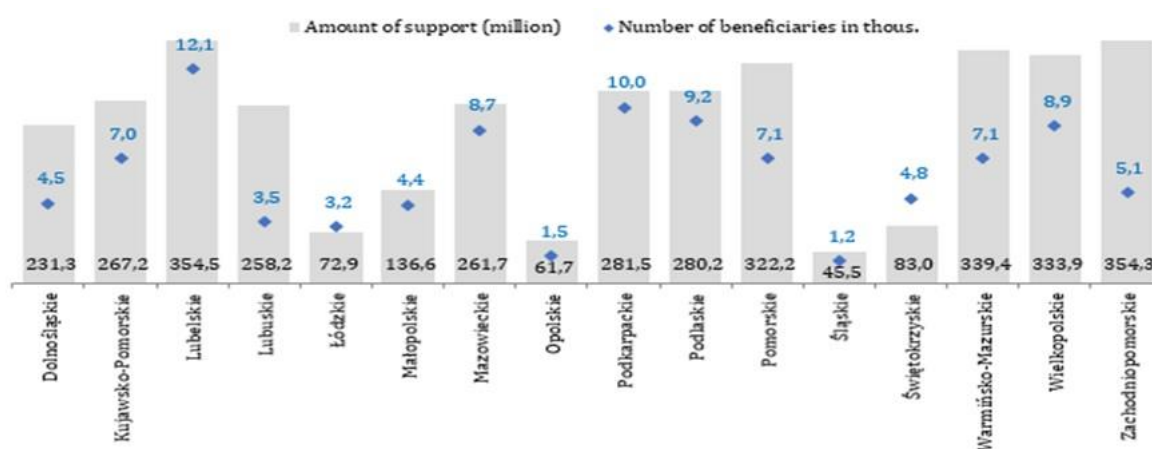


Figure 2. The amount of support including advance payments (in PLN million) and the number of beneficiaries (in thousands) Agri-Environmental-Climate measures by voivodeships cumulatively as of 31/21/2019 (Source: based on [\[49\]](#)).

[Figure 2](#) suggests that the absorption of the funds on M10 action could be much greater in Poland and the spatial differentiation of the number of beneficiaries and the amount of support is of great importance. Analysed policies resulted in specific legal regulations and requirements described below.

2.2.2.1 Legal regulations

Body of Implementation: Ministry of Agriculture and Rural Development and Ministry of Environment

The legal status of the respective policies for the Polish Use Case is described with the mentioned below acts:

- Rural Development Plan for 2004-2006, announced M.P. of 2004, No. 56, item 958, designed to flexibly Act of 28 November 2003 on Support for Rural Development from the Guarantee Section of the European Agricultural Guidance and Guarantee Agricultural, Journal of Laws No. 229, item 2273 with amendments, act derogated.
- The scope of the obligations arising from ZDPR specified in Annex F to the Plan and in the form of normative in Appendix 1 of Regulation of 14 April 2004 on Detailed Conditions and Procedures for Granting Financial Aid to Support Agricultural Activities in Areas Favored Covered by the Rural Development Plan, Journal of Laws No. 73, item 657.
- Text of 2013, Journal of Laws, item 1232 with amendments.
- Act of 13 April 2007 on the Prevention of Environmental Damage and its Repair, cons. text 2014 Journal of Laws, item 210.
- Act of 3 October 2008, on Access to Information on the Environment and its Protection, Public Participation in Environmental Protection and Environmental Impact Assessment, cons. text. 2013, Journal of Laws, item 1235, with amendments.
- Act of 18 July 2001 Water Law, cons. text Journal of Laws of 2012, item 145. Cons. text of 2013, Journal of Laws, item 1205. Act of 14 December 2012 on Waste, Journal of Laws of 2013, item 21.
- Act of 10 July 2007 on Fertilisers and Fertilisation, Journal of Laws No. 147, item 1033, with amendments. 24 Act of 8 March 2013 on Plant Protection Products, Journal of Laws of 2013, item 455.
- Act of 16 April 2004 on Nature Conservation, cons. text Journal of Laws of 2013, item 627.
- Act of 28 September 1991 on Forests, cons. text in 2011, Journal of Laws No. 12, item 59, with amendments.
- Act of 26 January 2007 on Payments under Direct Support Schemes, cons. text Journal of Laws of 2012, item 1164, with amendments.
- Ministry of Agriculture and Rural Development Regulation of 11 March 2010 on Minimum Standards, Journal of Laws No. 39, item 211, with amendments.
- Act of 7 March 2007 on Support for Rural Development with the Participation of the European Agricultural Fund for Rural Development, cons. text Journal of Laws of 2013, item 173.
- Ministry of Agriculture and Rural Development Regulation of 19 March 2009 on the Specific Conditions and Procedures for Granting Financial Assistance under the measure "Afforestation of Agricultural Land and Afforestation of Non-Agricultural Land" under the Rural Development Programme for 2007-2013, Journal of Laws No. 48, item 390, with amendments.
- Ministry of Agriculture and Rural Development Regulation of 13 March 2013 on the Detailed Conditions and Procedures for Granting Financial Assistance under the Measure "Agri-environmental program" under the Rural Development Programme 2007-2013, Journal of Laws of 2013, item 361. 32.
- Act of 26 June 2009 on Organic Farming, Journal of Laws No. 116, item 975.
- Minister of Environment Regulation of 23 December 2002 Concerning the Criteria for Designation of Waters Vulnerable to Pollution from Nitrogen Compounds from Agricultural Sources, Journal of Laws No. 241, item 2093.
- Minister of Environment Regulation of 23 December 2002 on Detailed Requirements to be met by the Programs of Measures Designed to Restrict the Outflow of Nitrogen from Agricultural Sources, Journal of Laws of 2003, No. 4, item 44.

- Ministry of Agriculture and Rural Development Regulation of 16 April 2008 on the Detailed Method of Application of Fertilisers and Conduct Training on their Use, Journal of Laws No. 80, item 479. 56 ECJ judgment of 29 April 1999 on C-293/97, judgment given in a preliminary ruling: High Court of Justice (England & Wales), Queen's Bench Division - United Kingdom, ECR 1999/4/I-02603. 57 ECJ judgment of 2 October 2003, C-322/00, Commission v. Kingdom of the Netherlands, ECR 2003/10A/I11267.

2.2.2.1.1 Ministry of Environment regulations

The Agency for Restructuring and Modernisation of Agriculture (ARMA) annual report is a base for the analysis and evaluation of Agri-Climate-Agricultural policies. On the basis of this report, responsible Ministries can evaluate the effectiveness of those policies. Irregularities in the fulfilment of commitments by farmers as a result of their participation in agri-climate-environmental programs belong to factors reducing the effectiveness of the policy pursued [\[49\]](#). Farmers receiving direct support, except for farmers participating in the small farmers' scheme, are subject to cross-compliance checks. Beneficiaries receiving direct payments must maintain all agricultural land, including land that is no longer used for production purposes, in good agricultural condition.

The most common irregularities were surface area irregularities and irregularities related to the implementation of the agri-environment-climate commitments. In terms of the area control of agricultural plots, the following were the most often stated:

- Increase or reduction of the scope of the field of development
- Differences between the area declared by the beneficiary and the area found during the control
- Identification of the boundaries of an agricultural parcel based on GIS data
- The values of the external circuit were used to calculate the measurement tolerance
- Extension of the boundaries of crops beyond those of the reference plot(s) declared in the application

As part of the agri-environment-climatic requirements, the following irregularities were stated.

- The farmer has an incomplete/non-compliant agri-environmental activity plan with regard to the agricultural plots located on specific registration plots and specific variants or packages implemented on them, according to the information provided in the application and attachments.
- The farmer has an incomplete/inconsistent agri-environmental activity plan with regard to the outline of the farm with the information provided in the application and attachments:
 - In the case of package 4 and 5, with marked signs of individual plots on which packages or variants are to be, and elements of agricultural landscape not used for agriculture, forming nature refuges, occurring in the field.
 - With an indication of the places on the agricultural plot where individual trees of the varieties listed in [Annex 4](#) of the Regulation or varieties traditionally grown in the territory of the Republic of Poland before 1950 are planted - in the case of package 3.
 - With a marked part of the agricultural parcel to be left unmown in individual years.
- Not leaving the area unmown on the agricultural plot
- Not sowing catch crops by the 15th of September
- Conversion of economically occurring permanent grasslands and permanent pastures in Art. 4 lit. h of Regulation No 1307/2013

- The farmer's possession of an incomplete / non-compliant agri-environmental activity plan, our products and appendices regarding the list of courses under which the farmer or the manager meets agri-environment-climatic conditions
- Not sowing as catch crop a mixture of at least 3 plants

2.2.2.1.2 Requirements of 5 packages within M10.1 action, being a base for commitments to be made by beneficiaries

2.2.2.1.2.1 Brief overview of M10.1 Agri-environment-climate commitments

The essence of the action is to promote practices contributing to sustainable land management (to protect soil, water and climate) [\[52\]\[53\]](#), and protect valuable natural habitats and endangered species of birds, genetic resources of crops and farm animals, as well as protect landscape diversity [\[54\]\[55\]](#).

The action is part of the EU and national strategic legal framework. It was planned as one of the components implementing strategic EU and national environmental goals, taking into account the significant economic and social importance of agriculture. It is essential due to the context of the growing demand for agricultural raw materials and the still high importance of agricultural activity for employment and territorial development in Poland [\[56\]](#).

The measure considers the diversity of Polish agriculture [\[57\]](#), which is characterised by two tracks. Traditional, extensive farming, which is particularly important for the preservation of naturally valuable areas, is accompanied by a tendency to intensify production, especially in areas with a favourable agricultural structure. It was taken into account by distinguishing nature packages targeted at Natura 2000 areas and beyond (Packages 4 and 5) [\[58\]](#) and packages addressed mainly to intensive production farms (Packages 1 and 2). Three separate Packages (3, 6 and 7 respectively) serve to maintain traditional orchards, varieties of fruit trees and genetic resources of plants and animals.

In M10.1, farmers have a wide selection of 5 packages to choose from the 23 variants. Each beneficiary of the Action is obliged to comply with the following requirements [\[59\]](#):

- Have an agri-environmental activity plan.
- Keep a register of agri-environmental activities.
- Not transform existing permanent grassland on the farm.
- Keep on the farm elements agricultural landscape not used in agriculture, which are the mainstay of nature.

Under sub-measure (10.1) payments under agri-environmental-climate commitments, aid will be granted for the following types of operations (packages):

1. Sustainable agriculture
2. Soil and water protection
3. Preservation of orchards with traditional varieties of fruit trees
4. Valuable habitats and endangered species of birds in Natura 2000 areas
5. Valuable habitats outside Natura 2000 areas

The support under the measure may be used by [\[59\]](#):

- Farmer conducting agricultural activity on a farm located in Poland; under the concept "farmer" means a natural or legal person, or a group of natural or legal persons, irrespective of the legal status of such group and its members.

- Land manager - an entity (natural person, legal person, group of natural or legal persons) farming in natural areas, i.e., non-agricultural land, on which there are certain types of natural habitats or bird nesting habitats.
- Group of farmers or group of farmers and land managers.

Packages under the agri-environmental-climatic measure are mostly a continuation of the packages implemented under the agri-environmental program RDP 2007 -2013. However, with the experience of implementing the agri-environmental program, they have undergone some modifications. Organic farming in the financial perspective 2014-2020 is functioning in Poland as two independent actions (M11), which is different from the previous one within RDP 2007-2013, where organic farming was one of the packages of the agri-environmental program.

2.2.2.1.2.2 M10.1 Requirements

Requirements that must be met under Package 1. Sustainable agriculture:

- Obligation to have an agri-environmental activity plan
- Obligation to maintain all permanent grasslands and landscape elements not used for agriculture, constituting wild nature refuges
- The use of a minimum of 4 crops in the main crop per year on the farm, including the share of the main crop and the total of cereals in the sown structure, may not exceed 65% and the percentage of each crop may not be less than 10%
- Double chemical soil analysis (pH, P, K, Mg and organic carbon) - performed in the first (or preceding) and fifth (or preceding) year of the package implementation
- Obligation to develop and follow a fertiliser plan annually, based on a nitrogen balance and chemical soil analysis, specifying the doses of N, P, K, Mg and the need for liming
- In order to obtain a positive balance of organic matter on an agricultural plot application of:
 - A minimum of 3 crop groups in rotation within the 5-year commitment
 - Use of catch crops (sown by the 1st of October, with a ban on resuming agrotechnical treatments before the 15th of February) at the latest in the 4th year of the commitment period, in two different years
 - Using catch crops (as above) or ploughing in straw or ploughing in manure
- Mowing or grazing on permanent grassland
- Use of sewage sludge is prohibited

Payment rate: PLN 400 / ha (approx. 90 EUR).

The agri-environmental-climate payment is granted only to arable land in the amount of

- 100% of the basic rate - for an area from 0.10 ha to 50 ha.
- 75% of the basic rate - for an area above 50 ha up to 100 ha.
- 60% of the basic rate - for an area of more than 100 ha.

Requirements to be met under Package 2. Soil and water protection:

- Obligation to have an agri-environmental activity plan
- Obligation to maintain all permanent grasslands and landscape elements not used for agriculture, constituting refuges of wild nature
- Sowing intercrop crops by the 15th of September

- Prohibition of resuming agrotechnical operations before the 1st of March
- Using as catch crops only a mixture composed of at least 3 plant species, the dominant plant species in the mixture or the cereal species used in the mixture must not exceed 70% of its composition; Prohibition of using a mixture consisting exclusively of different types of cereals
- Prohibition of fertilisation
- Prohibition of using pesticides and herbicides in catch crops
- Prohibition of using sewage sludge
- Ploughing of the biomass of the catch crop, excluding soil cultivation in a no-plough system
- Prohibition of cultivating a mixture of the same plants in the main crop (in the case of winter catch crops, also spring forms)

Payment rate: PLN 650 (approx. 145 EUR)/ha (applies to catch crops).

Payment rate: PLN 450 (approx. 100 EUR)/ha (applies to protection strips on the slopes with a slope above 20%).

The agri-environment-climate payment is granted in the amount of (only arable land)

- 100% of the basic rate - for an area from 0.10 ha to 50 ha.
- 75% of the basic rate - for an area above 50 ha up to 100 ha.
- 60% of the basic rate - for an area of more than 100 ha.

Requirements that must be met under Package 3. Preservation of orchards with traditional varieties of fruit trees:

- Obligation to have an agri-environmental activity plan
- Obligation to maintain all permanent grasslands and landscape elements not used for agriculture, constituting refuges of wild nature
- Obligation to maintain an orchard of traditional varieties of fruit trees, including at least 12 trees, propagated on vigorously growing rootstocks and kept as tall-stemmed trees, from the age of 15, representing not less than 4 varieties or species spaced not less than 4 x 6 m apart not larger than 10 x 10 m, and at the same time the number of these trees per 1 ha of the orchard area is not less than 90
- Minimum height of the tree trunk of 1.20 m
- Prohibition of using herbicides
- Obligation to perform basic nursing treatments in the orchard, i.e.:
 - Shaping and sanitary pruning of trees and thinning of thickened tree crowns
 - Removal of roots and self-seeding
 - Whitewashing trunks of older trees and preventing the trunks of young trees against being gnawed by rodents and hares
- Mowing and removing grass or grazing

Payment rate: PLN 1964 (approx. 440 EUR)/ha (only orchards).

The agri-environment-climate payment is granted in full, regardless of the area covered by support.

Requirements that must be met under Package 4. Valuable habitats and endangered species of birds in Natura 2000 areas:

- Obligation to have an agri-environmental activity plan
- Obligation to have documentation regarding nature prepared by an expert of nature (exception: extensive use in SPAs); SPAs - areas of special bird protection
- Obligation to preserve all permanent grasslands and landscape elements not used for agricultural purposes, constituting refuges of wild nature
- In the area covered by Package 4 it is prohibited:
 - Ploughing, rolling, application of sewage sludge, application of undersown and mechanical destruction of soil structure
 - Drifting in the period:
 - From 1st of April to 1st of September in lowland areas (up to 300 m above sea level).
 - From 15th of April to 1st of September in upland and mountain areas (over 300 m above sea level).
 - Applying plant protection products except for selective and local destruction of nuisance invasive species with the use of appropriate equipment (e.g. weed wipers)
 - Creating new, expanding and restoring the existing drainage systems, except for the construction of devices aimed at adjusting the water level using the existing drainage systems to the habitat requirements of the species/habitats being protected in the package, if such activities are described in detail by an expert of nature in the nature documentation
 - Storing biomass among clusters of trees and shrubs, in ditches, ravines and other depressions of the area (located on the plots declared in the application)

The payment rate depends on

- The extensive use on SPA: PLN 600 (approx. 135 EUR)/ha.
- The occurrence of bird species, i.e.: black-tailed godwit (as well as common snipe, redshank, lapwing): PLN 890 (approx. 200 EUR)/ha, aquatic warblers: PLN 1199 (approx. 270 EUR)/ha, great snipe (and curlew): PLN 1070 (approx. 240 EUR)/ha, corncrake: PLN 642 (approx. 140 EUR)/ha and
- The habitat type: variable damp meadows: PLN 1276 (approx. 285 EUR)/ha, Cnidion floodplain meadows and halophytic habitats: PLN 1043 (approx. 230 EUR)/ha, grasslands: PLN 1300 (approx. 290 EUR)/ha, semi-natural wet meadows: PLN 911 (approx. 204 EUR)/ha, semi-natural fresh meadows: PLN 1083 (approx. 243 EUR)/ha, peatlands: PLN 600 (approx. 135 EUR)/ha (mandatory requirements) or PLN 1206 (approx. 230 EUR)/ha (mandatory and supplementary requirements).

Requirements that must be met under Package 5. Valuable habitats outside Natura 2000 areas:

- Obligation to have an agri-environmental activity plan
- Obligation to have documentation regarding nature prepared by an expert of nature
- Obligation to maintain all permanent grasslands and landscape elements not used for agriculture, constituting refuges of wild nature
- In the area covered by Package 5, it is prohibited:

- Ploughing, rolling, application of sewage sludge, application of undersown and mechanical destruction of soil structure
- Drifting in the period:
 - From 1st of April to 1st of September in lowland areas (up to 300 m above sea level).
 - From 15th of April to 1st of September in upland and mountain areas (over 300 m above sea level).
- Using plant protection products, except for the selective and local destruction of nuisance invasive species with the use of appropriate equipment (e.g. weed wipers)
- Creating new, expanding and restoring the existing drainage systems, except for the construction of devices aimed at adjusting the water level using the existing drainage systems to the habitat requirements of the species/habitats being protected in the package, if such activities will be described in detail by a natural expert in the nature documentation
- Storing biomass among clumps of trees and shrubs, in ditches, ravines and other depressions (located on the plots declared in the application)

The payment rate depends on the type of habitat: variable wet meadows: PLN 1276 (approx. 285 EUR)/ha, Cnidion floodplain meadows and halophytic habitats: PLN 1043 (approx. 233 EUR)/ha, grasslands: PLN 1300 (approx. 290 EUR)/ha, semi-natural wet meadows: PLN 911 (approx. 204 EUR)/ha, semi-natural fresh meadows: PLN 1083 (approx. 242 EUR)/ha, peat bogs: PLN 600 (approx. 135 EUR)/ha (mandatory requirements) or PLN 1206 (approx. 270 EUR)/ha (mandatory and supplementary requirements).

The agri-environmental-climate payment is granted in the amount of

- 100% of the basic rate - for an area from 0.10 ha to 50 ha.
- 75% of the basic rate - for an area of more than 50 ha up to 100 ha.
- 60% of the basic rate - for an area of more than 100 ha.

The results of carrying out these policies were described below.

Information on the process of the M10.1 implementation in Poland

- Six application campaigns had been carried out, by the end of 2019 (RDP PL 2014-2020) [\[49\]](#):
 - From the 15th of March to the 10th of July 2015 - (Campaign 2015)
 - From the 15th of March to the 1st of July 2016 - (Campaign 2016)
 - From the 15th of March to the 26th of June 2017 - (Campaign 2017)
 - From the 15th of March to the 10th of July 2018 - (Campaign 2018)
 - From the 15th of March to the 25th of June 2019 - (Campaign 2019)
 - 2020 - ?
- The number of farms being beneficiary of M10 is 99,891.
- Share of M10 beneficiaries is:
 - 14,00% compared to total market farms [\[50\]](#).
 - 7,01 % compared to all farms [\[51\]](#).
- The number of beneficiaries of M10 is 99,891 producers (IX 2020).

- 22,472 producers who have not previously applied for support under the RDP 2007–2013 M10 program participate in the agri-environment-climate measure implemented under RDP 2014–2020 (XII 2019).
- The largest payments made concerned:
 - Package 4. Valuable habitats and endangered species of birds in the Natura 2000 areas of the RDP 2014-2020 and Package 5. Protection of endangered bird species and natural habitats in the Natura 2000 areas of the RDP 2007–2013 - PLN 1,016.9 million (31.8% of all final payments).
 - Package 5. Valuable habitats outside Natura 2000 areas of RDP 2014–2020 and Package 4. Protection of endangered bird species and natural habitats outside Natura 2000 areas (RDP 2007–2013) - PLN 795.9 million (24.9%).
 - Package 1. Sustainable agriculture RDP 2014–2020 and RDP 2007–2013 - PLN 759.4 million (23.8%).

2.2.3 Use Case #3: Greece

2.2.3.1 European legislation of Measure 6.1: Business start-up aid for young farmers – Regulations

Although the proportion of labour force in agriculture is continually decreasing, it remains high in Greece compared to the EU-28. More specifically, while 4.4% of the total labour force in the EU-28 is employed in the sector of agriculture, the corresponding percentage of Greeks stood at 11% in 2015 [28]. Interestingly, more detailed survey data show that the percentage of farm managers aged over 55 years old in Greece exceeds 55% of the total, while young farm managers aged <35 years old reach less than 6% of the total farmers. However, it should be noted that the last two programming periods of new entrants' policy after 2000 and early retirement yielded satisfactory results [29].

The scarce presence of young farmers is considered one of the main weak points in European agriculture competitiveness. The lack of young farmers puts at risk the sector's survival, due to an inadequate generational turnover rate in the sector [35]. New farmers can bring new skills and energy, as well as more professional management, to the farming sector. Against the context of an ageing agricultural labour force, the future of the farming profession must be ensured [36]. Young farmers – and new entrants to farming – are needed to take over and modernize rural activities and businesses. The CAP and Rural Development Policy in particular, can create an enabling environment for the current and the next generations of farmers. It provides the key that can unlock the access to finance, land, and knowledge that the new generations require when setting up their businesses.

The official EU policy documents define as “young farmer” a farmer under 35 years of age and as a “new entrant” someone who intends to break into farming. According [33], a new entrant to farming is a person or organization who acquires farmland for the first time through succession, purchase, or contractual agreement. Young farmers registered in the past as agricultural entrepreneurs cannot be regarded as “new entrants” [34]. “New farmers” could be defined as a group that includes young farmers (under 35 or 40 years old) who are also new entrants in agriculture. In the current programming period 2014-2020, beneficiaries of the new entrants' scheme must be less than 40 years old, must be the head of an agricultural holding for the first time and should also have occupational skills for submitting and implementing a business plan for the development of their farming activity [29].

From the beginning of the 1980s, the European Parliament had realised the need for a financial support system for young people willing to initiate agricultural activities. This support system's main purpose was to cover the considerable costs required in the first stage of establishment. In

this context, a series of chain regulations have been adopted to support the rural population's renewal and to create viable agricultural holdings by the new farmers [\[60\]](#).

From 1985 until now, a series of chain regulations has been adopted, intending to support the renewal of the rural population and to create viable agricultural holdings by the new farmers. The list of the relevant regulations is the following:

1. Council Regulation (EC) No 797/85 of 12 March 1985, on improving the efficiency of agricultural structures [\[61\]](#).

According to the first regulation implementation, 720 young farmers were included in the new entrants' policy. According to the specific regulation, the conditions for involvement in the measure were that the beneficiaries should be less than 40 years old, the compulsory term in agriculture for 10 years and the mandatory attendance of professional seminars. The premium for the first establishment was 8.800 euros.

2. Council Regulation (EC) No 2328/91 of 15 July 1991, on improving the efficiency of agricultural structures [\[62\]](#).

The main difference from the previous regulation is the increase in the first establishment's premium, which is formed at 11.000 euros. This fact led to a rise in the number of beneficiaries. More specifically, during the implementation of the second regulation (2328/91), a total of 5129 young farmers were included in the policy of new entrants.

3. Council Regulation (EC) No 950/97 of 20 May 1997, on improving the efficiency of agricultural structures [\[63\]](#).

In this regulation, the subsidy for the first establishment is formed at 13.000 euros. According to the specific regulation implementation, 7655 young farmers were included in the new entrants' policy. Moreover, the implementation of the new entrant's policy in the majority of Member-States of the EU did not have the desired outcomes before Regulation 1257/1999. The scope of attracting young people to the agricultural sector was not achieved and the results of the first regulations have been evaluated as poor (Tsiomidou, 2006 in Chatzitheodoridis and Kontogeorgos, 2020)[\[60\]](#).

4. Council Regulation (EC) No 1257/1999 of 17 May 1999, on support for rural development from the European Agricultural Guidance and Guarantee Fund (EAGGF) and amending and repealing certain regulations [\[64\]](#).

In Greece, the regulation 1257 of 1999, implemented under the RDP 2000-2006 in the 3rd Community Support Framework period, resulted in a total of 39.447 young farmers beneficiaries of Measure 3.1 and thus, it was evaluated as the most successful to date. In this regulation, the subsidy for the first establishment is formed at 25.000 euros. The regulations that followed 1257/1999 were improved in the sense of supporting young farmers, aiming to become more attractive than the previous ones. Changes made in the regulations, including the significant increase in the premium for the first establishment (from 8.800 to 40.000 euros in the 2007-2013 programming period), the reduction of employment farm units and the possibility of providing to young farmers for parallel non-agricultural employment.

5. Council Regulation (EC) No 1698/2005 of 20 September 2005, on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) [\[65\]](#).

Of equal importance to the previous regulation, it is characterised the Regulation 1698/2005 that followed in the RDP 2007-2013 and covered a smaller number of young farmers (19.128) in the measure 1.1.2 (Setting up of young farmers). In this measure, the subsidy for the first establishment was ranged from 20.000 to 40.000 euros.

6. Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 December 2013 [\[66\]](#), on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005.

The EU, in the current programming period (2014-2020), through the CAP, supports the new entrants to surpass both economic and market barriers to enter farming. The implementation of Regulation 1305/2013, specifically the sub-measure 6.1 of the RDP 2014-2020, which concerns the new farmers, is one of the most widespread measures trying to support young people entering agriculture [\[66\]](#). The eligibility criteria for the measure are: 1) Potential beneficiaries must not have owned a farm in the past. 2) Standard output of at least €8,000 and that does not exceed €100,000. 3) Young farmers must have their permanent residence in the area where the farm is located. 4) Business plan to be implemented in a period not shorter than three and no longer than four years. It is worth to mention that after 2007 and until now (Regulation 1305/2013), young farmers were forced to submit an initial business plan with specific goals. In the last part of the business plan, there was a set of targets related to the increase of the primary sector competitiveness and the prospect of new farmers as farming entrepreneurs, which was proved to be relatively difficult to achieve. This fact led to a reduction in the number of new farmers (12.000 beneficiaries) in comparison with the 2000-2006 period [\[67\]](#).

7. Regulation (EU) No 1307/2013 of the European Parliament and of the Council of 17 December 2013 [\[68\]](#) establishing rules for direct payments to farmers under support schemes within the framework of the Common Agricultural Policy and repealing Council Regulation (EC) No 637/2008 and Council Regulation (EC) No 73/2009.

In the frame of sub-measure 6.1, apart from the various conditions and commitments concerning the beneficiary and the holding, the “active farmer” status was added for the first time. According to this addition, which is described in article 9 of Regulation 1307/2013, the new farmer must be active for at least 18 months from the first installation date [\[29\]](#). An active farmer is considered a farmer who received the previous year a total amount of direct payments up to € 5.000. Similarly, to the previous Regulation, in 1307/2013, the new farmers are obliged to submit an original business plan with an implementation horizon of 5 years, to create a sustainable agricultural holding adapted to national and community requirements. According to the Regulation of European Commission 1307/2013, new farmers entering the primary sector since 2015 can receive an additional payment from Pillar I, which complemented the start-up aid under Pillar II. For this purpose, in addition to the basic grants, 2% of the national ceiling for direct payments is granted to new farmers in the form of annual area payments.

2.2.3.2 Young Farmers Scheme of the Greek Rural Development Program (2000-2020)

The implementation of the Rural Programme of Greece has difficulties in on-time delivery. The Young Farmers Scheme expands in three separate periods according to the CAP timespan. The first period of implementation was 2000-2006 under the Third Support Framework of the European Union. The Ministry of Agricultural Development and Food is responsible for the implementation of the Scheme in conjunction with regional authorities. Below are presented the key requirements for persons/ legal entities to be eligible for the Young Farmers Measure in Greece as they are currently running (period 2016-2020).

2.2.3.2.1 Eligibility requirements to apply for the Young Farmers Measure in Greece

- For persons
 1. Permanent resident of the rural area for which the application is submitted
 2. Legal capacity and be of age 18-40
- For legal entities
 1. The head of the holding is a young farmer as in the criteria above.

2. The head has a 51% share of the legal entity.
 3. The headquarters of the entity is in the same region as the permanent residence of the head.
 4. The entity reports agriculture as its main economic activity (according to tax data)
- Be the first establishment of the person or the head of the entity.
 - Be registered to the Integrated system of Management and Control (IACS) of the Ministry.
 - Be registered as professional farmers or new entrant farmers in the respective Registry.
 - Have a different occupation other than agriculture the last 5 years prior to application for the call.
 - Become professional farmers within 18 months since accession to the Measure.
 - Have adequate skills (see [Annex 4-E](#)) or obtain them within 36 months since accession to the Measure. Middle education must be in geotechnical major to become eligible for the scheme and according to the business plan of the application. For those with University degree and above, no specialization is required.
 - Submit business plan (min.3 years-max.4 years) with economic goals and timelines.

Selected holdings must be small and very small enterprises (according to the European Commission, 2003) [\[69\]](#).

Lack of analytical archives, especially for the second period (2007-2013), allows only for cumulative assessment of the Young Farmers Scheme data. Below are presented the sum of applicants, accepted Young farmers and dropouts from the programme, as well as budgetary data and geographical distribution of entrants.

2.2.3.2.2 2000-2006 period: Measure 3.1[70]

The first period of implementation for the Young Farmers Scheme was 2000-2006 under Priority Pillar 3 of the Rural Programme of Greece: Improvement of Rural Population Age, specifically Measure 3.1: "Lump Sum Premium for First Installation". There were five calls for participation, and the budget had already been absorbed by 2005. Participation applications were 21.636, and the granted agreements were 16.291 of which 528 dropped out.

- Measure objective: The objective of the measure was to provide aid to encourage the establishment of young farmers on agricultural holdings.
- Financial identity [Table 3](#)

Table 3. Financial identity (Source: based on [\[70\]](#)).

Total Budget	€264.750.693	100%
Public funds	€264.750.693	100%
Private funds	0	0%

- Summary of financial implementation [Table 4](#)

Table 4. Summary of financial implementation (Source: based on [\[70\]](#)).

Entrants	€354.293.611	134%
Legal Commitments	€337.072.427	127%
Payments	€255.352.446	96%

- Geographical distribution of Young Farmers: Greece is composed of 13 Regions at NUTS-2 level. The Region of Central Macedonia (19.5%) had the most admissions during the first period of implementation; the Regions of Crete (14%) and Western Greece (13%) followed with the most entries into the Scheme.

2.2.3.2.3 2007-2013 period: Measure 112 [71]

The second period of implementation for the Young Farmers Scheme was 2007-2013 under Priority Pillar 1 of the Rural Programme of Greece: Competitiveness And Modernisation Of Production And Distribution Of Agricultural Products, specifically Measure 112: "Young Farmers Establishment". The first call was in 2009, and the second exceeded the implementation period and took place in 2014. Total applications accounted for 19.246 and the accepted participants were 18.681. Central Macedonia (26%), Crete (14%) and Western Greece (11%) were the Regions with the most admissions into the Scheme.

The ex-post evaluation of the 2007-2013 implementation period reports that Measure 112 worked synergistically with Measure 121: "Modernisation of agricultural holdings" as 24.7% of the accepted Young Farmers were admitted into the M121, too.

- Measure objective: The measure aimed to improve the farms' overall performance through investment support.
- Financial identity [Table 5](#)

Table 5. Financial identity (Source: based on [71]).

Total Budget	€383.000.000	100%
Public funds	€383.000.000	100%
Private funds	0	0%

- Summary of financial implementation [Table 6](#)

Table 6. Summary of financial implementation (Source: based on [71]).

Entrants	€ 333.663.000	87%
Legal Commitments	€ 299.535.000	78%
Payments	€ 284.700.000	74%

- Geographical distribution of Young Farmers: In the second period of implementation, the Region of Central Macedonia (26%) had the most admissions again, as was the case with the Regions of Crete (14%) and Western Greece (11%).

2.2.3.2.4 2014-2020 period: Measure 6.1 [72]

The third period of implementation for the Young Farmers Scheme is 2014-2020 under Focus Area 2B of the Rural Programme of Greece: Development of Agricultural Holdings and Businesses, specifically Measure 6.1: "Young Farmers establishment". The first call was in 2016 (8837/14-10-2016) and later amended in 2018 (5824/5-7-2018). Up to this day, 16.900 applications have been submitted, and 15.576 have received approval.

- Measure objective: The Young Farmers Aid Program aims to increase the competitiveness of agricultural holdings through age renewal and the creation of farmer entrepreneurs who, with the end of the support, will have adequate supplies and sustainable holdings.
- Financial identity [Table 7](#)

Table 7. Financial identity (Source: based on [72]).

Total Budget	€267.667.500	100%
Public funds	€267.667.500	100%
Private funds	0	0%

- Summary of financial implementation [Table 8](#)

Table 8. Summary of financial implementation (Source: based on [72]).

Entrants	€ 325.224.491	122%
Legal Commitments	€ 299.535.000	112%
Payments	€ 209.986.350	78,5%

- Geographical distribution of Young Farmers: Since the Scheme is still open, there are not available data regarding the geographical distribution of the new entrants.

Selection criteria

The criteria for the available financial aid to young farmers are gathered in [Table 9](#).

Table 9. Selection criteria for the available financial aid to young farmers (Source: based on [72]).

Criteria		Amount (€)
Type of activity	Crop	17.000
	Livestock	19.500
	Mixed	17.000
Added amount according to type of residence	Mountainous	2.500
	Disadvantaged	2.500
	Islands>3.000 population	2.500
	Other	0
Total aid per applicant	Min	17.000
	Max	22.000

2.2.3.3 Measure 1.1.3: Early Retirement of farmers and farmworkers

Another rural development measure that accompanied and complemented the setting up of young farmers is Measure 1.1.3: "Early Retirement of farmers and farm workers". The European Community (EC) took the initiative on farmer retirement in 1972 under Directive 72/160/EEC. The specific directive encouraged a pause in agricultural activity and the land use for structural improvements (Mattas, 2000 in Arabatzis, 2005) [73]. This required member states to implement measures to encourage farmers aged 55-65 to retire by providing a pension. Their land had to be made available, by sale or by lease for at least twelve years, to other farmers who would operate a development plan.

Regulation 1096/88 then followed, which was optional for member states and encouraged termination of activities for farm owners over 55 years of age (early retirement) and a move from agricultural use to livestock and forest use.

According to the next regulation (EEC 2079/92), the EU specified objectives of the early retirement aid as contributing to:

1. Providing an income for elderly farmers who decide to stop farming.
2. Encouraging the replacement of such elderly farmers by farmers able to improve the economic viability of the remaining agricultural holdings.
3. Assigning agricultural land to non-agricultural uses where it cannot be farmed under satisfactory conditions of viability.

The early retirement scheme was phased out as part of the 2013 CAP reform, and therefore, it cannot be found in the Regulations [74]. This measure was included in the Rural Development Policy for the period 2007-2013. As far as concerning Greece, the transferor had to be at least 55 years old but not yet of normal retirement age. Beneficiaries must have practised farming as the main occupation for the preceding ten years. Continuance of farming on 10 per cent of the land, but not more than 1ha, was allowed, provided that commercial production ceased utterly. The transferee had to have adequate agricultural skill and competence and practise farming as the main occupation for at least five years. In order to improve its economic viability, the size of the agricultural holding had to be increased a minimum of 10% during the first 3 years of implementation (since accession to the Measure).

Annex 4-E

Table 10. Skills required to join the Young Farmers Scheme in Greece (Source: [72]).

European Qualification Framework	Professional and Vocational Training	Higher Education
Level 3	Degree in professional specialization, education and Level 3 training (awarded to graduates of vocational training schools of Ministry of Rural Development and Food)	
Level 4	<ul style="list-style-type: none"> • Degree of Vocational High School (EPAL) Diploma • Degree of Professional Specialty, Education and Training (Equivalent to the High School Diploma), [It is granted to the graduates of the 3rd class of Vocational High School (EPAL) after in-school examinations] 	
Level 5	<ul style="list-style-type: none"> • Bachelor of Professional Specialty, Education and Training [Granted to apprentices in the apprenticeship class of EPAL, after certification] • Diploma of Professional Specialty, Education and Training [It is granted to I.E.K. graduates. after certification] • Higher School Diploma / Degree (Tertiary Higher Education and not University Education) 	
Level 6		Bachelor's degree (University)
Level 7		Master's degree
Level 8		PhD

2.3 Information on the impact assessment mechanisms envisaged for the policies addressed in each use case

2.3.1 Use Case #1: Andalusia

For the European Union, one of the basic operating principles of the Cohesion Policy is that of evaluation. In fact, the effectiveness of assistance from the Funds depends, among other factors, on the establishment of a reliable monitoring and evaluation system. Regulation (EC) No 1303/2013 laying down general common provisions on the various European funds, including the European Agricultural Fund for Rural Development (EAFRD), sets out the obligations to be fulfilled in this area.

Article 50 of this Regulation lays down the obligation for the Member States to submit to the Commission, from 2016 to 2023 inclusive, an annual report on the implementation of the programme in the previous financial year.

The evaluation reports contain the evaluation of the Andalusian RDP 2014/2020. They are carried out by the Evaluation Unit of the Directorate General of European Funds, together with the technical assistance offered by the team of external evaluators of the SAET consultants.

This evaluation aims to assess the effectiveness of the Programme and the progress in the achievements made, adapting the analysis to the needs and circumstances of the different focus areas and programmed measures.

There is no specific evaluation on the olive orchard sector, although there is information on it in the evaluations carried out by this Managing Authority in the Annual Implementation Reports of the RDP-A for 2017 and 2019, detailed below.

2.3.1.1 Evaluation Report of the Andalusian Rural Development Programme (RDP 2014/2020): Year 2017 [75].

This evaluation report is mainly developed in two areas of studies:

- Analysis of the situation in which the progress and situation of the Rural Development Programme referred to the period 2014-2016 is set out, specifically through the financial and physical execution through the resulting data up to 31 December 2016.
- Description of all the activities carried out or implemented in each of the Measures that make up the Programme to extract and analyse of the necessary information, which subsequently allows the evaluation questions to be answered and drawing the appropriate conclusions and recommendations.

The purpose of this report is as follows:

- Deepen the knowledge on the implementation of the RDP of Andalusia until the end of 2016, identifying the programmed operations on which it is necessary to improve or provide a greater effort to achieve the programmed results.
- Assess the RDP contribution towards the achievement of the Union's rural development objectives, framed in the priority axes and areas of interest, as set out in article 5 of EU Regulation 1305/2013.
- Verify the synergies of the actions being developed with the intervention logic of the programme.
- Draw conclusions and recommendations on the results observed, which will allow improving the implementation of the programme throughout the 2014-2020 period.

All the evaluation analysis is done through 21 evaluation questions, of which only 3 of them involve Measure 11: Organic production, which includes evaluations on the impact of the Andalusian organic olive sector. Specifically, these questions are:

To what extent have RDP interventions supported the restoration, preservation and enhancement of biodiversity, including in Natura 2000 areas, areas with natural and other specific constraints and high nature value farming systems, as well as the state of European landscapes?

The preservation and improvement of Andalusian ecosystems, high nature value farming systems and their landscapes are being addressed by a wide range of measures and operations of the Andalusian RDP. 75,099,259.79 € has been invested in this Focus Area, distributed in 9 operations, which has benefited 23,085 farms that have subscribed to the commitment to improve agricultural practices (2,091 contracts in agri-environmental measures).

In this context of poor implementation, in order to be able to answer this evaluation question and show the degree of progress of the programme, it has been decided to use the information generated by the qualitative analysis, thus making it possible to know the achievements, as well as to point out the first impacts as far as the preservation and improvement of ecosystems is concerned.

The conversion of conventional agricultural systems to organic production systems has aroused great interest among farmers. In the case of olive orchards, 16,660.84 ha have also begun to be converted to organic production on 1,247 farms (in 707 cases, the owners are men; in 361 cases, they are women; and in the remaining 179 cases, they respond to other forms of management and/or ownership of the farms).

The predominant productive orientation in the granting of these crop premiums is permanent crops. With regard to organic olive orchards, a further 2,726 holdings (1,487 male owners, 870 female owners, 369 others) maintain their certification on 42,165.82 ha; 32.5% of these holdings have more than 50% of their surface area protected under one of the Natura 2000 Network figures.

Finally, transitional expenditure files have been identified: these are actions that were carried out in the previous programming period and included as part of these operations, given that they impact on the theme of this Focus Area.

As conclusions in the organic olive orchard production system, it continues to grow, with 1,247 holdings starting the conversion, covering 16,660.84 ha, and 2,726 olive orchard holdings remaining in organic production, contributing to the conservation of plant and animal biodiversity.

To what extent have RDP interventions supported water management improvement, including the management of fertilisers and pesticides?

The Andalusian RDP has not programmed any operation that directly impacts the improvement of water management (Focus Area 4B); instead, other programmed operations have been identified that indirectly affect the status of water bodies. Among these, the promotion of organic farming (Action 11) is an action that can potentially have a greater impact on improving the use of fertilisers and pesticides on farms, which has repercussions on enhancing the quality of water bodies.

Therefore, operations 11.1.2 and 11.2.2.2 for the conversion and/or maintenance of organic farming practices in olive growing, among others, are involved in reducing diffuse pollution of water resources, the effects of which are described below.

On poor mountain soils with high slopes (over 20%), permanent crops are the only agricultural alternative. The cultivation of organic mountain olive orchards has also been the focus of agri-environmental aid (operation 10.1.12): on 1,971 holdings (1,054 male holders, 644 female

holders and 273 other holders), which means that on an area of 28,072.75 ha, a commitment is made to maintain (spontaneous) plant cover and organic certification, with the consequent positive impact on the state of the water bodies in the basin into which they flow, bearing in mind that this aid is aimed at holdings with average slopes of more than 20%.

Organic production systems (Measure 11) have a positive impact on the qualitative status of water bodies; both the conversion to this system and its maintenance contribute to reducing the use of synthetic phytosanitary chemical products. Through organic farming, all ecological processes occurring in the soil (nutrient cycling, natural pest control, maintenance of soil fertility, balance of organism populations, etc.) are strengthened and positively impact watercourses. In the case of olive orchards, 16,660.84 ha were also converted to organic production on 1,247 holdings (707 men, 361 women and 179 other legal forms). Regarding the maintenance of organic production, the commitment was made by 2,726 olive holdings (1,487 men, 870 women and 369 belonging to other legal forms).

In conclusion, they cannot determine the desired effect on water bodies. A longer time horizon is required, at which point it will be necessary to assess these bodies' evolution, especially those located in areas vulnerable to nitrate pollution. On the other hand, it should be noted that this aid has been well received by the sector, bearing in mind that it is a voluntary commitment by farmers to implement agricultural practices that are better aligned with the environment.

To what extent have RDP interventions supported the prevention of soil erosion and improved soil erosion management?

Erosion is a phenomenon that involves the loss of soil and also generates diffuse pollution effects in surface waters. In Andalusia, erosion has been diagnosed as an environmental risk caused, among other reasons, by agricultural activity.

The operations for the conversion and maintenance of organic production systems (Measure 11) also implicitly contribute to preserving and improving soil tics, as they aim to balance the ecosystem.

As of the evaluation date, some 58,826.66 ha are under olive orchards and are certified or in the process of being certified.

Measure 11 has a positive impact on the improvement of soil management, either as a consequence of the cultivation techniques and methods used in organic farming or of traditional farming practices in areas with limitations.

2.3.1.2 Evaluation Report on the Result of the Andalusian Rural Development Programme (RDP 2014/2020): Annuality 2019 [76].

In order to improve the visibility of the expected and unexpected, main and secondary, positive and negative effects of the Andalusian RDP 2014-2020, a reconstruction of the intervention logic has been carried out using the construction of the results chain.

As far as possible, and whenever the degree of maturity of the measures implemented or the availability of data has allowed it, the evaluation questions have been addressed following the guidelines provided by the European Commission in the guide "Evaluating the achievements and impacts of the RDPs in 2019", which have been extended with other methods to obtain results more in line with the measures implemented and for the triangulation of results.

With regard to the achievement of objectives, the results obtained from the evaluation process indicate that there has been a general improvement in the environmental and socio-economic goals of the supported farms and the environment in which they operate, although in some cases, these improvements cannot be observed at the regional level.

In particular, this report includes an assessment of progress in achieving the objectives of the programme and its contribution to the EU strategy for smart, sustainable and inclusive growth.

This assessment has considered the evolution of the context indicators, defined in the socio-economic, sectoral and environmental context.

This report aims to address the specific evaluation needs for the evaluation 2019 of the Andalusia RDP 2014-2020, showing the results obtained during the evaluation process carried out in terms of impact and outcome, using the evaluation questions set out in the common monitoring and evaluation system, as well as attributing, as far as possible, the results of the intervention.

Specifically, for the Andalusian Use Case that concerns us, we highlight 3 of the 30 evaluation questions established in the common monitoring and evaluation system, which correspond to the analysis and evaluation of the areas of interest 4A, 4B and 4C in which Measure 11: Organic farming is directly involved, including operations 11.1.2 and 11.2.2.

Up to 31 December 2018, support was provided to 43 beneficiaries incorporated into organic production quality schemes that are developed on a total area of 3,023.52 ha, 38% of which are located in Natura 2000 Network areas. This operation, which supports an environmentally friendly production method by introducing organic quality marks in rural areas, is complementary to Measure 11 (Organic production systems) and has been implemented by 30% of rural women, occupying a third of the area supported by the aid.

These operations have been implemented on 2,489 farms (for a total of 33,202.71 ha), maximising land use by planting vegetation covers that favour the system's self-regulation in combination with the development of organic production.

The number of olive orchard beneficiaries among organic producers is significant, with these farms accounting for 35% of the total number of beneficiaries.

Measure 11 has invested in the promotion of biodiversity and the maintenance of the landscape through a Total Public Expenditure of 140.5 million euros, supporting 5% of the region's farms and 11% of the regional agricultural area.

With regard to the profile of beneficiaries, approximately 20% of the beneficiary farms are owned by women, while the percentage of men reaches 40% of the total. The rest are different forms of legal entities.

The operations implemented under this measure are grouped into initiation into organic production and maintenance of organic production with specific operations for olive orchards 11.1.2 and 11.2.2. Specifically, the ratio of beneficiaries/holdings in measure 11.1.2 (initiation into organic olive orchards) was 1,190, and in measure 11.2.2 (maintenance of organic olive orchards), 2,684.

The distribution of beneficiaries at the operation level is particularly interesting when analysing this operation: 73% of the beneficiaries of Measure 11 are beneficiaries of maintenance of production systems, compared to 27% of the total who are starting in organic production.

In terms of subsidised area, Measure 11 has subsidised a total of 501,614 ha, benefiting 11,211 farms. The olive orchard area accounts for 12% of the total, with 25% of the total olive orchard area having undergone a change in the organic production system.

Measure 11, Organic farming is the main responsible for the promotion of these practices, with a very high uptake as commitments have been established in 11,211 farms from 2015 to 2018, almost 5% of the farms in the region. Of these, 2,990 farms have started the conversion period, and 8,211 farms have been encouraged to maintain their commitments.

Aid for organic production was announced in 2015, with no new announcements having been made. As a result, there has been no change in the area receiving aid, except for minor variations in the product of aid management or the farm system.

Although no change has been detected, it is important to note that the subsidised organic area corresponds to 51% of the certified organic area in Andalusia (both in conversion, the first year of practice and the area already certified as organic).

Although the percentage indicates the influence of the subsidy on half of the organic producers, it is possible to observe that in 2013 and 2014, years of transition and adaptation from one subsidy period to another, there is a hidden increase in the number of farms and surface area of organic products. However, in 2015 (the year in which these operations began), the area of organic production increased, exceeding that recorded in 2013 by 20%.

On the other hand, there are indirect contributions associated with Measure 1, including Operation 1.2.1, through which dissemination and demonstration activities are carried out specifically aimed at the olive sector, in the sense of improving the sustainability and competitiveness of the olive sector, reinforcing the aspects of quality, traceability and control, market functioning and risk management.

As mentioned in previous paragraphs, we highlight three issues from those analysed in the 2019 Andalusia RDP 2014-2020 progress report. The issues are the following:

Area of interest 4A: To what extent have RDP interventions supported the restoration, preservation and enhancement of biodiversity, including in Natura 2000 areas, areas with natural and other specific constraints and high nature value farming systems, as well as the state of European landscapes?

The Andalusian RDP 2014-2020 foresees to contribute directly to the objective related to the restoration, preservation and enhancement of biodiversity and the state of European landscapes over the whole period 2014-2020 with approximately 35% of the Total Public Expenditure.

One of the measures directly involved in the achievement of these objectives is Measure 11: Organic farming including the specific measures adopted for organic olive orchards (Operation 11.1.2 and 11.2.2.2).

43% of the Total Public Expenditure executed in Focus Area 4A according to the implemented actions belongs to Measure 11.

Three criteria of judgement were considered to conduct the evaluation of the results of this area of interest, reflecting the achievements derived from the execution of each of the operations that contribute to the objective, directly or indirectly.

a. Actions have maintained, preserved or restored biodiversity. The performance indicators for this criterion are based on:

- Amount spent on actions carried out
- Number of farms that have developed activities to enhance their natural value
- Number of actions in the network of cattle trails, greenways or similar
- Population affected the development of municipalities in rural areas, Natura 2000 Network areas, and other areas of great natural value
- Number of organic farms: maintenance and conversion
- Number of farms according to LFA (Less Favoured Areas) typology
- Number of management contracts supporting biodiversity and/or landscapes
- Number of activities to balance the functions performed by forests and provide ecosystem services

b. The area where actions supporting biodiversity are implemented has been maintained or increased. The outcome indicators for this criterion are based on:

- Area in organic: maintenance and conversion
- Area of farms where agricultural activity has been promoted or its abandonment has been prevented
- Area under beekeeping activity
- Area of forest restored
- Area of sustainable cropping systems
- Area of ecologically oriented mountain systems
- Forest area where activities have been carried out to balance the different functions performed by the forests and to provide ecosystem services

c. Capacities for the maintenance, preservation or restoration of biodiversity have been built. Outcome indicators for this criterion are based on:

- Number of hours of environmental training by type
- Number of participants in environmental training/demonstration and information/advice activities (gender and age)
- Number of activities in training/demonstration and information activities/environmental counselling
- Amount of training/demonstration and information activities/environmental advice
- % Activities/hours of training/training/environmental advice in relation to the total

Operations 10.1.11 and 10.1.12, aimed at promoting woody mountain crops, including olive orchards, seek to establish on-farm organic production systems that reduce diffuse pollution of agricultural systems and introduce better use of resources, thus contributing to the recovery and improvement of biodiversity. This is particularly important in mountain systems, characterised by poor soils and steep slopes, where it is also necessary to protect soils in particular from erosion and loss of organic matter by plant cover.

Among the objectives of these operations are some directly related to biodiversity and others linked to the agricultural systems in which they are developed that will have an indirect impact on it, such as those listed below, among others, (article 4 of the EU organic farming regulation 2018/848 of 30 May 2018).

- Contribute to environmental and climate protection.
- Maintain soil fertility in the long term.
- Contribute to a high degree of biodiversity.
- Promote short distribution channels and local production in the EU.
- Contribute to the development of the supply of plant genetic material adapted to organic farming's specific needs and objectives.
- Contribute to a high level of biodiversity, in particular through the use of diverse plant genetic material, such as heterogeneous organic material and organic varieties suitable for organic production.
- Promote the development of organic plant breeding activities in order to contribute to the beneficial economic prospects of the organic sector.

Through the fieldwork carried out for this evaluation, it can be observed that more than 60% of the beneficiaries consider that organic production promotes environmentally friendly agricultural practices and an improvement of the environment in general (and biodiversity in

particular), while 15% consider that the changes could be estimated as little or no perceptible change.

Another of the perceptions highlighted by the beneficiaries surveyed is that, after the implementation of organic production, there is a greater presence of agricultural birds and natural vegetation on their farms, a perception shared by 60% of the beneficiaries surveyed. This percentage increases to 89% when asked about the presence of hedges (and their maintenance), islands of natural vegetation or scattered trees. Therefore, the practices used in organic farming contribute to the biodiversity objectives set out in the Andalusia RDP 2014-2020 in a direct way.

The direct contributions of the Programme on sub-priority 4A are relevant both for the implemented level of public expenditure, 320.8 million euros, and for the wide range of measures programmed with direct impact on this sub-priority, which is indicative of the environmental character of the Programme.

Despite the fact that all the measures programmed for this sub-priority influence on biodiversity, it is important to highlight the influence of Organic Production (Measure 11), Agri-environment and Climate aid (Measure 10), whose financial weight is over 70%, and with a slightly lesser but equally relevant influence, aid for areas with natural limitations (Measure 13) and forestry aid (Measure 8).

Area of interest 4B. To what extent have RDP interventions supported the improvement of water management, including fertiliser and pesticide management?

The Andalusia RDP 2014-2020 does not directly contribute to the objective related to the improvement of water management and water quality. However, in the reconstruction of the intervention logic, links have been established between this sub-priority and some operations of Measure 10 (Agri-environment and climate) and Measure 11 (Organic farming).

In this sense, the programme plans to contribute to this objective by investing approximately 20% of the Total Public Expenditure programmed over the whole period 2014-2020 through the operations programmed in Sub-Priority 4B according to the intervention logic. Within these measures, Measure 11 is the one with the highest programmed expenditure to boost this objective, 56%.

Three judgement criteria were considered to conduct the evaluation of RDP results in relation to Sub-Priority 4B, reflecting the achievements derived from the implementation of each of the operations contributing to the objective either directly or indirectly.

a. The actions implemented have led to improved water management to improve or maintain conditions that contribute to water quality. The performance indicators used in this criterion are based on:

- Amount spent has led to improved water management to improve or maintain conditions that contribute to water quality
- Number of organic farms: maintenance and conversion
- Number of farms according to LFA typology
- Number of management contracts supporting improved water management

b. The area where actions have been taken to improve water management to improve or maintain conditions that contribute to water quality has been maintained or increased. The performance indicators used in this criterion are based on:

- Area under organic: maintenance and conversion
- Area under sustainable arable cropping systems
- Area of sustainable woody crop systems

- Area of ecologically oriented mountain systems

c. Capacities for improved water management have been developed. The outcome indicators used in this criterion are based on:

- Number of participants in training/demonstration and information activities/environmental advice (gender and age)
- Number of activities in training/demonstration and information activities/environmental advice (by gender and age)
- Amount of training/demonstration and information activities/environmental advice

The nature of the measures that aim to further the objective is very diverse, so the contributions are analysed separately. In this project, it is of interest to describe the contribution made by Measure 11 (Organic farming). In this case, Measure 11 is complementary to other operations that contribute directly to the water quality objective.

Through the fieldwork carried out, the beneficiaries' perception of the changes implemented in their farms' production systems through agri-environmental aid, either directly or indirectly, can be observed.

More than 85% of the beneficiaries consider that they have reduced the dose of organic fertilisers. However, slightly more than 50% consider that they have more information on soil, water and foliar analysis, so that they better adjust fertiliser doses to their needs. On the other hand, almost 50% of the beneficiaries have adopted new forms of pest control, such as biological pest control or the use of pheromone traps.

The actions promoted by the Programme aimed at improving water management, including the management of fertilisers and pesticides, have been allocated a significant economic effort both through operations with direct contributions (241 million euros) and operations with secondary contributions, exceeding 5 million euros.

If we consider the actions implemented over the past programming period, it is possible to see the impetus given to this objective more clearly. Thus, significant progress has been made in the promotion of sustainable systems in Measure 10 by supporting the implementation of organic farming practices (Measure 11), which is joined by other low-input practices from the previous programming period, such as integrated control of olive orchards.

Despite actions on large areas, low impact results have been obtained with respect to this objective. It should be borne in mind that beneficial changes in production systems affect large, heterogeneous and dispersed water bodies.

Area of interest 4C. To what extent have RDP interventions supported the soil erosion prevention and the improvement of soil erosion management?

Throughout the whole period 2014-2020, the RDP of Andalusia foresees to contribute directly to the objective related to the prevention of soil erosion and the improvement of its management with about 22% of the Total Public Expenditure through certain operations, including Measure 11. It is the measure programmed with the greatest economic weight to promote this objective with 47%.

Three criteria of judgement were considered to conduct the evaluation of the results of the RDP in relation to the 4C area of interest, reflecting the achievements derived from the implementation of each of the operations that contribute to the objective either directly or indirectly.

a. The actions implemented have led to improved land management. The performance indicators used in this criterion are based on:

- Number of management contracts to improve soil management and/or prevent soil erosion

- Number of farms that have developed activities to enhance their natural value

b. The actions carried out have prevented soil erosion. The performance indicators used in this criterion are based on:

- % Forest area protected by risk prevention actions
- Area under organic farming: maintenance and conversion
- Area of sustainable arable crop systems
- Area of sustainable woody crop systems
- Area of ecologically oriented mountain systems
- Livestock stocking density (number of heads, species and age)

c. Capacities for improved soil management have been developed. The performance indicators used in this criterion are based on:

- Number of participants in environmental training and advice
- Amount of training and environmental advice

Considering all the RDP measures that contribute mainly or secondarily to this Sub-Priority 4C, and the indications of the "GuideLines Assessing RDP achievement and Impacts in 2019", the effects of the operations of Measure 10 (Agri-environment and Climate) and Measure 11 (Organic Agriculture) have been analysed for the calculation of Indicator I13: Soil erosion by the action of water, as they have been considered to be the actions with the most significant potential impact.

To estimate the effect on the decrease in erosion rates of these measures, the RUSLE model has been used, as implemented by INE, of the Ministry of Agriculture, Fisheries and Food. The RUSLE model (Revised Universal Soil Loss Equation) makes it possible to estimate the losses caused in the soil based on the calculation of the different factors involved in the erosion process.

One of the objectives of organic production is to maintain the soil's fertility and biological activity, thereby reducing water erosion and improving the supply of organic matter to the soil. Therefore, activities such as selecting more adapted species, promoting biological diversity, appropriate and adapted design of rotations in composting, green manuring, mulching, and others are promoted.

The contribution of Measure 11 to the improvement of soil management is of great relevance both for the producers involved and for the importance of the set of practices involved, which in turn represents an important reference to the promotion of a product with differentiated quality of reference for Andalusia.

The fieldwork carried out for the evaluation showed that more than 55% of the beneficiaries consider that the agri-environmental aid has promoted environmental conservation, including soil management and quality as part of the concept.

On the other hand, almost 90% of the beneficiaries consider that as a result of the new practices associated with agri-environmental aid, there is a greater presence of natural vegetation; unploughed areas; spontaneous vegetation cover, which are closely related to the improvement of soil structure; the presence of organic matter; and erosion control.

The actions promoted under the Programme aimed at preventing soil erosion and improving soil erosion management have been allocated a financial effort of 289.1 million euros directly, representing approximately 50% of the total public expenditure paid during the programming period.

The operations with secondary impact associated with this sub-priority have accumulated a total public expenditure of 42.1 million euros.

Significant progress has been noted in several measures, in particular, the promotion of sound soil management through the application of organic farming practices has been promoted through measure 11.

To date, there are no further evaluation reports. They are expected to be released in the coming months.

2.3.2 Use Case #2: Poland

Information on the impact assessment mechanisms envisaged for the policies addressed in Polish Use Case express selected and described below indicators.

Among different indicators met in different source items, some were selected to characterise in a synthetic way with considering the impact of soil, water, air, biodiversity and farming level what allows assessing the effects of agro-climate-environmental policy [77]. A selection of indicators was made because the responsible Ministries official impact assessment plan could not have been obtained. The selected indicators are considered rational to analyse and assess current policies and set new directions for them.

2.3.2.1 Indicators that indirectly confirm ecosystem services (confirmation of the effects of M10.1 sub-measures).

Soil

With regard to soil quality, a decrease in the area of fallow land was observed in 2015-18, compared to 2014 (Table 11), whereas a constant level in 2014-18 of devastated and degraded land was noted (Table 12)[78][79][80][81].

Table 11. Fallow land area (Source: based on [78][79][80][81])

Year	Area (thousands of Ha)
2014	475.0
2015	134.1
2016	165.6
2017	150.4
2018	179.9

Table 12. Devastated and degraded land area (Source: based on [78][79][80][81]).

Year	Area (thousands of Ha)
2014	62.8
2015	63.4
2016	64.7
2017	62.0
2018	61.9

The share of very acidic and acidic soils

Soil pH is a limiting factor for the selection and size of plant crops. In 2017-18, it amounted to about 58% of the arable land, ranging from 30 to over 80% on the voivodeship scale. Poland is the only country in Europe where soil acidification is so large.

Water

Table 13. Water intake for needs of the national economy and population (Source: based on [78][79][80][81]).

Year	Water intake (hm ³)
2015	10502
2016	10581
2017	10080
2018	9886

The water consumption rate per capita (293 m³ per capita) places Poland in the middle of the EU countries' rate. In 2017, the highest water consumption was recorded in the Mazowieckie Voivodeship - over 26% of the country's total water consumption [78][79][80][81].

Quality of surface water

In 2017, 1159 **uniform water bodies (UWB)** were assessed as part of river diagnostic monitoring. A negligible number of UWB achieved a favourable situation, just 7 UWBs, while 1155 UWBs were in bad condition. In 2018, 1472 UWBs were rated correctly, 9 and 1463 in good and bad conditions, respectively.

In 2017, 860 of the lake UWBs were also assessed. The conditions of 126 (15%) lakes were evaluated as good and 734 as bad (85%). In 2018, it was rated 885 UWBs, 119 and 766 in good and bad conditions, respectively. The most commonly observed problem is the poor trophic condition of lake waters and their eutrophication.

Uniform water bodies (**UWB**) mean their separate and significant element: a lake, a reservoir, a stream, a river or canal, a part of a stream, river or canal, transitional waters or a strip of coastal waters, as well as dam reservoirs.

On the national scale, there was a trend of a decrease of approx. 5% in water consumption for the needs of the national economy and population in 2017-18, compared to 2015-16 (Table 13). The quality of water supplied for consumption remained high and increased from 98.2 to 99.1% (Table 14) [78][79][80][81].

Table 14. Quality of water supplied for consumption (in % of meeting the requirements) (Source: based on [78][79][80][81]).

Year	%
2015	98.2
2016	98.5
2017	98.8
2018	99.1

Air

Table 15. Aggregate emissions of greenhouse gases expressed in carbon dioxide equivalent (Source: based on [79][80][81]).

Year	Aggregate emissions (mln)
Base year (for Poland 1988)	577
2015	390
2016	399
2017	414

The total national emissions of greenhouse gases in 2015-17 decreased by approx. 30% compared to the base year (1988 for Poland) [79][80][81].

Climate change indicators

Based on our own measurements and studies, in central Poland - the main area of agricultural production - a tendency of air temperature increase in winter by 0.44°C/10 years (Figure 3) and a tendency of air temperature increase in the growing season by 0.24°C/10 years were shown (Figure 4). However, no increase in the frequency of atmospheric droughts was found, which occurred with a frequency of 20-27% in the analysed 30-year climate normal of 1991-2020, depending on the critical period for a given group of crops (Figure 5).

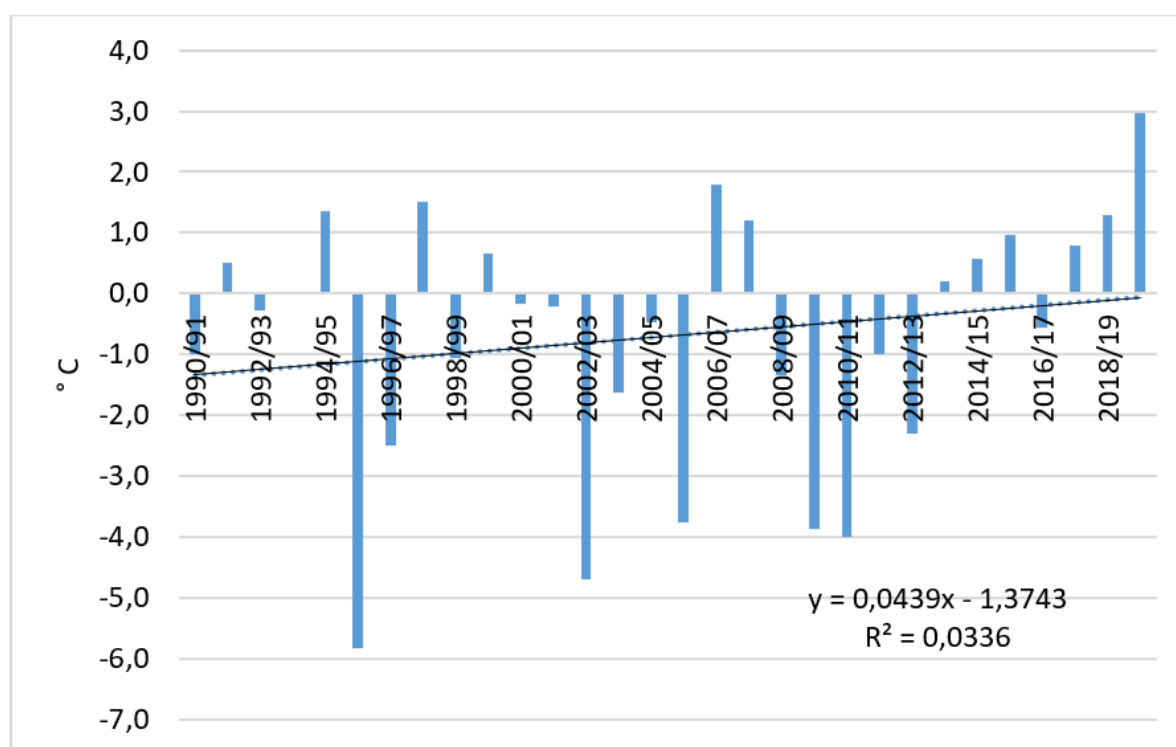


Figure 3. Air temperature increase indicator in winter in central Poland in 1991-2020
(Source: UTP Bydgoszcz own study)

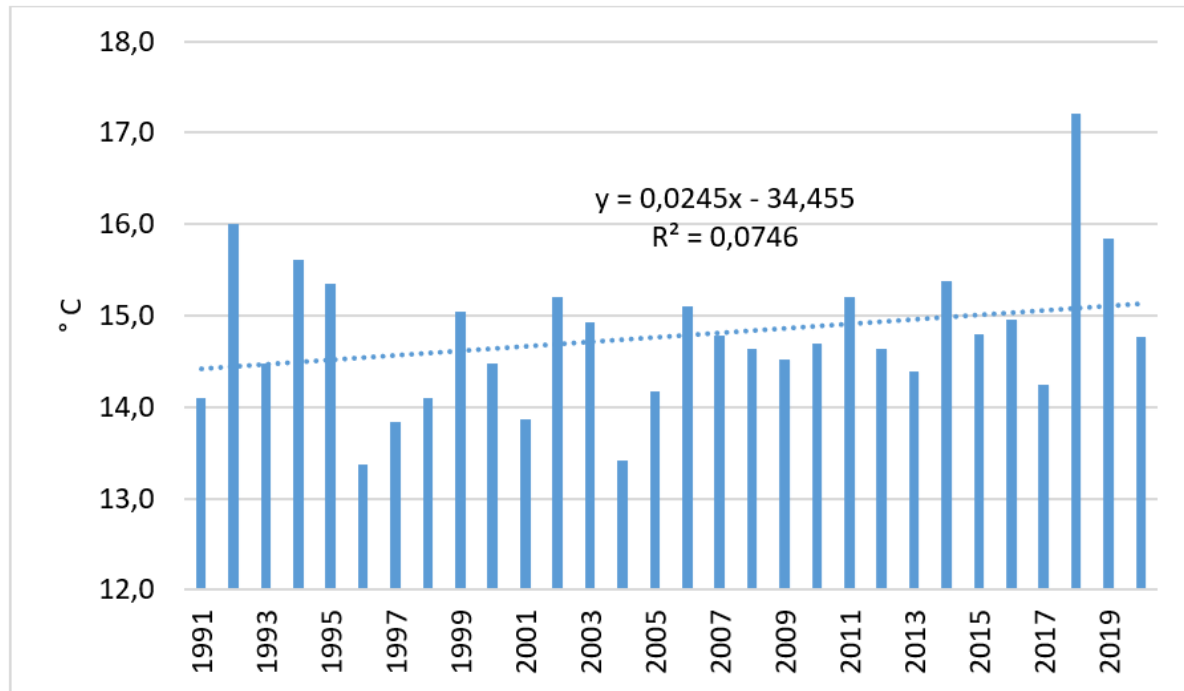


Figure 4. Indicator of air temperature increase during the growing season in central Poland in 1991-2020 (Source: UTP Bydgoszcz own study)

Year	V-VI	VI-VII	VII-VIII	V-VIII
1991				
1992				
1993				
1994				
1995				
1996				
1997				
1998				
1999				
2000				
2001				
2002				
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2014				
2015				
2016				
2017				
2018				
2019				
2020				
Slight drought	1	2	1	4
Moderate drought	2	4	3	2
Strong drought	2	2	0	2
Extremely strong drought	1	0	2	0
Total	6	8	6	8
%	20.0	26.6	20.0	26.6

Figure 5. Occurrence of atmospheric droughts during the vegetation period of plants in central Poland in 1991-2020 (V-VIII period of active growth; critical periods: V-VI for cereals, VI-VII for maize, VII-VIII for root crops) (Source: own study of UTP Bydgoszcz)

Protection of the biodiversity

Farmland Bird Index (FBI)

It is an officially used indicator of the state of the environment to assess the condition of ecosystems used by the Member States of the European Union for agricultural purposes [82][77]. The Farmland Bird Index is an aggregate indicator of the population status of 22 bird species typical of farmland habitats. As shown in Table 16, the FBI index in 2014-2018 decreased significantly compared to the base year 2000 [25].

Table 16. Farmland Bird Index (FBI) (Source: based on [25]).

Year	Base year 2000 = 1
2014	0.83
2015	0.85
2016	0.86
2017	0.80
2018	0.75

Selected agricultural production indicators

Agricultural production indicators (Table 17) present, in a synthetic way, basic characteristics of agriculture in Poland. They show stability in the usage of main resources like land and sown area and a non-significant decrease in agricultural employment, which can measure improvement in productivity of work with considerations of increase in agricultural market output between 2014 and 2018 [83][84].

The remaining indicators, like growth in agricultural market output at constant prices and in consumption of mineral fertilisers, and improving raw food materials quality indicators, show a tendency that farmers are in progress about economic and market goals that will also let better achieve environmental objectives.

Table 17. Selected agricultural production indicators (Source: based on [83][84]).

Indicator / Year	2014	2015	2016	2017	2018
Agricultural land (ha/1 inhabitant)	0.378	0.378	0.374	0.381	0.382
Sown area (million ha)	10.4	10.8	10.6	10.8	10.8
Percentage of employed in agriculture	15.5	15.3	14.9	14.5	14.3
Market agricultural output at constant prices (1995 = 100)	155.0	153.9	162.7	167.4	172.9
The share of cereals in the sown structure (%)	71.8	69.9	69.6	70.7	72.1
Consumption of mineral fertilisers kg of pure component / ha	133	123	130	140	142
Food quality - milk (% disqualified samples)	6.9	6.7	7.4	7.2	7.3
Food quality - meat (% disqualified samples)	2.3	3.4	2.5	2.3	1.7
Food quality - fruit and vegetables (% disqualified samples)	2.2	2.5	1.5	2.6	3.4

In Poland, the ecosystem indicators reflect a slow but constant growth of ecological and agricultural land areas that are adequately maintained and protected between 2014 and 2019. Moreover, it is confirmed by similar tendencies in the growth of the forest area and progress towards sustainable forestry management (see Figure 6)[25].

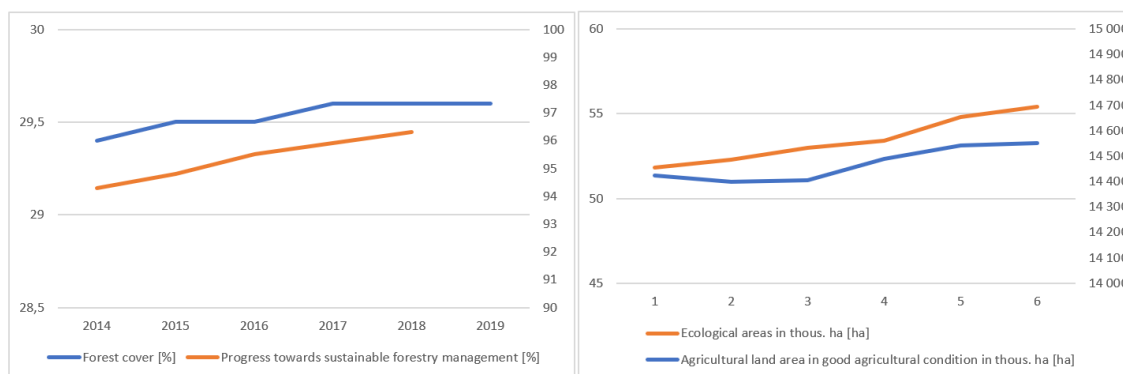


Figure 6. Values of indicators and measures characterising ecoservices development in Poland in 2014-2019 (Source: based on [25]).

2.3.3 Use Case #3: Greece

The Young Farmers scheme is part of AXIS I: *Improving Competitiveness of Agriculture and Forestry* of the Greek Rural Development Program, currently running as Measure 6.1. The main target of the measure is to improve productivity in the agricultural sector by establishing new holdings (young farmers) with improved skills and modern equipment. Below are presented the key indicators of impact assessment for Measure 6.1.

Ministerial impact assessment plan (ex-post assessment of RDP 2007-2013)

Common Indicators

- Number of reinforced young farmers (Performance)
- Total amount of investments (Performance)
- Increase in gross value added on supported holdings (Result)
- Economic growth (Impact)
- Labour productivity (Impact)

Base Indicators

- BO 5 - Age structure of the agricultural sector
 - BC4 - Structure of agricultural holdings
1. a) Number of Holdings
 2. b) Used Agricultural Area (Ha)
 3. c) Average size (ha / farm)
 4. d) Economic average size of holdings)
 5. e) Employed in agriculture in Annual Work Units

2.4 Recommendations for ex-ante analysis with a view to modifying future policy instruments or proposing new ones

2.4.1 Use Case #1: Andalusia

To date, no reports about the development of specifically designed future plans have been found. The European Union has provided a website on which it periodically updates future regulations approaches without specifying concrete actions. In this way, the EU states that certain objectives must be met in the next reform of the European Agricultural Policies. However, it leaves it up to each EU country to design its own strategies to pursue and implement these objectives.

European regulation. Reform 2021-2027

- Draft Regulation COM 2018/0216 of the European Commission establishing rules in relation to the support to the strategic plans that must develop the Member States in the framework of the Common Agricultural Policy (strategic plans of the CAP), funding to FEAGA (European Agricultural Guarantee Fund, EAGF) and FEADER (The European Agricultural Fund for Rural Development, EAFRD) [\[85\]](#).
- Transitory Regulations of the CAP to the continuity of CAP payment 2021/2022 [\[86\]](#).

Spanish regulation. Reform post-2020

The Ministry of Agriculture, Fisheries and Food is developing Spain's Strategic Plan for the CAP post-2020.

The European Commission's June 2018 proposal for reform of the CAP retains the essential elements of the current CAP and, at the same time, introduces a profound change in the way its instruments are to be designed. It is done moving from a policy based on the description of requirements to be met by the final beneficiaries of aid to a policy geared towards the achievement of concrete results, linked to three general objectives:

- a) The promotion of a smart, resilient and diversified agricultural sector that ensures food security
- b) The intensification of environmental care and climate action, contributing to the achievement of the EU's climate and environmental objectives
- c) Strengthening the socio-economic fabric of rural areas

These general objectives are further broken down into nine specific goals, based on the three pillars of sustainability and complemented by a common cross-cutting aim of modernising the agricultural sector through knowledge, innovation and digitalisation in rural areas.

On this website, the Ministry of Agriculture, Fisheries and Food contains all the information on the Strategic Plan for Spain that is being drawn up for the future CAP. In addition, a brief Basic Guide to the Strategic Plan for the CAP post-2020 has been produced containing basic information about it [\[87\]](#).

From other platforms catalogued by organizations, foundations or private bodies, it is unknown whether they have prepared reports with new instruments for elaborating future versions of the CAP.

The results of this participatory research could form the basis of recommendations for the development of future versions of the current instruments implemented.

2.4.2 Use Case #2: Poland

Based on the direct contacts with selected farmers who were delivered a prepared version of the questionnaire, it was possible to gather preliminary knowledge about the

participants' expectations regarding actions similar to M10. The recommendations that result from these interviews concern expected changes in detail requirements of M10.1 action, including:

- The sowing, fertilisation and harvesting dates of some crops.
- Base rates of payments, which should be higher to enable the competitiveness of the farmers taking part in M10 action in relation to the other farmers or non-agrarian undertakings, e.g., sale of plots to basic enterprises (intensive) and farms (social-extensive).
- Possibility of modifying the fertilisation plan - the fertilisation plan is prepared based on only one chemical analysis of the soil performed usually in the autumn (or directly after the harvest). Annual variation in weather conditions make it difficult to strictly follow the fertilisation plan, while in the M10 action, no changes to the fertilisation plan are allowed.

2.4.3 Use Case #3: Greece

The future CAP will focus on nine general objectives reflecting the policy's economic, environmental and social importance. Attracting young people into the sector and helping them establish themselves as viable businesses is one of the main priorities of the CAP post-2020.

Member States will be able to tailor the tools to their own specific needs, setting out how they plan to do so in a comprehensive CAP Strategic Plan. These CAP Strategic Plans will set out how each country proposes to meet the overall CAP objectives, mindful of its own specific needs. They will define a strategy and explain how actions under both pillars will contribute to reaching these objectives. The plans will also set the targets for reaching the objectives; progress towards achieving these targets will be assessed at the Member State level and verified by the European Commission in a new annual monitoring and review exercise.

A standard set of result indicators would be defined at the EU level to ensure a level playing field for farmers in every Member States. Each year, countries could submit a performance report to the Commission to show their progress, based on these specific indicators. The Commission could review the reports and consider recommendations for improving performance if necessary.

Additionally, the maximum amount of aid for the installation of young farmers and rural business start-ups could be increased. In this context, rural development funding can be used to support schemes aimed at improving access to land and land transfer, traditionally a major barrier to young farmers joining the profession. The increased amount of aid for the installation of young farmers will be allowed to establish financial instruments supporting working capital for young farmers, who often face significant difficulties raising finance given the high investments and low returns of a farm at the start-up phase. Moreover, a new system of possible sanctions and rewards would also be introduced to ensure progress.

Lastly, as a new one future policy instrument could be an increased investment in knowledge and innovation, which could make enable farmers and rural communities to benefit from it.

3 Information gaps detected so far

Depending on the objectives of each use case, the characteristic of the target populations and the available datasets, some information gaps have appeared or might appear. This section aims to detect those current gaps and the potential ones, especially those that may be filled through Participatory Research. Its results, together with the already available databases, must allow for the obtention of the necessary data to estimate the agent's attributes ([Table 1](#)) and generate the synthetic population. Therefore, the simulation with the Agent-Based Model heavily depends on the design and implementation of the Participatory Research.

3.1 Use Case #1: Andalusia

The distinctive features of this use case with regard to the limitation to one region and one crop directly affect the required data and its acquisition. Firstly, the study of olive farming makes that livestock's data were unnecessary, but it, in turn, complicates the search of a specific biophysical model. Consequently, some information gaps might appear depending on the selected biophysical model's inputs. These possible information gaps would be filled with the information of investigations related to olive farming or that provided by stakeholders with which fluid relationships have been established. Concerning the available databases, many variables may be estimated based on them because many national datasets include regional breakdowns. Moreover, due to the olive sector's importance in Andalusia, the availability of detailed datasets of the Andalusian public administration and other Andalusian organizations is remarkable.

Considering the above, the detected information gaps regarding [Table 1](#) are described below and how they will be filled with the Participatory Research.

- **Innovativity:** this feature shared by the farm owner and farm manager indicates the propensity to change the agricultural tools and methods in order to improve the farm's production and save time, effort and money. The development of innovations usually involves some risks because they may be associated with investments, complex techniques or lack of information. The farmer's innovativity rate measurement will be carried out with a multi-item scales question in the survey.
- **Risk aversion:** like the previous feature, it is shared by the farm owner and farm manager. In this project, risk aversion is understood as the farmer's tendency to get into debt to invest in machinery, farmlands or innovations. Therefore, risk aversion and innovativity are significantly related to each other. In this case, this parameter will be measured with lottery-choice and multi-item scales questions.
- **Coordinates and areas of the parcels:** both parameters are very related, and they are necessary to create a bank of parcels to simulate the synthetic population. Thanks to the data provided by SIGPAC and SIPEA, it has been possible to obtain the coordinates, areas and shapes of the organic and conventional olive farming parcels in Andalusia. In addition, other data of those agrarian parcels have been obtained such as mean slope and irrigation regime. [Figure 7](#) shows the process followed to obtain a representation of a real olive farm. The table at the top of the figure gathers the data of a farmer and his/her agrarian parcel extracted from the target population dataset provided by SIPEA. This table includes the parcel's area and coordinates, indicated with the orange square, and the parcel's location according to the Andalusian land division codes, that is, province, municipality, polygon, parcel and enclosure, which are the orange circles. A developed Python script automates taking these codes (step 1) and requesting the parcel's data to SIGPAC (step 2). The result is a JSON file that, in addition to the previous data, includes the coordinates of the parcel's perimeter, its mean slope and its irrigation rate. Moreover, the script may plot the parcel (step

3). The example, which is the bottom left parcel of the area shaded in a light yellow in the right image, is represented in the graph at the bottom of the figure.

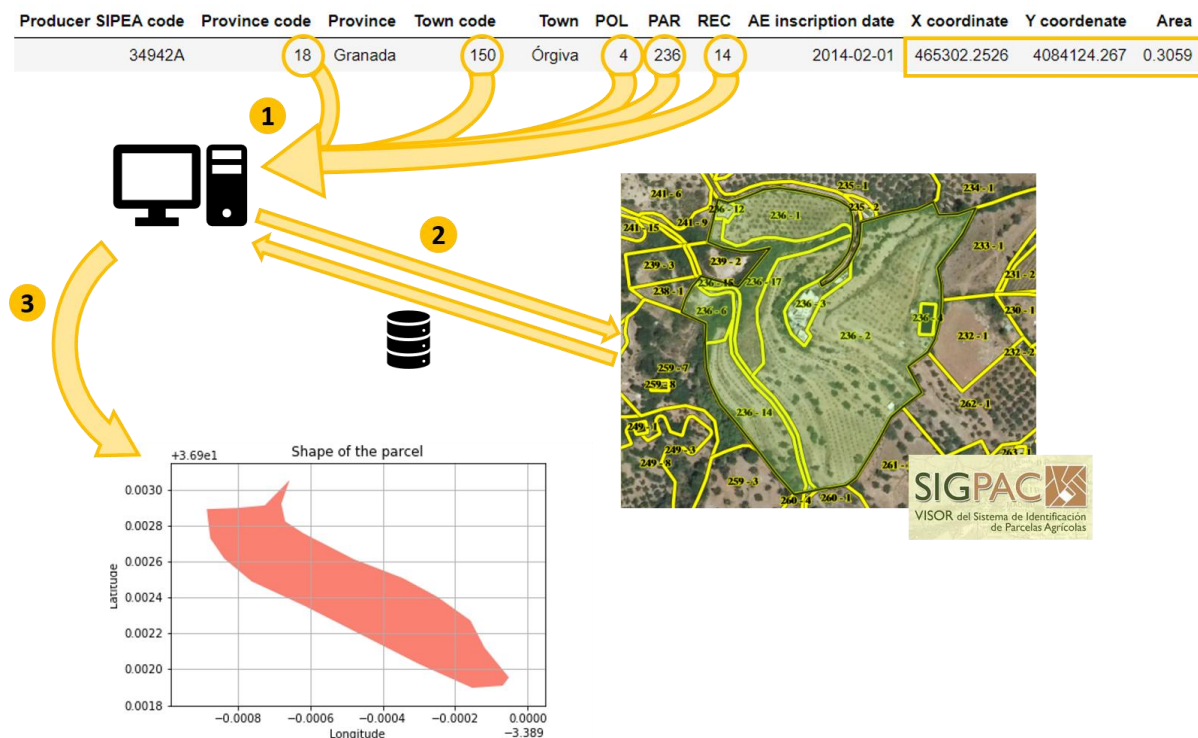


Figure 7. Process to obtain the coordinates and area of an agrarian parcel (Source: own elaboration).

- Biomass level:** this variable refers to the pruning residue (branches and leaves). Since it varies according to the pruning intensity and frequency, IFAPA's technicians' recommendations will be followed [88]. Therefore, it will be assumed that a production pruning is carried out every year in the adult olive orchards. That means that each olive tree would generate a mean of 12.5 kg of pruning residue [89].
- Age:** the age of the olive orchard is a biophysical models' standard input. Since the replanting may drastically change this parameter, it has been decided to ask for the planting year of the olive orchard in the questionnaire.
- Cultivation standards:** this point refers to the olive farming campaigns and agricultural labours calendar, and innovative organic olive farming techniques. In olive farming, the agricultural labours calendar has to be planed according to the harvest [90], and it strongly depends on the soil and climate conditions and type of olive. Based on [90] and [91], an illustrative organic olive orchard calendar has been designed (Figure 8). This calendar does not include the operations for the control of plagues and diseases, but it will be explained below.

Operations		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pruning		x	x										
Desvareto (sucker removal)								x	x				
Fertilisation	Soil	x									x	x	x
	Foliar			x	x								
Foliar treatments											x	x	x
Soil management	Sowing of cover crop									x	x		
	Mowing of cover crop		x	x	x	x	x						
Harvest												x	x

Figure 8. Agricultural labours calendar (Source: based on [90] [91]).

Since [Figure 8](#) activities may be carried out in different ways and periods, their main features and recommendations are gathered in the following points.

- **Harvest.**
 - The harvest time depends on the type of olive. In the table olive case, this period starts at the end of September until November, whereas the oil olive must be harvested between November and January.
 - The harvesting may be brought forward or delayed according to the olive's ripening rate, olive's greasy yield, climatic year, market prices and impact of plagues and diseases, among others.
 - [\[90\]](#), [\[92\]](#) and [\[93\]](#) recommend bringing forward the harvest to achieve a good quality olive.
 - As can be seen in [\[20\]](#), this campaign represents a significant percentage of the production costs.
 - The mechanisation of the harvest is determined by the land slope and the requirements of some certificates of origin.
- **Pruning.** According to [\[94\]](#), the most significant features of this agricultural labour are:
 - It is carried out after the harvest, coinciding with the dormant winter period of the olive tree.
 - There are three types of pruning for the olive tree: formation, production and rejuvenation. The most common one is the production pruning which is oriented to increase the adult olive trees' yield. This type of pruning has a light intensity, and it is annual or biannual.
- **Fertilisation.**
 - According to [\[90\]](#), the soil fertilisation period aims to fix the provided nutrients to the land with those months' typical rains.
 - The allowed fertilisers in organic olive farming are the ground pruning remains, alpeorujo compost, remains of the cover crop's mowing, manure from extensive livestock and authorised commercial fertilisers [\[93\]](#).
 - Foliar fertilisation is recommended when the deficiency of a specific nutrient is detected because this operation is cheaper than soil fertilisation, and the nutrients are

more quickly absorbed. Moreover, this kind of fertilisation must be avoided when there is a probability of rains [95].

- **Foliar treatments** provide the olive trees with nutrients that improve vegetative development, but they are used to **control plagues and diseases**, too [90]. For this reason, the organic methods to carry out this control are included in this point.

According to [93], the most common diseases in Andalusian olive orchards are verticillium wilt, repilo and tuberculosis. Table 18 gathers agricultural practices and foliar treatments to control these diseases.

Table 18. Common diseases in the Andalusian olive orchard and their treatments
(Source: based on [93]).

Disease	Type of method	Practices – Products
Verticillium wilt	Agricultural practices	<ul style="list-style-type: none"> ▪ Stop irrigating ▪ Remove and burn the ill olive trees' branches ▪ Desinfect the agrarian tools ▪ Plant cruciferous vegetables as a cover crop
Repilo	Agricultural practices	<ul style="list-style-type: none"> ▪ Production pruning ▪ Well-balanced fertilisation ▪ Good irrigation
	Foliar treatments	<ul style="list-style-type: none"> ▪ Copper
Tuberculosis	Agricultural practices	<ul style="list-style-type: none"> ▪ Not prune in rainy days ▪ Prune the infected olive trees at the end ▪ Desinfect the agrarian tools ▪ Not harvest through hand-pole beating
	Foliar treatments	<ul style="list-style-type: none"> ▪ Copper hydroxide

- The main plagues in Andalusia are olive fruit fly, olive moth (*prays oleae*), pyralid moth (*euzophera pingüis*) and black scale (*saissetia oleae*). The detection periods and methods to control them are gathered in Table 19 and Table 20 [93].

Table 19. Common plagues in the Andalusian olive orchard and their control periods
(Source: based on [93]).

Plague	Ene	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Olive fruit fly					X		X	X	X	X	X	
Olive moth			X	X	X	X						
Pyralid moth				X	X	X	X	X	X			
Black scale				X	X	X			X	X		

Table 20. Methods to control the most common plagues in Andalusia (Source: based on [93]).

Plague	Type of method	Practices – Products
Olive fruit fly	Mass trapping	▪ Olipe
	Biological control	▪ Opius concolor
	Natural cover crop	▪ Caper, Critonia quadrangularis
	Agricultural practices	▪ Bring forward the harvest ▪ Separate the olives from the ground from those from the tree ▪ Not store
	Natural products	▪ Biammonic phosphate
Olive moth	Mass trapping	▪ Funnel trap
	Biological control	▪ Chrysoperla carnea, chelonus, ageniaspis
	Natural cover crop	▪ Plants with flowers with nectar
	Natural products	▪ Bacillus thurigiensis
Pyralid moth	Mass trapping	▪ Funnel trap
	Biological control	▪ Bedbugs, ants, birds
	Natural cover crop	▪ Plants with flowers with nectar
	Foliar treatments	▪ Pruning without damaging the tree
Black scale	Biological control	▪ Wasp (metaphicus barletti), birds
	Natural cover crop	▪ Caper, Critonia quadrangularis
	Agricultural practices	▪ Slight pruning ▪ Well-balanced fertilisation ▪ Good irrigation
	Natural products	▪ Copper salts

- **Soil management.**
 - The most cultivated species for the cover crop belong to gramineae, leguminouse and cucurbitaceae families.
 - The planting and mowing dates depend on the species.
 - The natural or sowed cover crop facilitates the absorption of nutrients and control of plagues and diseases. Moreover, it protects the soil from the erosion.

3.2 Use Case #2: Poland

Information gaps were detected on one side on the basis of the analysis of needs resulted from the synthetic generation process to assign values to synthetic agent attributes and on another side from a comparison of the content of available databases (e.g. Polish FADN [50], Statistics Poland [96]).

As a result of the comparison of the content of available databases, it was detected that the data about age, gender and education level, and risk aversion and innovativity of decision-makers were not as specific as is required. Concerning the former, there is not a division among decision making roles of farmer family members, whereas the latter data have not an evaluation of stakeholders of their quality of used soils and machinery sets, which let mitigate both farming and environmental risks. In addition, the following gaps will also be detected.

- Previous experiences of farmers resulting from participation in M10 action

- Size of parcels
- The minimum size of plots
- Revenues obtained from agriculture guaranteeing farmer's family maintenance
- Location of farms in relation to Natura 2000 areas
- Ecosystem components existing on the farm being friendly for M10 action participation
- Profitability of participation in M10 action
- Social/cultural impact being barriers/chances to access M10 action

Lacking data detected as a result of such comparison will be completed with Participatory Research mainly through a created questionnaire (also helpful for the questionnaire content and structure was pilot survey results described below), and be waited for responses and their interpretation. Some of these gaps have been filled during the participatory research design process itself, through contact with stakeholders, bibliographic review or access to non-public databases through contacts with public administrations.

The remaining features analysed based on responses from the questionnaire, like the data not available or hardly available in databases, will be completed by Participatory Research over usage of opinions of farmers, farmer's organizations, public administration representatives, or non-public databases. Such data like the total number of employees, type of the primary production, legal form, size of farms, size of arable land area, special areas existing on the farm could be useful because of their different precision, units of measure, and context compared to those amounts included in relevant databases. So, the mentioned features can have important explanation meanings that let better interpret the analysed parameters.

As regards the aforementioned pilot survey, it was conducted among several of the biggest and leading farmers with which UTP and IAPAS previously cooperated within various other projects. The main idea was to check the respondents' opinion about the structure of the questionnaire, its clarity, and its ability to get the most relevant issues that made the participation in M10 was not convenient for some of the agricultural producers. It was also wanted to check whether the questionnaire covers all the aspects related to the measure M10. During the pilot survey, feedback about problems with the implementation of the action that the farmers have met was received.

The producers indicated that some action's obligations are not sufficiently adjusted to the existing climatic and economic conditions. Due to climate change, farmers have to adjust the sowing, fertilisation, and harvesting dates beyond the limiting dates defined in the action. Without it, the plant's production profitability is substantially limited, and subsidies received within M10 do not cover the yield losses. Many farmers indicated that base rates of payments should be higher to enable the competitiveness of the farmers taking part in M10 action in relation to the other farmers or non-agrarian undertakings, e.g. sale of plots to basic enterprises (intensive) and farms (social-extensive). Furthermore, some respondents expressed doubts about the strict following of the fertilisation plan prepared based on only one chemical analysis of the soil performed usually in the autumn (or directly after the harvest). Annual variation in weather conditions makes it difficult to follow the fertilisation plan strictly, while in the M10 action, no changes to the fertilisation plan are allowed.

3.3 Use Case #3: Greece

The identification of the information gaps for the Greek Use Case is following the standard procedure applied to all AGRICORE Use Cases. The first step comprises the elaboration and systematic register of the available quantitative data. These data for the description of the Greek Use Case include:

1. The latest available Greek Farm Accountancy Data Network (FADN) data for the period 2014-2018, which are presented in [Table 21 \(Annex 5-A\)](#)
2. The data provided by the 13.905 applicants for the participation in the Young Farmers Scheme in Greece in 2016, which are presented in [Table 22 \(Annex 5-B\)](#).

Concerning the gaps detected between the systematic register of the available quantitative data and the objects' attributes, which define each agent and are required for the synthetic generation process, they are focused mainly on the features of innovativity and risk aversion. The attribute of innovativity indicates the propensity to change the agricultural tools and methods in order to improve the farm's production and save time, effort and money. On the other side, the feature of risk aversion is defined as the farmer's tendency to get into debt to invest in machinery, farmlands or innovations. This type of detected gaps will be filled with Participatory Research actions.

Additionally, the available quantitative data do not include several essential topics crucial for describing, analysing and elaborating the Greek Use Case. These topics include:

1. Young farmer's motivation.
2. Beliefs about Young Farmers Scheme.
3. Beliefs about the farming sector in general.
4. Beliefs concerning Young Farmer's future in Agriculture.

Annex 5-A

Table 21. Variables of the Greek Farm Accountancy Data Network (FADN) data for the period 2014-2018 (Source: based on [\[97\]](#)).

A	Income
A1	Total output
A2	Total output / Total input
A3	Total intermediate consumption
A4	Depreciation
A5	Total external factors
A6	Balance subsidies & taxes on investments
A7	Gross Farm Income
A8	Farm Net Value Added
A9	Farm Net Income
A10	Farm Net Value Added / AWU
A11	Family Farm Income / FWU
A12	Balance current subsidies & taxes
B	Sample and population
B1	Farms represented
B2	Sample farms
B3	Structures
B4	Economic size
B5	Total labour input
B6	Unpaid labour input
B7	Paid labour input
B8	Total Utilised Agricultural Area
B9	Rented U.A.A.
B10	Cereals

B11	Other field crops
B12	Energy crops
B13	Vegetables and flowers
B14	Vineyards
B15	Orchards
B16	Olive orchards
B17	Other permanent crops
B18	Forage crops
B19	Agricultural fallows
B20	Set aside
B21	Total livestock units
B22	Dairy cows (incl. buffaloes)
B23	Other cattle
B24	Sheep and goats
B25	Pigs
B26	Poultry
B27	Yield of wheat
B28	Yield of maize
B29	Stocking density
B30	Milk yield
C	Production
C1	Total output
C2	Total output / Total input
C3	Total output crops & crop production
C4	Total crops output / ha
C5	Cereals
C6	Protein crops
C7	Energy crops
C8	Potatoes
C9	Sugar beet
C10	Oil-seed crops
C11	Industrial crops
C12	Vegetables & flowers
C13	Fruit
C14	Citrus fruit
C15	Wine and grapes
C16	Olives & olive oil
C17	Forage crops
C18	Other crop output
C19	Total output livestock & livestock products
C20	Total livestock output / LU
C21	Cows' milk & milk products
C22	Beef and veal
C23	Pigmeat
C24	Sheep and goats

C25	Poultrymeat
C26	Eggs
C27	Ewes' and goats' milk
C28	Other livestock & products
C29	Other output
D	Costs
D1	Total Inputs
D2	Total intermediate consumption
D3	Total specific costs
D4	Specific crop costs / ha
D5	Seeds and plants
D6	Fertilisers
D7	Crop protection
D8	Other crop specific costs
D9	Specific livestock costs / LU
D10	Feed for grazing livestock
D11	Feed for pigs & poultry
D12	Other livestock specific costs
D13	Forestry specific costs
D14	Total farming overheads
D15	Machinery & building current costs
D16	Energy
D17	Contract work
D18	Other direct inputs
D19	Depreciation
D20	Total external factors
D21	Wages paid
D22	Rent paid
D23	Interest paid
E	Subsidies
E1	Total subsidies - excluding on investments
E2	Total subsidies on crops
E3	Compensatory payments/area payments
E4	Set aside premiums
E5	Other crops subsidies
E6	Total subsidies on livestock
E7	Subsidies dairying
E8	Subsidies other cattle
E9	Subsidies sheep & goats
E10	Other rural development payments
E11	Subsidies on intermediate consumption
E12	Subsidies on external factors
E13	Decoupled payments
E14	Single Farm payment
E15	Single Area payment

E16	Additional aid
E17	Support_Art68
E18	Other subsidies
F	Balances subsidies and taxes
F1	VAT balance on investments
F2	Taxes
F3	VAT balance excluding on investments
F4	Balance subsidies & taxes on investments
F5	Subsidies on investments
F6	Payments to dairy outgoers
F7	Balance current subsidies & taxes
F8	Total subsidies - excluding on investments
G	Balance sheet
G1	Total assets
G2	Total fixed assets
G3	Land, permanent crops & quotas
G4	Buildings
G5	Machinery
G6	Breeding livestock
G7	Total current assets
G8	Non-breeding livestock
G9	Stock of agricultural products
G10	Other circulating capital
G11	Total liabilities
G12	Long & medium-term loans
G13	Short-term loans
H	Financial situation
H1	Net worth
H2	Change in net worth
H3	Average farm capital
H4	Gross Investment
H5	Net Investment
H6	Cash Flow (1)
H7	Cash Flow (2)
H8	Cash flow / farm total capital

Annex 5-B

Table 22. Variables of the Young Farmers Scheme Applicants in Greece (2016) (Source: based on [97]).

A	BENEFICIARIES DATA
A1	Sex
A2	Date of birth
A3	Education level
A4	Main Insurance Fund
A5	Marital status
A6	Place of permanent residence
A7	Post Code
A8	Type of Area
A9	Area population
A10	Area character
A11	Citizenship
A12	Students (School, year, required)
A13	Type of Existing Employment
A14	Existing employment sector
A15	Duration of unemployment (months)
A16	Individual income
A17	Family income
A18	Date of first installation in Agriculture
B	AGRICULTURAL HOLDING ELEMENTS
B1	Current Productive Direction
B2	Future Productive Direction
B3	Business Plan Objectives (Objective, Target Price, Estimated Achievement Period)
B4	Relevance of education with Agriculture
B5	Obligation to attend training activities (Yes / No)
B6	Environmental actions (Yes / No)
B7	Innovative actions (Yes / No)
B8	Organic cultivation area

4 Design, implementation and operation of participatory research activities to fill the detected gaps.

4.1 Selection of the subjects to be investigated

4.1.1 Use Case #1: Andalusia

Considering the objective of the Participatory Research for the Andalusian Use Case, the target population sample must represent the whole organic olive farming in Andalusia. Since the Participatory Research focuses on the ex-post analysis period (from 2014 to 2017), the designed survey will be conducted among the 10% of the olive farmers who converted to organic farming in this period. This turns into approximately 200 organic olive farming surveys. Moreover, based on the methodology of [\[6\]](#) and [\[9\]](#), other 200 surveys will be conducted among conventional olive farmers in order to compare both types of farming and the results of the mentioned studies and Participatory Research.

With the purpose of obtaining a sample which was as representative as possible, the distinction made by the Master Plan for the Olive Orchard [\[20\]](#) is included as a criterion to select the sample. In this way, six types of olive exploitation may be defined:

- **Type 1: Low-yield olive orchard:** the olive orchard yield is 775 kg of olives per hectare or less, or it is cultivated in zones with bad soil and climatic conditions or high slope zones.
- **Type 2: High slope olive orchard:** the soil and climatic conditions are better than those of the previous type, but the land slope is equal to or more than 20%. As a result of the high slope, it is not possible to mechanise the olive harvesting.
- **Type 3: Extensive olive orchard with a density equal to or lower than 150 olive trees per hectare:** the land slope is lower than 20%, and the harvesting mechanisation is possible.
- **Type 4: Extensive olive orchard with medium density:** the land slope is lower than 20%, and the planting density is between 150 and 180 olive trees per hectare.
- **Type 5: Intensive olive orchard:** the planting density is between 180 and 325 olive trees per hectare, and it is located in flatlands.
- **Type 6: Super-Intensive olive orchard:** the planting density is higher than 325 olive trees per hectare, and it is located in flatlands.

The surveys' distribution is based on the Andalusian olive orchard area distribution gathered in [\[20\]](#). Furthermore, this distribution includes the distinction between irrigated and non-irrigated olive orchards, as shown in [Table 23](#).

Table 23. Distribution of the Andalusian olive orchard area according to the types of exploitation defined in the Master Plan for the Olive Orchard (Source: based on [20]).

Type	Irrigation regime	Area (ha)	%
1		95923	6.3 %
2	Non_irrigated	296978	19.5 %
	Irrigated	57537	3.8 %
3	Non_irrigated	472006	31.0 %
	Irrigated	251012	16.5 %
4	Non_irrigated	68277	4.5 %
	Irrigated	45353	3.0 %
5	Non_irrigated	90264	5.9 %
	Irrigated	123096	8.1 %
6	Non_irrigated	4989	0.3 %
	Irrigated	16386	1.1 %
TOTAL OLIVE GROVE AREA		1521821	100.0 %

Although [Table 23](#) might be out-of-date because the data correspond to the 2009-2010 campaign, it is the newest distribution according to the type of exploitation. Furthermore, some changes were made in order to have enough sample farmers per each exploitation type. First, type 5 and 6 were joint because few surveys would be assigned to them separately. Moreover, the representation of these types in the Andalusian olive orchard may have increased in recent years. Secondly, since type 3 and 4 are distinguished by a planting density of 30 olive trees per hectare, these two types were combined, too. Therefore, the resultant distribution ([Table 24](#)) reduces the number of clusters to seven, facilitating the survey's conduction.

Table 24. Distribution of the Andalusian olive orchard area according to the types of exploitation defined for the Andalusian Use Case (Source: based on [20]).

Type	Irrigation regime	Area (ha)	%	Surveys
1		95923	6.3 %	13
2	Non_irrigated	296978	19.5 %	39
	Irrigated	57537	3.8 %	8
3-4	Non_irrigated	540283	35.5 %	71
	Irrigated	296365	19.5 %	39
5-6	Non_irrigated	95253	6.2 %	12
	Irrigated	139482	9.2 %	18
TOTAL OLIVE GROVE AREA		1521821	100.0 %	200

Nonetheless, this methodology is difficult to apply because the type of olive exploitation managed by the surveyed farmer is unknown before conducting the survey. For this reason, it was decided to analyse which Andalusian agrarian regions had a characteristic type of olive exploitation. In this way, each cluster could be located in one or more agrarian regions. To this end, the data about olive yield, land slope and planting density are needed to classify the target population by type. However, since there is no record of the planting density in Andalusia, the mean olive orchard yield per type of exploitation indicated in the Master Plan for Olive Orchard ([Table 25](#)) was used to classify. Regarding the other data, the land slope was obtained from SIGPAC, and the Regional Government of Andalusia provided the olive orchard yield dataset. These latter data were organized according to agrarian region offices, whose Spanish acronym is OCAs. Therefore, the organic olive farms were classified by OCAs, and the mean olive orchard yield of each OCA was calculated. [Table 26](#) illustrates which are the most representative OCAs per type of exploitation

and irrigation regime. From these OCAs, one or two will be chosen for each cluster, and the same number of surveys will be conducted for organic and conventional olive farming, as is indicated in [Table 24](#).

Table 25. Mean olive yield per type of exploitation based on [PDO] (Source: based on [20]).

Type	Mean yield (kg/ha)	Estimated mean yield (kg/ha)
1	431	431
2	3356	3356
3	3967	4039.5
4	4112	
5	4832	5501.5
6	6171	

Table 26. Selected OCAs to represent each type of exploitation (Source: own elaboration).

Type	Irrigation regime	OCA	Organic olive production (kg)	Organic olive grove area (ha)	Mean yield (kg/ha)	Mean slope (%)	Non-irrigated area (%)	Irrigated area (%)
1	Non-irrigated	SIERRA DE CADIZ	781735	2211.7554	353.446	28.74	100	0
		SIERRA DE CAZORLA	309553	502.0521	616.575	23.5	74.8	25.2
		SERRANIA DE RONDA	380192	912.0172	416.869	26.89	95.8	4.2
	Irrigated	SERRANIA SUDOESTE	846444	1809.3046	467.828	15.92	80	20
		VEGA DE SEVILLA	1045979	3790.9935	275.912	19.43	64	36
2	Non-irrigated	VEGA - MONTES OCCIDENTALES	927268	552.6379	1677.894	21.4	91.5	8.5
		MONTES OCCIDENTALES	1800693	930.7651	1934.637	22.281	95	5
		ALTO GUADALQUIVIR	7795331	2140.2249	3642.295	29.94	84.95	15.23
	Irrigated	VEGA DE GRANADA	454271	249.6391	1819.711	21.84	72.6	27.4
3-4	Non-irrigated	SUBBETICA	4077506	1498.1620	2721.672	19.98	98	2
		MONTES ORIENTALES	2968542	912.8711	3251.874	18.0	90	10
	Irrigated	CAMPO DE TABERNAS	1993574	788.4139	2528.588	14.46	69.66	30.33
		CAMPIÑA - SIERRA SUR	4471181	1995.7604	2240.34	15.02	81.4	18.6
5-6	Non-irrigated	SIERRA OCCIDENTAL	11327934	1897.2252	5970.790	19.57	100	0
	Irrigated	GUADAJOS Y CAMPIÑA ESTE	17413652	2322.6500	7497.3201	16.32	89	11

Lastly, it is necessary to remark that the classification has been made with the oil olive production data because the organic table olive production is negligible compared to the organic oil olive production. Moreover, significant differences may be observed between the average olive yield of types 2, 3-4 and 5-6 and the average olive yield of the selected OCAs. Probably, it is due to the fact that the estimated mean yields are very different. Finally, there are no OCAs where the

irrigated olive orchard predominates. Consequently, the selected ones to represent the irrigated clusters are those with the highest percentage of irrigated area, although it was not significant. This is understandable because two-thirds of the Andalusian olive orchard area corresponds to the non-irrigated olive orchard [\[20\]](#).

4.1.2 Use Case #2: Poland

Participatory Research is based on the need to fill in the information gaps in the available databases, and its purpose is to complete such information with appropriate responses from appropriate stakeholders (mainly farmers). In the frame of the Participatory Research, it is planned to perform an electronic questionnaire and to organize a common (by IAPAS & UTP) scientific and business conference (workshop) (September 2021 – traditional, remote or hybrid form) for stakeholders (including representatives of public administration institutions responsible for agro-climate-environmental policies, farmers' organizations and agricultural advisory centres).

Selection of the questionnaire respondents

Participants of the survey will be selected from the databases of leading farmers from the whole territory of Poland and other farms cooperating with agricultural advisory centres because of the data availability coming from them. Leading farms and/or those that carried out cooperation with advisory centres are typed based on such criteria as:

- Reached outstanding economic results
- High competitiveness
- High-technology used
- Openness and undertaking many activities for local societies (CSR high level)
- Activities for sustainable development aims (including a rule: being friendly for climate and environment)

Leading farms are designated by organizations such as:

- Association of Lease and Agricultural owners (1000 farms in Poland in total and 90 in Kujawy & Pomorze Region). Carrying out questionnaires (electronic ones) is possible, but the number of survey returns is estimated at a low level, approximately between 5 to 10 per cent according to the opinion of Director of the Association for Kujawy & Pomorze region.
- Agricultural Advisory Centre. The cooperation with the Agricultural Advisory Centre in Brwinów will enable sending the questionnaire to around 3000 farms, but at this stage, it is difficult to estimate the response level.
- Association of winners of the Farmer the Year competition - approximately between 200 and 350 respondents are available in total.
- Industry associations of Pig Breeders and Producers – between 60 to 85 respondents are available.

Therefore, together it is expected to send questionnaires to more than 4000 farmers, but the expected level of survey returns is about 10 per cent from the whole sample.

4.1.3 Use Case #3: Greece

4.1.3.1 Identification and involvement of relevant stakeholders

An oft-quoted definition of 'stakeholder', taken from a key reference [\[98\]](#) in the relevant literature, is: 'A stakeholder in an organization is any group or individual who can affect or is

affected by the achievement of the organization's objectives.' In a research project, integration between science and society should occur to shape research agendas, produce knowledge, and incorporate such knowledge into social and scientific practice [99]. Stakeholders could be engaged in research for three main reasons: (1) normative, in order to represent a democratic ideal by focusing on the process of inclusion; (2) substantive, to harness knowledge and risk perceptions from stakeholders in order to improve outcomes; and (3) instrumental, to increase the legitimacy of pre-defined decisions and therefore increase effectiveness [100].

The survey participants will be selected from the databases of farmers from the whole territory of Greece. According to the Labour Force Survey (LFS) of 2017, the age composition of the employed in Greek agriculture holds at 24,8% for those with age <39 years old, at 68,4% for people between 40-64 years old and the remaining 6.8% holds for employees over 65 years old. Interestingly, more detailed survey data show that the percentage of farm managers aged over 55 years old in Greece exceeds 55% of the total, while young farm managers aged <35 years reach less than 6% of the total farmers. According to ELSTAT (2013), there are 709.500 farmers in Greece. Thus, 170.000 farmers approximately constitute the target population, of which 13.000 are beneficiaries of Measure 6.1.

The sampling technique adopted in the research corresponds to the snowball sampling technique. According to [101], this technique consists of selecting respondents from a core network of existing sample members. The sampling process starts when the researcher selects an initially small number of respondents referred to as seeds. After that, the seeds recruit others to participate in the study, and this process of existing sample members recruiting future respondent members continues until the size of the sample selected for the investigation is reached. In this case, the sample would be unweighted and composed of about 600 respondents, mainly beneficiaries of Measure 6.1. Such a sampling procedure is frequently used when there is no sampling frame available which registers all respondents [102].

The knowledge of the stakeholders gathered in Table 28 will be used to fill the existing gaps in the available information through Participatory Research actions. Additionally, another remarkable aspect of their engagement is facilitating the development of Participatory Research actions and providing, mainly through exchange activities, the knowledge that would hopefully serve as inspiration for the project as a whole.

4.2 Selection and design of appropriate participatory research actions for each sample

4.2.1 Use Case #1: Andalusia

Participatory Research aims to gather all the necessary information to implement the population simulators to be designed in the AGRICORE tool. Specifically, the AGRICORE tool will be built as an agent-based approach in which each farm will be modelled as an autonomous decision-making entity that individually assesses its context based on its current situation and expectations. This modelling approach will allow simulating the interaction between farms and their context (taking into account the environment, rural integration, ecosystem services, land use and markets) at various geographical scales, from regional to global. In the Andalusian Use Case, several sources of information have been selected to achieve this objective.

On the one hand, research has been carried out based on documented information published in previous studies. In addition, public data have been extracted from several tools such as SIPEA (Information System of Organic Production in Andalusia) created by the Ministry of Agriculture, Livestock, Fisheries and Sustainable Development, and SIGPAC (Geographic Information System of Agricultural Plots) created by the Ministry of Agriculture, Fisheries and Food, among others, to generate a set of data in accordance with the purpose of the research.

On the other hand, a questionnaire has been designed as a source of information, addressed to a specific population of the olive orchard sector in Andalusia. The questionnaire is based on a previous study carried out by IFAPA (Institute for Agricultural and Fisheries Research and Training), directed by Dr. Carlos Parra López.

The questionnaire provided by Carlos Parra López had to be modified to be updated and adapted to the Andalusian Use Case's objectives. First, since the questionnaires' results would be used to fill some information gaps and generate synthetic agents, most of those questions not related to the objects' parameters for the Andalusian agents (see [Table 1](#)) were removed. In this way, the length of the questionnaire was considerably reduced. However, some minor significance questions for the project, such as opinion questions, were maintained in order to compare the results of both investigations and analyse the organic farming awareness. The second general change was the reformulation of qualitative questions to be answered with quantitative data, and the dichotomous questions as multiple-choice questions. Moreover, those questions about olive farming aspects that might influence the conversion to organic farming and vice versa were rephrased to refer to the previous conventional olive farming period, during the conversion and the organic olive farming period after having transitioned. These periods were substituted for the period from 2014 to the present in the conventional farming survey. Finally, some questions were added, such as questions to distinguish between female and male workforce and questions to measure the farmer's risk aversion and innovativity with the lottery-choice and multi-item scale methods. On the whole, the resultant structure of the questionnaire was:

- Section 1: Description of the survey.
- Section 2: Personal details of the interviewee.
- Section 3: Details of the agricultural holding.
- Section 4: Data on the agricultural holding dedicated to organic/conventional olive orchards.
- Section 5: Data on the interviewee's dedication to agriculture.
- Section 6: Dissemination process. Phases from knowledge to adoption or rejection of organic production.
- Section 7: Balance of the farm.
- Section 8: Interviewee's attitude towards innovation.
- Section 9: Interviewee's attitude towards risk aversion.
- Section 10: Interviewee's attitude towards organic farming.

As mentioned before, several versions of this questionnaire have been designed: one addressed to organic producers, which was based on the questionnaire provided by Dr. Carlos Parra, and another one for organic producers, which was an adaptation of the former. Both questionnaires have two versions, an official version and a practical version. The difference is that the latter uses common terminology in the sector so that the respondent is comfortable in his answers. The surveys will be intended to be carried out telematically (an on-line version of both practical questionnaires are available) and by telephone (a PDF version is also available for both practical questionnaires). Furthermore, several pilot surveys of the practical versions were conducted on some olive farmers in order to check that they could answer all the questions without any support. Their feedback was used to improve the understandability of the questionnaires.

The complete questionnaires for Andalusian Use Case are available as Appendix C and Appendix D.

4.2.2 Use Case #2: Poland

The Polish questionnaire is planned to get feedback from large groups of entities (individual farmers, production cooperatives and agricultural associations). It is addressed to farmers who participated or not in the M10 measure and those who plan to participate in similar actions in future. Moreover, as mentioned before, the intention is to gather survey data from the whole territory of Poland (at least a few hundred responders are being looked for), and the study will be performed as an online questionnaire. To support this activity, national agricultural organizations, such as Agricultural Advisory Centres or the Agency for Restructuring and Modernisation of Agriculture (ARMA), will be invited to collaborate.

The questionnaire aims to fill the detected information gaps of the Polish Use Case, and its results will be incorporated in further actions within the use case. The data expected to obtain through the questionnaire are gathered in the list below.

- Age, gender, education of decision-makers responsible for strategic decisions
- Legal form of entity
- Risk aversion of decision-makers
- Total number of employees
- Previous experiences of farmers resulting from participation in M10 action
- Type of the main production
- Size of farms
- The minimum size of plots
- Revenues obtained from agriculture guaranteeing farmer's family maintenance
- Ecosystem components existing on the farm being friendly for M10 action participation
- Size of parcels
- Location of a farm in relation to Nature 2000 areas
- Size of arable land area
- Special areas existing on the farm
- The profitability of participation in M10 action
- Social/cultural impact being barrier/chance to access M10 action
- Bureaucratic/institutional factors being barrier/chance to access M10 action

The questionnaire is structured in five sections, some of them with some subsections.

- Section 1: General information sheet of the questionnaire
- Section 2: Questions about the entity participating in the survey
- Section 3: Questions for farmers who were beneficiaries of the M10 measure
 - Subsection 1: Economic impact
 - Subsection 2: Social/Cultural impact
 - Subsection 3: Bureaucratic/Institutional factors
- Section 4: Questions for farmers who are not beneficiaries of measure M10 or have withdrawn from participation

- Subsection 1: Specific questions connected with some requirements of measure M10.1
- Section 5: Questions for farmers who intend to apply for funds within actions similar to the M10 measure

The complete questionnaire for Polish Use Case is available as Appendix E.

4.2.3 Use Case #3: Greece

4.2.3.1 Participatory research actions

The methodological approaches that will be applied for the needs of the Greek Use Case are the following. Firstly, in-depth interviews will be addressed with all the relevant stakeholders. These interviews aim to describe the implementation of the M 6.1, Startup aid for young farmers, and recognise possible problems linked to the young farmers' satisfaction. The second approach is a questionnaire survey aiming to directly identify the young farmers' satisfaction and perceptions about M 6.1. Furthermore, since data confidentiality is a priority for EU authorities under the General Data Protection Regulation (GDPR) and the AGRICORE Project's commitment to follow such rules, a Consent Form will be added to the questionnaire in accordance with WP11: Ethics Requirements of the project.

The questionnaire will focus on assessing the young farmers' satisfaction from their decision to participate and enter the agricultural sector and determine the factors affecting this decision. The questionnaire will be distributed to beneficiaries and non-beneficiaries of Measure 6.1 (Startup aid for young farmers). Proposed data on beneficiaries and non-beneficiaries of setting up measure should be collected for the ex-post analysis (years 2014-2017) and the ex-ante analysis (years 2018-2020). It is worth mentioning that a severe problem for the participatory research actions concerning the Greek Use Case is that the sub-measure 6.1 (Startup aid for young farmers) have been not completed yet.

The questionnaire used for the aims of the study was constructed by taking into account the literature on Common Agricultural Policy in general and young farmers schemes in particular. More specifically, the questionnaire is divided into three sections. Demographic and socioeconomic data are asked in the first section. In the second section, there are variables relating to the financial and accounting aspects of agricultural holdings. As for the third section, there are variables that have to do with the investigation of young farmers' evolution and agricultural holdings improvement in the case of beneficiaries and non-beneficiaries of setting up measure 6.1 (Startup aid for young farmers).

The most significant part of the questionnaire was made up of structured questions with pre-programmed answers to guarantee that all questions were asked in the same way and to make it possible to analyse the data in a statistically sound manner. Some open questions are included in the questionnaire about the farmers' age and the mean hectares (ha) of owned and rented UAA (Utilised Agricultural Area). Moreover, in order to obtain quantitative data, a questionnaire based on the 5-point Likert scale was designed.

It is worth mentioning that a pilot survey in representative farms will be conducted. The list with the main variables by which the questionnaire is constructed is the following:

a) Socio-economic variables

- Gender
- Age (in years)
- Exclusively occupied as a farmer
- Educational level

- Annual Income

Regarding young farmers' socioeconomic characteristics, relevant research has revealed that young farmers' education level plays an important role in explaining their lack of interest in working on farms because more educated young farmers may find better-paid employment in other industry sectors ([103]; [104]). The evolution and specialisation of agriculture and the particular challenges faced by micro-, small- and medium-sized enterprises in rural areas require appropriate technical and economic training level. This training not only should comprise technological and managerial skills but also entrepreneurial skills [105]. Gender has also been identified as another factor. Some researchers have found that potential male successors are more likely to take over the family farm, and which may reflect familial norms related to the heir's gender [106]. From a gender point of view, there are significant gaps between women and men.

b) Financial and accounting variables

- Standard output of the agricultural holding
- Gross Value Added
- Annual Work Units
- Farm size (hectares)
- Labour productivity (euro per annual work unit)
- Land productivity (euro per hectare)

The Common Agricultural Policy, during its evolution, has increasingly pursued the objective of improving competitiveness in the agricultural sector to cope with the progressive reduction of protections to farms from the public administration. This has been achieved, beginning from technical and economic information about farms collected through financial and accounting variables [107].

c) Beneficiaries and non-beneficiaries of setting up measure evolution

- The competitiveness of supported primary producers has improved.
- The share of the final price of agriculture products retained with primary producers has increased.
- The added value of agricultural products of primary producers has increased.
- Implementation of quality schemes by primary producers has increased.
- Participation of primary producers in short circuit schemes, quality-oriented producer group and/or inter-branch organization has increased.
- The young farmer payment would make me feel more secure in my role.
- The young farmer payment would improve my quality of life.
- The young farmer payment would increase the stress levels experienced by young farmers.
- The young farmer payment would influence my decision to remain in farming.
- The young farmer payment would encourage a greater variety of cropping and stocking.
- The young farmer payment would offset the risk and uncertainty in the farming sector.
- The young farmer payment would be too small to keep me in farming.
- The young farmer payment would lead to more environmentally friendly farming practices.
- The young farmer payment would allow me to improve the productivity of the farm.

- The young farmer payment would increase my motivation to succeed in the farming industry.
- The young farmer payment would not compensate for the high levels of debt on my farm.
- Low-profit levels would prevent me from staying in the farming industry.

The evaluation of changes in the agricultural holdings before and after this reform and the changes may have on-farm are key factors in delineating agriculture's overall scenario in the current programming period. The strategic approach to rural development has greatly increased the need to create a monitoring and evaluation system based on standard indicators [\[108\]](#).

The complete questionnaire for Greek Use Case is available as Appendix F.

4.3 Plan for the implementation of the campaign to carry out participatory research activities, including measures to minimise the effect of COVID19 or its associated restrictions

Since the different managements of the Covid-19 pandemic, each use case will adapt the Participatory Research actions according to its features and the countries' situations. Although the measures taken to fight against the pandemic may change in a matter of days, the objective is to minimise the impact of Covid-19 restrictions on the Participatory Research results as much as possible.

4.3.1 Use Case #1: Andalusia

The Participatory Research actions in the Andalusian Use Case has been adapted to the current and possible future Covid-19 restrictions. On the one hand, the collaboration with relevant stakeholders has been done via email and phone. Fortunately, CAAND could have provided much olive farming information about the Common Agricultural Policy requirements, the conversion process to organic farming and the organic olive farming features, among others. It avoided possible waiting times.

On the other hand, the questionnaire was designed to be conducted in different situations. For this reason, there are Google Forms questionnaires, which are the online versions, and their corresponding PDF versions. The formers will send by email, and the others will be used to fill in it via phone or in person.

4.3.2 Use Case #2: Poland

As previously mentioned, the questionnaire survey will be done electronically in order to avoid Covid-19 restrictions. Despite the fact that it is a direct channel that allows reaching a large number of Polish farmers, it does not guarantee that many of them responded. Moreover, the Covid-19 situation leads to other risks and limitations, which are gathered in [Table 27](#).

Table 27. Use Case#2 Participatory research risks and limitations analysis (Source: own elaboration)

Risk number	Description	Prob.	Crit	Mitigation action
1	Difficulties in contacting agencies and farmers due to Covid restrictions	M	Y	Intensive campaign to encourage respondents to participation in online questionnaire
2	Some national agencies not interested in supporting questionnaire distribution	M	Y	Intervention at the highest government agents (ministries of agriculture/environment)
3	Not satisfactory number of responses to the questionnaire	M	Y	Looking for additional respondents
4	Received data from the questionnaire not easily interpretable	L	N	Looking for ways to improve data quality and interpretation methods

4.3.3 Use Case #3: Greece

Due to the Covid-19 pandemic and difficulties in transportation and face-to-face meetings, remote communication tools will be used for as long as health-protective restrictions apply. Teleconference technology such as Skype, Microsoft Teams, or Zoom will facilitate web interviews with respective participants. However, lack of internet connection, particularly for rural and remote areas, could be a considerable setback for the research's on-time implementation. If Covid-19 restrictions apply for a more extended period than expected, and there is no internet access for participants, traditional analogous tools will be used ultimately, such as telephonic interviews.

Plan for processing the data obtained and transforming it into useful information for the project in general and for the execution of use cases in particular.

This section describes the tentative plans to process and transform Participatory Research data into useful information. Once all information gaps are filled in, the specific models to imitate the farmers' autonomous behaviours for each use case are developed. Furthermore, although there could be some proposed reforms for the Common Agricultural Policy measures, other proposals could be extracted from the farmers' subjective impressions obtained from the Participatory Research. Therefore, another objective is to deduce possible reforms in order to simulate different scenarios with the ABM.

4.3.4 Use Case #1: Andalusia

In addition to filling the detected information gaps, another objective of the Participatory Research is to obtain enough data to develop a model capable of predicting which synthetic farms are liable to convert to organic farming. To this end, the data processing performed in [6] and [9] will be replicated with the data obtained from the Participatory Research. Therefore, four operations will be carried out with them:

1. **Data cleaning:** the resultant dataset is analysed in search of errors and gaps. This operation might reduce the amount of obtained data, although it is expected that most of them could be used.
2. **Data wrangling:** the data are analysed in order to deal with categorical variables, discretise some variables, assess the farmers' risk aversion and innovativity, and study possible relationships between different independent variables. This operation is essential to automate the following two ones.

3. **Influential factors:** although this operation might be included in the previous one, it is considered independent due to the fact that its results will be of utmost interest for this use case. This operation aims to study the influence of the farmer and farm features and surrounding circumstances, such as diffusion rate, market prices, and crop yield, on the organic farming conversion. Finally, the most influential independent variables will be extracted as predictive variables.
4. **Logistic regression model:** the data obtained in the previous step will be the baseline of the logistic regression model. The inputs of this model will be the predictive variables, and, on this basis, the model will predict a categorical variable, in this case, if the olive farm converts to organic farming or not. The model's accuracy will depend on the quality and volume of the data.

This model will allow estimating a diffusion rate of organic olive farming in Andalusia, and the evolution of this parameter could be analysed. Moreover, thanks to the available data, we could study the regions where this diffusion is higher or which farmer profile is more appropriate to convert to organic farming.

4.3.5 Use Case #2: Poland

The data obtained from the questionnaire, which are listed in [Section 6.2.2](#), will be statistically verified if they are representative and can be used to simulate properties of the farmers' synthetic population in the ABM model. After that, the data concerning various aspects of the protection of the environment, biodiversity and actions performed to deliver eco-services, possessed both from the questionnaire and Polish national agencies will be processed using statistical analysis. It will allow finding correlations between various factors describing farm status and activities and farmer attitude towards participating in the M10 action.

This analysis and simulations performed using the ABM model will enable us to estimate the KPIs concerning environmental and ecosystem services, which will be useful to recommend policy actions necessary to improve the efficiency of future actions aimed at farmers' involvement in environmental protection.

4.3.6 Use Case #3: Greece

The questionnaire built upon quantitative assessment includes Likert-scale questions that will be analysed with IBM SPSS Statistics software to extract robust results regarding the Greek Use Case participatory research. SPSS Statistics is a widely used software for statistical analysis, easy to handle and offers a range of capabilities. The purpose is to obtain profiles of the beneficiaries of Measure 6.1, both new entrants and new farmers, to detect potential beneficiaries. Moreover, the reason(s) why some beneficiaries dropped out of the programme will be analysed, and a general opinion of the measure, considering positive and negative aspects, will be built based on the subjective impressions of the respondents.

4.4 Tentative plan for the dissemination of results and for the generation of synergies among stakeholders

4.4.1 Use Case #1: Andalusia

After determining the results of all the Participatory Research, including both the extrapolation and interpretation of data from all the information collected, as well as the questionnaire for the selected sample, the aim is to disseminate them.

Cooperativas Agro-alimentarias de Andalucía proposes a communication plan whose general objective is to announce the project to the entities involved and the potential beneficiaries. Moreover, this plan aims to inform and communicate the project results to public and private, national and European bodies and entities that could be interested in the project. In addition, specific objectives are contemplated, such as:

- Make the public aware of what the project consists of, its objectives, the reason for its creation, the make-up of the member entities, its results, etc.
- Disseminate the progress made and the results obtained during the course of the project.
- Provide a documentary base and reference material for future work or studies.
- Encourage cooperatives or Agri-food industries in the sector to diversify their business activities, innovate, grow or adopt more innovative, creative or efficient techniques and practices, the results of the project itself.
- Carry out effective, transparent and understandable communication to the whole society on the project's themes.

All this dissemination will be carried out through press releases and regular publications in 'Cooperative Land' Magazine. (Revista 'Tierra cooperativa'). In addition to the dissemination provided by Cooperativas Agro-alimentarias, the results of this research may be the subject of future scientific publications, both for the continuity of previously published studies and for the emergence of new lines of research, involving the generation of synergies with different stakeholders.

4.4.1.1 COLUMELA PLAN [109]

The COLUMELA PLAN was a Plan designed by the Andalusian 'Regional Ministry of Agriculture, Livestock, Fisheries and Sustainable Development' to promote organic agriculture and livestock in Andalusia.

The participating sub-regions considered the promotion of organic agriculture as a key element for achieving territorial competitiveness and proposed a "Global Plan for Organic Agriculture" which comprises both local actions at each sub-region and also common cooperative actions among all participant sub-regions. This plan affected 158 municipalities (about 20,000 km²) populated by 782,695 inhabitants.

The specific objectives of this plan were:

1. To make the local populations aware of the distinguishing characteristics regarding nutritive, economics, social and environmental benefits of the products coming from organic agriculture and livestock.
2. To make the local farmers from participant sub-regions aware of the characteristics of organic farming, organic production and marketing of organic products. This encompass the techniques to apply, the economic results, the existing grants and the re-conversion processes.
3. To provide the managers of local farms willing to transition to organic farming in these sub-regions with sufficient and individualized information.
4. To raise cooperative and agri-food companies managers' awareness of the advantages of organic crops and organic livestock, for them to consider the establishment of organic products lines to handle the organic production of producers located within its geographical area of influence.
5. To coordinate organizations and public bodies related to organic agriculture for cooperating in valorising available resources.

6. To link organic production development to other lines of the sub-regions development strategy, like quality marks, environmental education, etc.
7. To recover the traditional knowledge that can be used in organic agriculture and livestock.

Three different campaigns were considered in the global plan

1. Awareness campaign among the general population about the characteristic of organic production.
2. Awareness campaign among farmers, managers of cooperatives, managers of agro-food companies and sales professionals.
3. Awareness campaign among students in non-higher education institutions.

4.4.2 Use Case #2: Poland

In the Polish Use Case, the main planned dissemination activity is the organization of a common (by IAPAS & UTP) scientific and business conference (workshop) (September 2021 – traditional, remote or hybrid form) for stakeholders, including representatives of public administration institutions responsible for agro-climate- environmental policies, farmers' organizations and agricultural advisory centres. During the conference, the main goals and ideas of the AGRICORE Project and partial findings from Participatory Research and/or AGRICORE suite application results based on the Agent-Based Model and synthetic population of farms will be presented. Another planned activity is to publish information of AGRICORE ideas, goals and the findings on websites of ARMA, Ministry, farmers organizations, advisory centres and students.

4.4.3 Use Case #3: Greece

Regarding the dissemination strategy, the plan is designed to maximise the project's potential impact through the implementation of broad-based and efficiently targeted dissemination activities for the findings of the Greek Use Case. To this end, three main target groups have been identified:

1. The Academic Community

The new knowledge that will be created will be disseminated throughout the academic fields engage scientists all over the world in the further development of research on this topic. This target could be achieved through manuscripts that will be submitted to peer-reviewed scientific journals. These papers will be submitted to high impact journals to ensure maximum impact from the scientific work carried out, moreover, through participation at conferences or organization of them and exchanging views with other scholars and professionals. By providing presentations at these conferences and publishing in various disciplinary and highly regarded academic journals, we will be reaching out beyond the narrow academic communities.

2. Policy-makers

Regional and local policy-makers will be one of the target group for dissemination activities. These policy-makers face questions relating to agricultural policy on a different level than European Policy Makers. Additionally, knowledge dissemination and exchange of the Greek Use Case will also take place through many different professional associations, networks and bodies dealing with the wider agricultural sector.

3. Stakeholders

In order to ensure practical results and effective dissemination, the acting stakeholders will be included from the beginning of the project implementation to receive valuable feedback and aim to keep them involved throughout the project duration. Furthermore, in the context of maximising the potential impact on these target groups, specific dissemination activities and

ambitions have been designed for each target group specifically. The overall objectives of the plan are to maximise internal and external communications, publish results in the academic field, translate and communicate the results to policy-makers and professionals, and involve and engage relevant stakeholders. Concerning the purposes of the Greek Use Case, the pool of relevant stakeholders includes:

- Greek Ministry of Rural Development and Food: Investment Unit in Agricultural Holdings of the Special Service for the Implementation of the Rural Development Program 2014-2020
- Greek National Rural Network (NRN)
- Payment and Control Agency for Guidance and Guarantee Community Aid (OPEKEPE)
- Directorate of Agricultural Economy and Fisheries of the Metropolitan Unit of Thessaloniki (Under General Directorate of Agricultural Economy and Veterinary Medicine)
- ELGO - DEMETER (Hellenic Agricultural Organization- Demeter)
- Panhellenic Union of Young Farmers
- Private Agricultural Consulting Services

In the next table ([Table 28](#)) are presented the reason for the selection of each one relevant stakeholder.

Table 28. List of relevant stakeholders (Source: own elaboration).

Relevant stakeholder	Reason for selection
Greek Ministry of Rural Development and Food: Investment Unit in Agricultural Holdings of the Special Service for the Implementation of the Rural Development Program 2014-2020	Responsible for the issuance of the institutional framework, the coordination, and the monitoring of the effective implementation of the following measures: <ul style="list-style-type: none"> • Sub- measure 4.1 - Investments in agricultural holdings. • Sub- measure 6.1 – Start-up aid for young farmers. • Sub-measure 6.3 - Start-up aid for the development of small farms. • Measure 5 - Restoration of the agricultural productive capacity affected by natural disasters and taking appropriate preventive actions.
Greek National Rural Network (NRN)	<ul style="list-style-type: none"> • Identify, analyse and disseminate information at local and national level on transferable relevant practices for rural development. • Disseminate the results of the Rural Development Programme (RDP) at local, national and EU level and • Strengthen capacity building for RDP evaluation purposes.
Payment and Control Agency for Guidance and Guarantee Community Aid (OPEKEPE)	<ul style="list-style-type: none"> • Its main task is the control and payment of beneficiaries, according to European and national Laws.

	<ul style="list-style-type: none"> • It is responsible for the payments of the beneficiaries and inspects the implementation of their obligations (experts).
Directorate of Agricultural Economy and Fisheries of the Metropolitan Unit of Thessaloniki (Under General Directorate of Agricultural Economy and Veterinary Medicine)	<ul style="list-style-type: none"> • Responsible for the implementation of National and Union Legislation on plant and animal production to promote all kinds of crops, farming, and good agricultural practices. • Study the possibilities of development and improvement of animal husbandry and provide suggestions for the decision -making of necessary measures. • Also study the utilization of the data of the production process, and care for the implementation of the programs of improving the quality of plant and animal products.
ELGO - DEMETER (Hellenic Agricultural Organization- Demeter)	<ul style="list-style-type: none"> • One of the Elgo's operations is the provision of professional agricultural education and training Agricultural professional training programs related to: New Farmers with two main directions of the specialized technical part of the Training Programs: Plant Production and Animal Production. • Responsible for training young farmers under the sub-measure 1.1, (mandatory in M6.1) (experts).
Panhellenic Union of Young Farmers	<ul style="list-style-type: none"> • It brings together all young farmers in local associations. • Aims to develop and upgrade agriculture and the entire countryside, using knowledge, innovation, and professionalism. • Promotes the profession and claims the best for the future of rural areas. • Examines issues related to young farmers and makes proposals for the development and modernization of all agricultural economy sectors while cooperating with public and local governments to make proposals to solve farmers' problems.
Private Agricultural Consulting Services	<ul style="list-style-type: none"> • Provision of consulting services, elaboration of investment studies and participation in investment programs such as: The installation of new farmers (Business plans). • Responsible for the business plans that the young farmers must submit. Have the knowledge of quality and quantity goals of the farms, the problems may occur, and the implementation of the business plans.

5 Conclusions

This Deliverable presents the participatory research activities developed during the first 18 months of the AGRICORE Project and the design and planning of PR activities to be developed during the coming months. The field of application of the project is the modelling of public agricultural policies. The relevant stakeholders for the project are all those involved in the life cycle of agrarian policies, from their design (policymakers), through their implementation (national and regional administrations), to the results of their application (the farm owners and farm workers whose activity and life is directly affected by them).

In this sense, for each of the three use cases initially contemplated in the GA (Spain, Greece and Poland), the process of identifying these stakeholders has been carried out over the last few months, as presented in [Section 6.5](#). For some of them, contact has already been established, and information is already flowing in both directions: the stakeholders are providing information required by the project, and the Consortium is communicating information resulting from the project to the stakeholders. During the remainder of the project, this work should continue along several lines. On the one hand, consolidating and extending these communication channels, making the data obtained public so that they can be known by other stakeholders, even those not identified a priori. On the other hand, building synergies between the various stakeholders, initially with the AGRICORE Consortium acting as an enhancer, but with the intention that they can endure even when the project ends. These synergies should be aimed at achieving the following objectives:

1. To bring farm owners and farmworkers, individually or in associations and cooperatives, into the loop of public agricultural policy-making. These actors can participate either by directly proposing alternative measures or indirectly by providing reliable data on how the various policy measures affect their lives and their farms' socio-economic state.
2. To enable public administrations in charge of implementing the EU policies to identify information gaps that are relevant for the impact analysis of these policies. Also, to provide them with more rapid and representative mechanisms for obtaining data on these impacts.
3. To list all data and reports generated (and often unpublished) over the last decade on the implementation and impact of the respective measures under study so that they are available to other departments of the same public administrations, to other different public administrations, or to EU policymakers.
4. To allow policymakers to explain transparently to policy recipients the criteria used to choose among various alternative measures, based on data analysis and simulation using the tools provided by AGRICORE.
5. To assist in filling some information gaps if the results of the questionnaires are not sufficiently conclusive.

At AGRICORE, participatory research is not merely an activity included to justify stakeholder involvement, but it is also fundamental for:

- the calibration and iterative re-adaptation of the initial model designed for the agents.
- the design of complementary models of the AGRICORE suite (e.g., for impact assessment).
- the study of factors determining the achievement of the objectives of the CAP measures in each use case (farmer profile, type of farm, etc.).
- the design of possible reforms of the current policy instruments based on the respondents' subjective perceptions, which could be simulated using the AGRICORE suite.

In this sense, the first step was selecting those attributes (Attributes Table) that would be necessary to simulate the agribusiness activity of each synthetic agent, representing a real farm.

Subsequently, each attribute had to be matched with the data source(s) through which it would be possible to assign a value for that attribute. In this step, information gaps are identified. These are attributes for which there are no data sources or for which the data sources are not statistically representative or do not have sufficient spatial or temporal resolution.

To initialise every one of the agents' attributes, it is therefore essential to design participatory research mechanisms to fill the information gaps detected in the previous point. The design of these activities is presented in section X. The three use cases have opted for a questionnaire focused on farmers affected by each of the respective measures under study. Each use case will have its own information gaps, and therefore the selection of questions for each questionnaire is independent. However, there are also questions common to all three questionnaires, since so are the agents' attributes that will simulate the farms in all cases.

The questionnaires for each use case were reviewed by the organizations responsible for the other use cases within the Consortium. Besides, in all of them, pilot survey processes were carried out to check the correct understanding of the questions and the completion of the questionnaire below a reasonable time of 20 minutes. Considering the limitations that the COVID-19 epidemic will foreseeably impose on face-to-face surveys, electronic versions of the questionnaires have also been designed so that they can be completed online.

Once the tools for obtaining the information had been constructed, the research subjects were selected; in other words, the statistical sample was designed. The first step was to identify the beneficiaries of the measures under study in the respective national registers corresponding to each use case. Then, the respondents were chosen according to statistical representativeness criteria to determine the samples' size and stratification.

Finally, and even before performing the survey campaigns, each of the organizations responsible for each use case outlined a plan for the transformation of the data obtained and their scientific use, not only for the AGRICORE Project itself but also for their potential dissemination in the form of scientific publications or informative sectoral communications.

Thus, practically all the participatory research activities associated with the AGRICORE Project have been designed and are ready for implementation over the coming months. The aggregation of all the activities mentioned above, and their generalisation to generic cases, will constitute the foundations of the 'Methodology for the identification of information gaps through participatory research actions' (D1.7), which will be ready by November 2021.

For preparing this report, the following deliverables have been taken into consideration:

Deliverable Number	Deliverable Title	Lead beneficiary	Type	Dissemination Level	Due date
D1.1	Standardised methodology and set of ontologies for the ation of data sources	UNIPR	Report	Public	M09
D10.7	Directives on gender equality and non-discrimination within AGRICORE	IDE	Report	Public	M06
D11.2	POPD – Requirement No. 3	IDE	Ethics	Confidential	M18

6 References

1. [^] S. Abar, G. K. Theodoropoulos, P. Lemarinier, and G. M. P. O'Hare, "Agent Based Modelling and Simulation tools: A review of the state-of-art software," *Computer Science Review*, vol. 24, pp. 13–33, 2017, doi: 10.1016/j.cosrev.2017.03.001.
2. [^] R. Huber et al., "Representation of decision-making in European agricultural agent-based models," *Agricultural Systems*, vol. 167, no. November 2019, pp. 143–160, 2018, doi: 10.1016/j.agry.2018.09.007.
3. [^] D. Kremmydas, I. N. Athanasiadis, and S. Rozakis, "A review of Agent Based Modeling for agricultural policy evaluation," *Agricultural Systems*, vol. 164, no. March, pp. 95–106, 2018, doi: 10.1016/j.agry.2018.03.010.
4. [^] D. Kremmydas, "Agent based modeling for agricultural policy evaluation: A review," no. April, Athens, p. 19, 2014.
5. [^] K. Happe, *Agricultural policies and farm structures: Agent-based modelling and application to EU-policy reform*, vol. 30. Leibniz Institute of Agricultural Development in Transition Economies (IAMO), 2004.
6. [^] ¹²³ Parra López, C. and Calatrava Requena, J., "Factors related to the adoption of organic farming in Spanish olive orchards," *Spanish Journal of Agricultural Research*, vol. 3, no. 1, p. 5, 2005, doi: 10.5424/sjar/2005031-119.
7. [^] J. Milgroom, Soriano, María Auxiliadora, Garrido, José M., Gómez, José A., and Fereres, Elías, "The influence of a shift from conventional to organic olive farming on soil management and erosion risk in southern Spain," *Renewable Agriculture and Food Systems*, vol. 22, no. 1, pp. 1–10, 2007, doi: 10.1017/S1742170507001500.
8. [^] B. A. Bryan, J. Ward, and N. D. Crossman, "Modelling farmer decision making for natural resource management outcomes," *Proceedings of the iEMSs 3rd Biennial Meeting, "Summit on Environmental Modelling and Software"*, 2006.
9. [^] ¹²³ C. Parra-Lopez, De-Haro-Giménez, Tomás, and J. Calatrava-Requena, "Diffusion and adoption of organic farming in the Southern Spanish olive orchards," *Journal of Sustainable Agriculture*, vol. 30, no. 1, pp. 105–151, 2007, doi: 10.1300/J064v30n01_09.
10. [^] C. Carmona-Torres et al., "Multifunctional Impacts of the Olive Farming Practices in Andalusia, Spain: An Analytic Network Approach," 2011.
11. [^] S. Mili, Júdez, Lucinio, and de Andrés, Rosario, "Effects of New CAP Reform and Trends in Sustainable Olive Growing Systems in Southern Spain," in *International Conference of Agricultural Economists*, 2015, p. 18.
12. [^] ¹² ² Consejería de Agricultura, Ganadería, Pesca y Desarrollo Sostenible, *Texto Consolidado M11*. Andalucía, España, 2018.
13. [^] Unidad Prospectiva de la Consejería de Agricultura y Pesca de la Junta de Andalucía, *El olivar Andaluz*. 2002.
14. [^] C. R. R. Pleguezuelo Zuazo, V. H. D. .. Martínez, J. R. F. et al., "Organic olive farming in Andalusia, Spain. A review," *Springer*, vol. 38, 2018, doi: 10.1007/s13593-018-0498-2.
15. [^] ¹²³ P. y D. S. Consejería de Agricultura Ganadería, "Avance de Superficies y Producción." 2020, [Online]. Available: <https://www.juntadeandalucia.es/organismos/agriculturaganaderiapescaydesarrollosostenible/servicios/estadistica-cartografia/estadisticas-agricolas/paginas/avance-superficie-producciones-agricolas.html>.

16. ^ [1](#) [2](#) A. C. on Olive Oil and T. O. of the International Olive Council, "III Exchange of information on operational activities of the IOC Economy and Promotion." 2020, [Online]. Available: <https://www.internationaloliveoil.org/advisory-committee-55th-meeting-on-10-november-2020/?lang=es>.
17. ^ [1](#) [2](#) Consejería de Agricultura, Ganadería, Pesca y Desarrollo Sostenible, Aforo de Producción de Aceituna de Mesa en Andalucía, Campaña 2020-2021. 2020.
18. ^ [L](#) [G](#) [N](#)ogales, "Importancia económica y perspectivas empresariales del sector oleícola andaluz: el caso de Oleoestepa," Sevilla, España, 2018.
19. ^ [1](#) [2](#) [3](#) Consejería de Agricultura, Ganadería, Pesca y Desarrollo Sostenible, Aforo de Producción del Olivar de Almazara en Andalucía, Campaña 2020-2021. 2020.
20. ^ [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) Consejería de Agricultura Pesca y Desarrollo Sostenible, Plan Director del Olivar Andaluz. 2015, p. 146.
21. ^ [P](#) [y](#) [A](#) [Ministerio](#) [de](#) [Agricultura](#), "Encuesta sobre Superficies y Rendimientos de cultivo. Informe sobre regadíos en España." 2019, [Online]. Available: https://www.mapa.gob.es/es/estadistica/temas/estadisticas-agrarias/regadios2019_tcm30-526243.pdf.
22. ^ [P](#) [y](#) [D](#) [R](#) [Consejería](#) [de](#) [Agricultura](#), "Costes en Explotaciones de olivar campaña 2015/2016," Junta de Andalucía, Oct. 2017.
23. ^ [E](#) [Cabrera](#), [R](#) [Gallardo-Cobos](#), and [J](#) [Gomez-Limon](#), "La sostenibilidad del olivar: producción convencional vs. ecológica en Los Pedroches," Información técnica económica agraria, vol. vol 109-3, pp. 345–369, Jun. 2013, doi: 10.12706/itea.2013.021.
24. ^ [1](#) [2](#) [3](#) [GUS](#), "Rocznik Statystyczny Rolnictwa 2019," stat.gov.pl. [Online]. Available: <https://stat.gov.pl/obszary-tematyczne/roczniki-statystyczne/roczniki-statystyczne/rocznik-statystyczny-rolnictwa-2019,6,13.html>.
25. ^ [1](#) [2](#) [3](#) [GUS](#), "STRATEG." [Online]. Available: <https://strateg.stat.gov.pl/#/strategie/krajowe/1003>.
26. ^ [ELSTAT](#), Gross value added by Industry. 2019.
27. ^ [ELSTAT](#), Employment. 2019.
28. ^ [12](#) [Eurostat](#), Agriculture, forestry and fishery statistics. 2017.
29. ^ [1](#) [2](#) [3](#) [4](#) [5](#) [MRDF](#), Rural development programme 2007-2013. Athens, Greece, 2014.
30. ^ [ELSTAT](#), Economic characteristics of Greek Population. 2019.
31. ^ [ELSTAT](#), Labour force survey. 2019.
32. ^ [ELSTAT](#), "AIR EMISSION ACCOUNTS," Athens, Greece, 2019. [Online]. Available: https://www.statistics.gr/en/statistics?p_p_id=documents_WAR_publicationsportlet_INSTANCE_qDQ8fBKKo4lN&p_p_lifecycle=2&p_p_state=normal&p_p_mode=view&p_p_cacheability=cacheLevelPage&p_p_col_id=column-2&p_p_col_count=4&p_p_col_pos=1&p_p_documents_WAR_publicat.
33. ^ [1](#) [2](#) [P](#) [Cook](#) and [F](#) [Williams](#), "Barriers to New Entrants to Scottish Farming," 2008. [Online]. Available: http://www.tenantfarmingforum.org.uk/eblock/services/resources.ashx/000/244/597/58_final_report_from_contractors.pdf.
34. ^ [1](#) [2](#) [L](#) [Zagata](#) and [Lošt'ak](#), M, "Farming Transitions: Pathways Towards Regional Sustainability of Agriculture in Europe," 2013.

35. ^{^ 12}A. Kontogeorgos, A. Michailidis, F. Chatzitheodoridis, and E. Loizou, “New Farmers’ a Crucial Parameter for the Greek Primary Sector: Assessments and Perceptions,” *Procedia Economics and Finance*, vol. 14, pp. 333–341, 2014, doi: [https://doi.org/10.1016/S2212-5671\(14\)00721-7](https://doi.org/10.1016/S2212-5671(14)00721-7).
36. ^{^ 12}J. Redigor, “EU measures to encourage and support new entrants. In: Policy Department B structural and cohesion policies. Agriculture and Rural Development,” 2012. [Online]. Available: [http://www.europarl.europa.eu/RegData/etudes/note/join/2012/495830/IPOL-AGRI_NT\(2012\)495830_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/note/join/2012/495830/IPOL-AGRI_NT(2012)495830_EN.pdf).
37. [^]D. oficial de la Unión Europea, “Reglamento 1305 2013 del Parlamento Europeo,” *Diario oficial de la Unión Europea*, 2013.
38. [^]D. oficial de la Unión Europea, “Reglamento 1306 2013 del Parlamento Europeo,” *Diario oficial de la Unión Europea*, 2013.
39. [^]D. oficial de la Unión Europea, “Reglamento 1307 2013 del Parlamento Europeo,” *Diario oficial de la Unión Europea*, 2013.
40. [^]D. oficial de la Unión Europea, “Reglamento 1308 2013 del Parlamento Europeo,” *Diario oficial de la Unión Europea*, 2013.
41. [^]M. de la Presidencia Relaciones con las cortes y Memoria democrática, “Pagos directos a la Agricultura y a la Ganadería,” Gobierno de España, 2014.
42. [^]D. oficial de la Unión Europea, “Reglamento CE 834/2007 producción y etiquetado de productos ecológicos,” *Diario oficial de la Unión Europea*, Jun. 2007.
43. [^]Junta de Andalucía, “Orden por la que se aprueban en la Comunidad Autónoma de Andalucía las bases reguladoras para la concesión de subvenciones a la Medida 11 incluidas en el PDR,” Junta de Andalucía, May 2015.
44. [^]Junta de Andalucía, “Se efectúa convocatoria para la media M11,” Junta de Andalucía, Feb. 2018.
45. [^]Junta de Andalucía, “Ampliación periodo compromiso de las subvenciones de la Medida 11,” Junta de Andalucía, 2019.
46. [^]Junta de Andalucía, “Ampliación periodo compromiso de las subvenciones de la Medida 11,” Junta de Andalucía, 2020.
47. [^]K. Giemza, “Wdrażanie funduszy europejskich w polskim rolnictwie na przykładzie Programu Rozwoju Obszarów Wiejskich na lata 2014-2020,” *Studia z Polityki Publicznej*, vol. 15, no. 3, pp. 81–97, 2017, [Online]. Available: <https://www.ceeol.com/search/article-detail?id=725622>.
48. [^]PROW, Program Rozwoju Obszarów Wiejskich 2014-2020 (PROW 2014-2020). 2020.
49. ^{^ 123}Agencja Restrukturyzacji i Modernizacji Rolnictwa, “Sprawozdania z działalności Agencji Restrukturyzacji i Modernizacji Rolnictwa,” Warszawa, 2020. [Online]. Available: <https://www.arimr.gov.pl/dla-beneficjenta/biblioteka/sprawozdania-z-dzialalnosci-agencji-restrukturyzacji-i-modernizacji-rolnictwa.html>.
50. ^{^ 123}I. E. Rolnictwa and Gospodarki Żywnościowej – PIB, “Polski FADN.” [Online]. Available: <https://fadn.pl/>.
51. ^{^ 12}GUS, “Rolnictwo w 2019 roku,” stat.gov.pl. [Online]. Available: <https://stat.gov.pl/obszary-tematyczne/rolnictwo-lesnictwo/rolnictwo/rolnictwo-w-2019-roku,3,16.html>.

52. [^] [B. Feledyn-Szewczyk](#), "Bioróżnorodność roślin jako element zrównoważonego rozwoju rolnictwa," *Studia i Raporty IUNG-PIB*, vol. 40, no. 14, pp. 163–177, 2014.
53. [^] [B. Gnusowski](#), [A. Nowacka](#), [B. Łozowicka](#), [E. Szpyrka](#), and [S. Walorczyk](#), "Pozostałości środków chemicznej ochrony roślin w roślinnej produkcji ekologicznej," *Journal of Research and Applications in Agricultural Engineering*, vol. Vol. 56, no. nr 3, pp. 102–107, 2011, [Online]. Available: <http://yadda.icm.edu.pl/yadda/element/bwmeta1.element.baztech-article-BAR8-0013-0019>.
54. [^] [J. Tyburski](#), "Dzika bioróżnorodność ekosystemów rolnych i metody jej ochrony," [Tyburski J.](#), [Kostrzewska MK](#), *Biologiczna różnorodność ekosystemów rolnych oraz możliwości jej ochrony w gospodarstwach ekologicznych*, Olsztyn, pp. 279–291, 2013.
55. [^] [A. K. Berbec](#), "Bioróżnorodność i usługi ekosystemowe w rolnictwie," *Wies Jutra*, no. 2, 2014, [Online]. Available: <http://agro.icm.edu.pl/agro/element/bwmeta1.element.agro-f2368fe4-101a-44fc-91b4-d9bebd66ec88>.
56. [^] [G. Nieweglowska](#), "Analiza możliwości wykorzystania wskaźników powiązanych z produkcją zaproponowanych przez Komisję Europejską (KE) oraz zaproponowanie wskaźników specyficznych dla produkcji rolnej w Polsce w ramach delimitacji obszarów ONW w 2010 r., ekspertyza wykonana dla MRiRW," *IERiGŻ–PIB*, Warszawa, 2010.
57. [^] [A. Kostrzewski](#), [A. Mizgajski](#), [M. Stępniewska](#), and [J. Tylkowski](#), "The use of Integrated Environmental Programme for ecosystem services assessment," 2014.
58. [^] [A. Pietrzyk-Kaszyńska et al.](#), *Usługi ekosystemów na obszarach cennych przyrodniczo z perspektywy różnych grup interesariuszy*. Kraków: Instytut Ochrony Przyrody PAN, 2016.
59. [^] ^{1 2} [Ministerstwo Rolnictwa i Rozwoju Wsi](#), *PRZEWODNIK PO DZIAŁANIU ROLNO-ŚRODOWISKOWO-KLIMATYCZNYM PROW 2014–2020*. 2019.
60. [^] ^{1 2} [F. Chatzitheodoridis](#) and [A. Kontogeorgos](#), "New entrants policy into agriculture: researching new farmers satisfaction," *Revista de Economia e Sociologia Rural*, vol. 58, 2020, [Online]. Available: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-20032020000100205&nrm=iso.
61. [^] [EEC](#), *COUNCIL REGULATION (EEC) No 797/85 of 12 March 1985 on improving the efficiency of agricultural structures*. 1985.
62. [^] [EEC](#), *Corrigendum to Council Regulation (EEC) No 2328/91 of 15 July 1991 on improving the efficiency of agricultural structures*. 1991.
63. [^] [European Commission](#), *COUNCIL REGULATION (EC) No 950/97 of 20 May 1997 on improving the efficiency of agricultural structures*. 1997.
64. [^] [European Commission](#), *EUR-Lex - 31999R1257 - EN - EUR-Lex*. 1999.
65. [^] [European Commission](#), *EUR-Lex - 32005R1698 - EN - EUR-Lex*. 2005.
66. [^] ^{1 2} [European Union](#), *REGULATION (EU) No 1305/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005*. 2013.
67. [^] [E. Schimmenti](#), [V. Borsellino](#), [A. Ferreri](#), [M. D. Gesaro](#), and [M. D. Acquisto](#), "Implementation and prospects of the rural development policy in Sicily to support young farmers," *Italian Review of Agricultural Economics*, vol. 69, no. 1, pp. 31–42, 2014, doi: 10.13128/REA-16306.

68. [^] [European Union](#), REGULATION (EU) No 1307/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 December 2013 establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy and repealing Council Regulation . 2013.
69. [^] [European Commission](#), COMMISSION RECOMMENDATION of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises. European Commission, 2003.
70. [^] [MRDF](#), Rural Development-Rural Restructure Program. 2007.
71. [^] [MRDF](#), "Annual Report of 2015 for 2007-2013 RDP (in Greek)," Athens, Greece, 2016. [Online]. Available: http://archive.agrotikianaptixi.gr/Uploads/Files/ethsia_ekthesi_paa_2007_2013_gia_to_2015.pdf.
72. [^] [MRDF](#), Rural Development Programme 2014-2020: Establishment of Young Farmers (in Greek). 2020.
73. [^] [G. Arabatzis](#), "European Union, Common Agricultural Policy (CAP) and the afforestation of agricultural land in Greece," *New Medit*, vol. 4, no. 4, p. 48, 2005.
74. [^] [L. Zagata et al.](#), Young farmers-Policy implementation after the 2013 CAP reform STUDY. 2017.
75. [^] [FEADER](#), "Informe de evaluación del Programa de Desarrollo Rural de Andalucía 2014-2020," Ministerio de Agricultura Alimentación y Medio Ambiente, 2017.
76. [^] [FEADER](#), "Informe de Evaluación del Programa de Desarrollo Rural de Andalucía 2014-2020," Ministerio de Agricultura Alimentación y Medio Ambiente, 2019.
77. [^] [12eurostat](#), "Agri-environmental indicators (AEIs) - Agriculture - Eurostat." [Online]. Available: <https://ec.europa.eu/eurostat/web/agriculture/agri-environmental-indicators>.
78. [^] [123GUS](#), "Ochrona środowiska 2018," stat.gov.pl. [Online]. Available: <https://stat.gov.pl/obszary-tematyczne/srodowisko-energia/srodowisko/ochrona-srodowiska-2018,1,19.html>.
79. [^] [1234GUS](#), "Ochrona środowiska 2017," stat.gov.pl. [Online]. Available: <https://stat.gov.pl/obszary-tematyczne/srodowisko-energia/srodowisko/ochrona-srodowiska-2017,1,18.html>.
80. [^] [1234GUS](#), "Ochrona środowiska 2016," stat.gov.pl. [Online]. Available: <https://stat.gov.pl/obszary-tematyczne/srodowisko-energia/srodowisko/ochrona-srodowiska-2016,1,17.html>.
81. [^] [1234GUS](#), "Ochrona środowiska 2015," stat.gov.pl. [Online]. Available: <https://stat.gov.pl/obszary-tematyczne/srodowisko-energia/srodowisko/ochrona-srodowiska-2015,1,16.html>.
82. [^] [J. Solon](#), "Koncepcja" Ecosystem Services" i jej zastosowania w badaniach ekologiczno-krajobrazowych," *Problemy ekologii krajobrazu*, vol. 21, 2008.
83. [^] [GUS](#), "Rolnictwo w 2018 roku," stat.gov.pl. [Online]. Available: <https://stat.gov.pl/obszary-tematyczne/rolnictwo-lesnictwo/rolnictwo/rolnictwo-w-2018-roku,3,15.html>.
84. [^] [GUS](#), "Rolnictwo w 2015 roku," stat.gov.pl. [Online]. Available: <https://stat.gov.pl/obszary-tematyczne/rolnictwo-lesnictwo/rolnictwo/rolnictwo-w-2015-roku,3,12.html>.

85. [^] C. Europea, “Reglamento COD 2018/0216 Planes estratégicos de la PAC,” Bruselas, Jun. 2018.
86. [^] P. y A. Ministerio de Agricultura, “Reglamento Transitorio que Garantiza el pago de la PAC.” 2020, [Online]. Available: <https://www.mapa.gob.es/es/prensa/ultimas-noticias/aprobado-el-reglamento-transitorio-que-garantiza-la-continuidad-del-pago-de-las-ayudas-de-la-pac-en-2021-y-2022/tcm:30-553659>.
87. [^] P. y A. Ministerio de Agricultura, “Plan estratégico para la PAC post2020.” 2020, [Online]. Available: <https://www.mapa.gob.es/es/pac/post-2020/default.aspx>.
88. [^] Instituto de Investigación y Formación Agraria y Pesquera (IFAPA), La Poda de Producción del Olivo - YouTube. 2015.
89. [^] A. Tombesi and S. Tombesi, “Olive pruning and training,” in *Production techniques in olive growing*, 1st ed., Madrid: International Olive Council, 2007, p. 346.
90. [^] ¹²³⁴⁵ J. Casado, *Calendario de Labores del Olivo* | Gesmontes. .
91. [^] Fondo Español de Garant[1]a Agraria, *Referencias orientativas de calendarios de labores para grupos de cultivos*. 2020.
92. [^] A. Tombesi and S. Tombesi, “Olive harvesting and mechanization,” in *Production techniques in olive growing*, 1st ed., Madrid: International Olive Council, 2007, p. 346.
93. [^] ¹²³⁴ Rodríguez, N., López, I., and F. Ortiz, *Olivar ecológico*. Seville: Junta de Andalucía. Consejería de Agricultura y Pesca. Instituto de Investigación y Formación Agraria y Pesquera, 2011, p. 60.
94. [^] Molina de la Rosa, José Luis, Jiménez Herrera, Brígida, Ruiz Coletto, Félix, García Zamorano, Francisco, López Caballero, Francisco, and Salmerón Rodríguez, Eva, *Agronomía y poda del olivar*. Seville, 2010, pp. 368–370.
95. [^] R. Fernández-Escobar, “Fertilisation,” in *Production techniques in olive growing*, 1st ed., Madrid: International Olive Council, 2007, p. 346.
96. [^] GUS, “Agriculture. Forestry,” [stat.gov.pl](https://stat.gov.pl/en/topics/agriculture-forestry/). [Online]. Available: <https://stat.gov.pl/en/topics/agriculture-forestry/>.
97. [^] European Commission, *FADN Database*. 2020.
98. [^] R. E. Freeman, *Strategic Management: A Stakeholder Approach*. Cambridge University Press, 2010.
99. [^] T. Jahn, M. Bergmann, and F. Keil, “Transdisciplinarity: Between mainstreaming and marginalization,” *Ecological Economics*, vol. 79, pp. 1–10, 2012, doi: <https://doi.org/10.1016/j.ecolecon.2012.04.017>.
100. [^] A. Stirling, “‘Opening Up’ and ‘Closing Down’: Power, Participation, and Pluralism in the Social Appraisal of Technology,” *Science, Technology, & Human Values*, vol. 33, no. 2, pp. 262–294, 2008, doi: [10.1177/0162243907311265](https://doi.org/10.1177/0162243907311265).
101. [^] M. J. Salganik and D. D. Heckathorn, “Sampling and Estimation in Hidden Populations Using Respondent-Driven Sampling,” *Sociological Methodology*, vol. 34, no. 1, pp. 193–240, 2004.
102. [^] L. A. Goodman, “Snowball Sampling,” *The Annals of Mathematical Statistics*, vol. 32, no. 1, pp. 148–170, 1961, doi: [10.2307/2237615](https://doi.org/10.2307/2237615).
103. [^] Aldanondo Ochoa, A M, Casanovas Oliva, V, and Almansa Sáez, C, “Explaining farm succession: The impact of farm location and off-farm employment opportunities,” *Spanish Journal of Agricultural Research*, vol. 5, no. 2, pp. 214–225, 2007, doi: [10.5424/sjar/2007052-241](https://doi.org/10.5424/sjar/2007052-241).

104. [^] D. Cavicchioli, D. Bertoni, and R. Pretolani, "Farm succession at a crossroads: The interaction among farm characteristics, labour market conditions, and gender and birth order effects," *Journal of Rural Studies*, vol. 61, no. November 2017, pp. 73–83, 2018, doi: 10.1016/j.jrurstud.2018.06.002.
105. [^] K. S. Klair, A. Boggia, and D. W. Richardson, *THE CHANGING INFORMATION NEEDS OF FARMERS IN THE U.S. AND EUROPE*, no. 1685-2016–137100. Minneapolis, USA, 1998, p. 12.
106. [^] D. Cavicchioli, D. Bertoni, F. Tesser, and D. G. Frisio, "What Factors Encourage Intrafamily Farm Succession in Mountain Areas?" *Mountain Research and Development*, vol. 35, no. 2, pp. 152–160, 2015, doi: 10.1659/MRD-JOURNAL-D-14-00107.1.
107. [^] I. Bassi, L. Cesaro, F. Cisilino, and G. Zilli, "I DATI RICA PER LA VALUTAZIONE DI PIANI E PROGRAMMI," Friuli Giulia, Italy, 2006. [Online]. Available: http://dspace.crea.gov.it/bitstream/inea/394/1/analisi2_reg_friuli.pdf.
108. [^] S. Tarangioli, "La programmazione e la gestione della Politica di sviluppo rurale," 2005. [Online]. Available: https://www.researchgate.net/profile/Serena_Tarangioli/publication/305816947_La_programmazione_e_la_gestione_della_Politica_di_sviluppo_rurale/links/57a34a5208aef3c1a7b4c54d/La-programmazione-e-la-gestione-della-Politica-di-sviluppo-rurale.pdf.
109. [^] P. y D. S. Consejería de Agricultura Ganadería, "Plan Columela." 2006, [Online]. Available: <https://www.juntadeandalucia.es/organismos/agriculturaganaderiapescaydesarrollosostenible/areas/produccion-ecologica/promocion/paginas/campanas-plan-columela-manuales.html>.
110. [^] ^{1.2} Consejería de Agricultura, Ganadería, Pesca y Desarrollo Sostenible, *Manual de Procedimientos de certificación ecológica en Andalucía*. Andalucía, España, 2015.

7 Appendix A - Process for obtaining the organic certification associated with Measures M11.1 and M11.2 in Andalusia.

Manual of organic certification procedures in Andalusia[\[110\]](#)

Content

- What is certification?
- Who can certify?
- What can be certified?
- How is it certified?
- Submission to the control regime
- Control requirements
- Traceability
- Check list

Organic production in Europe, and therefore in Andalusia, is regulated by Regulation (CE) No 834/07 on organic production and labelling of organic products, which is directly applicable in all EU Member States. In Andalusia it is developed through Decree 166/2003.

This regulation establishes the objectives and principles on which organic farming is based, its general production rules, and also defines the possible ways in which certification can be carried out, which is what is known as the control system.

It follows from the above that organic production is a controlled activity, which means that all products placed on the market using the terms "organic", "fair trade", "organic" and "sustainable" must be certified.

• **What is the certification?**

In a scenario where the organic producer is on one side and the consumer on the other, the certification of a product consists of the verification of the requirements of a standard by a third party who has no interest in the production and/or processing processes.

In our case, the standard is Regulation (CE) No 834/07, and Regulation (CE) No 889/08 laying down detailed rules on organic production, labelling and control.

The third party must be an entity designated or authorised by the competent authority.

• **Who can certify?**

Regulation (EC) No 834/07 provides that each country is to establish the model by which control and certification of organic production is to be carried out by designating one or more competent authorities, which may in turn confer their powers of inspection and certification on one or more control authorities, or delegate inspection and certification tasks to one or more private control bodies.

The powers to define the certification model for organic production in Spain are vested in the Autonomous Communities.

In Andalusia, the competent authority since 2033 is the Ministry of Agriculture, Livestock, Fisheries and Sustainable Development, which has chosen to delegate inspection and certification functions to third party, private and independent entities, known as control bodies.

The situation is different in the rest of the communities, some of which have chosen to confer their inspection and certification powers on a public administrative organization (control authority) and others have opted for a mixed system of public and private entities.

In addition, Regulation (EC) No 834/07, requires as a requirement for the delegation of inspection and certification functions to private control bodies, which are accredited according to UN-EN ISO/IEC 17065 on requirements for bodies that certify products, processes and services.

- **What can be certified?**

Agricultural and livestock products from primary production, seaweed and aquaculture animals, products processed from these products for use in human food, yeasts for human consumption and animal feed can be certified.

- **How is it certified?**

The way certification is carried out is called "conformity assessment" or "third party certification", since it is an entity outside the operator that carries out checks to evaluate the conformity of the procedures established by the operator and of the processes taking place in the production unit, with respect to Regulation (EC) No 834/07.

The certification process begins when an operator (farmer, livestock owner, industry, marketer or importer) is subject to the control system of an inspection body. This takes the form of a request for information from an operator to an inspection body. In response, the inspection body sends him a request or questionnaire which must be completed and sent to the inspection body together with the relevant documentation.

Once the questionnaire and the accompanying documentation have been reviewed, and when this is in accordance with the requirements of the control body, an inspector will be appointed to carry out the verification of the information provided in the application, by means of a visit to the production unit.

After the hearing, the inspector draws up a report which will be assessed by staff who have not taken part in the inspection process. If the result of the assessment is in conformity, the applicant is issued with a document certifying that he is subject to the control system, but that in no case may it be used to market the products with references to the organic production method, since according to Regulation (EC) No 834/07, products obtained during the first year of conversion to organic farming, cannot be marketed as organic, nor with references to conversion to organic farming.

If the result of the assessment is not in conformity, the applicant is informed that he must resolve those aspects which do not comply with the Regulation on organic production by proposing a plan of corrective action. If the plan is satisfactory, the dossier is re-evaluated and brought into conformity, at which time the document referred to in the previous paragraph is issued.

If the result of the evaluation of the corrective actions continues to be non-compliant, the file will be closed.

Once the document certifying that the applicant is subject to the control system has been issued, the applicant becomes part of the control body's inspection programme. This programme must be organized in such a way as to ensure that each operator is visited at least once a year. After the visit, the inspector draws up a new report which will be assessed by staff who have not taken part in the inspection process. If the result of the assessment is satisfactory, the operator is issued with a certificate which can be used to market his products with the words "produced in conversion to organic farming" or "organic", depending on the length of the conversion period for the crop in question. For olive cultivation, the conversion period is 3 years. This document is known as the "Certificate of Conformity".

If the result of the assessment is not in conformity, the operator is informed that he must resolve those aspects that do not comply with the Regulation on organic production by establishing a plan of corrective action. If this is satisfactory, the dossier is re-evaluated and brought into conformity, at which point a certificate of conformity is issued.

In cases where the result of the assessment continues to be non-compliant, the certificate of conformity will not be issued or renewed, depending on the status of the file.

After the issue of the certificate of conformity, the operator is taken into account in the inspection programme so that the process described is repeated.

OVERVIEW CERTIFICATION PROCESS

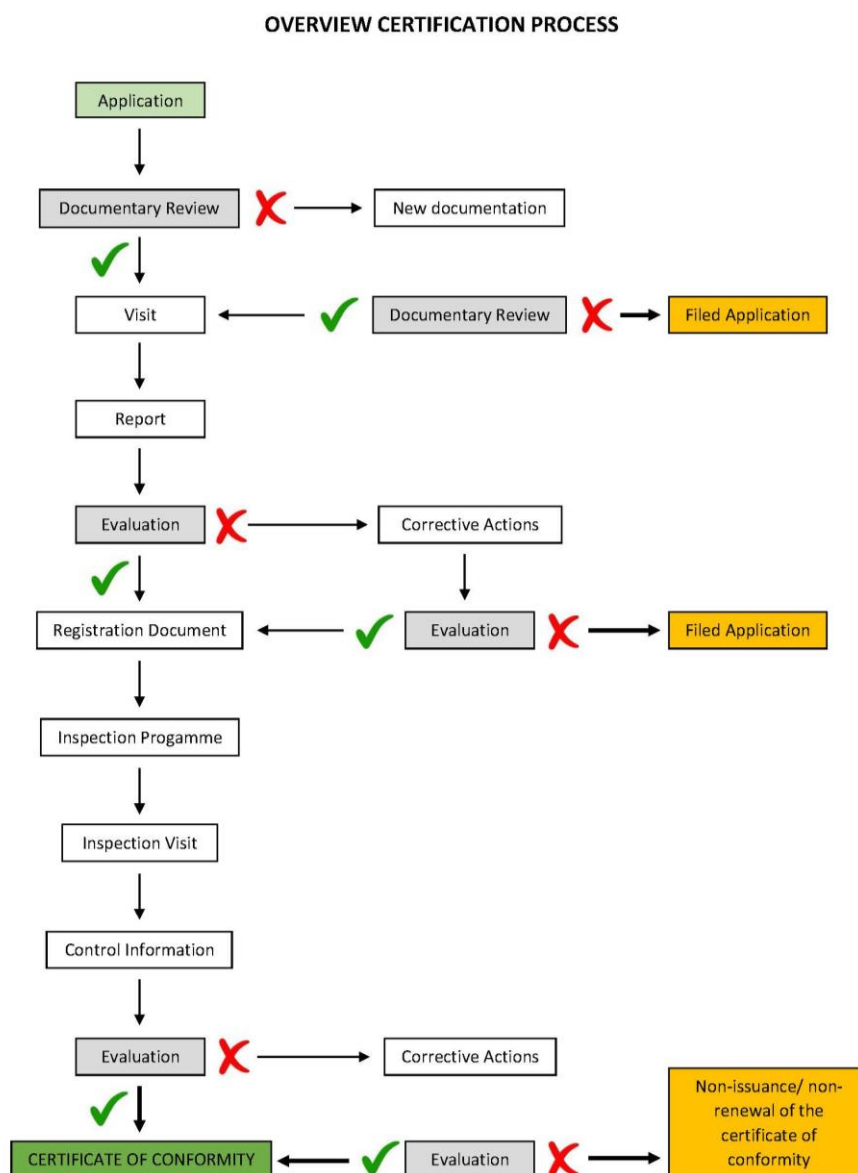


Figure 9. Overview certification process (Source: based on [110])

Submission to the control regime

When an operator is subject to the control system for organic production, he must:

- Provide certain information to the control body relating to the location, description of the production unit, establishment and maintenance of records, as well as measures to be taken to avoid or reduce the risk of contamination.
- Assume a series of commitments that can be summarised as carrying out operations in accordance with the rules of organic production, and assume their non-respect.
- To allow the inspection body access to the production unit, accounts and relevant supporting documents, and to provide all information reasonably considered necessary for the purposes of inspection.

Control Requirements

- Location
- Description
- Records
- Traceability

As we have seen, the control bodies have to carry out a number of checks on operators, the results of which have to be evaluated in order to verify compliance with the organic production rules. In order to ensure that the various control bodies perform the same controls on all operators, Regulation (EC) No 834/07 sets out which controls are to be carried out by the various control bodies, dividing them into minimum control requirements and specific control requirements.

Location: The operator must indicate the location of the production units, including the buildings involved in organic production (warehouses, premises for machinery...). In the case of plant production, the plots must be identified according to their SIGPAC data.

Description: A full description of the unit, the premises and its activity must be drawn up and the measures to be taken to ensure compliance with the organic production rules must be laid down. In addition, the precautionary measures to be taken to reduce the risk of contamination by unauthorised products or substances must be described, as well as the cleaning measures taken in storage places and throughout the operator's production chain.

The operator must declare the products for which he is seeking certification.

Records: The operator must keep the necessary stock and accounting records to enable the inspection body to identify:

- The supplier: of the raw materials and inputs received by the production unit.
- On receipt: the nature and quantities of raw materials received by the production unit. Inputs purchased (seeds, fertilisers and plant protection products).
- At storage: the nature and quantities of organic products stored on the unit and of raw materials and inputs stored on the premises of the production unit
- To the recipient: of the organic products produced or processed
- At dispatch: the nature and quantities of organic products leaving the production unit

The documented accounts should include the results of the verification upon receipt of the organic products and any other information requested by the control body for the purpose of proper verification.

The data in the accounts must be documented by means of appropriate supporting documents.

The accounts must show the balance between income and expenditure.

Where an operator runs several production units on the same area, the units dedicated to non-organic products, together with the storage premises for inputs, must also be subject to the minimum control requirements.

Traceability: According to Regulation (EC) 178/2002 of the European Parliament and of the Council of 28 January 2002, traceability is defined as the ability to trace and follow, at all stages of production, processing and distribution, a food, a feed, a food-producing animal or a substance intended to be, or expected to be, incorporated into a food or feed.

8 Appendix B - Auditing Process for Farmers and Exploitations granted under Measure M6.1 in Greece

8.1 Monitoring and Supervision of the implementation of sub-measure 6.1: "Establishment of Young Farmers" of RDP 2014-2020

The Rural Development Program (RDP) of Greece for 2014-2020 adhered to Pillar II of the Common Agricultural Policy (CAP) is developing specific operations to monitor the implementation of each action according to the standards set by the Ministry of Agricultural Development and Food.

Regional authorities for agricultural development (DAOK) are responsible for monitoring RDP and several audits throughout the implementation period. The main steps for the sub-measure 6.1: "Establishment of Young Farmers" are presented below.

Regarding monitoring and supervising the implementation of the act and the business plan of the beneficiaries of sub-measure 6.1 "Establishment of Young Farmers", the regional authority DAOK [\[1\]](#) must proceed with a series of audits per year according to article 22 of no. 8585 / 10-10-2016 Ministerial Act (MA). If supporting documents are required for the inspections, the DAOK informs the beneficiaries and their consultants of it by sending an e-mail to the e-mail address they have declared to the PSKE [\[2\]](#). From their notification, the relevant supporting documents must be submitted within two months.

When deviations and changes are found during the monitoring, the DAOK acts in accordance with the provisions of Article 22 of the MA.

Monitoring process for each year of the business plan

To facilitate the monitoring, the DAOK completes the attached seven (7) checklists for each year.

A. Audits per year

For each year of the business plan of the beneficiaries the following is checked:

1. The submission of a Single Aid Application (EAE) to OPEKEPE [\[3\]](#) for the audit year. DAOK will have access to an application that will display the necessary data of the IACS [\[4\]](#)

For the beneficiaries joined until June 2018, the first year of control is defined the period that concerns the EAE of 2018. Regarding the year of goal achievement, if this is the third, the EAE of 2020 is checked. In contrast, if it is the fourth year, the EAE of 2021 is checked. For the year of achievement and only for this, the personalization of the EAE is also reviewed.

For the beneficiaries joined after 1st July 2018, the first year of the audit is defined as the period covered by the 2019 EAE. Regarding the goal fulfilment year, if this is the third, the EAE of 2021 is checked. On the contrary, if it is the fourth year, the EAE of 2022 is checked. For the year of achievement and only for this, the personalization of the EAE is also reviewed.

In order to assist the above controls, the EYE RDP [\[5\]](#) will create a relevant control tool which will calculate the standard yield of the beneficiaries' holdings.

2. The production capacity of the farm (in terms of standard yield).

The beneficiary must maintain at least the initial production capacity (in terms of standard yield) of the holding with which he was accepted in the Measure.

It is noted that since the agricultural holding of the candidate must be located in the surrounding area of the place of his permanent residence, plots outside the surrounding area are not accepted in the calculation of the T.A.

It is also reminded that the agricultural parcels of the holding must be:

- Owned or leased or a combination thereof.
- Greater than or equal to the minimum area by type of parcel eligible under the single payment schemes.

3. The score achieved based on the selection criteria.

The score must be at a level higher than the first runner-up score if there are runners-up. In the event that there are no runners-up, the score achieved must be at a level higher than or equal to the minimum eligible score applicable to each call.

It is noted that with the exception of the category of criteria "4. Characteristics of areas "of the rating which can be changed by changing the permanent residence throughout the implementation of the business plan and the category of criteria" 6. Approach of the plan to the future situation ", all the other criteria concern the conditions of entry into the Measure and their possible change does not differentiate the score with which they joined.

It is noted that criteria 6.1, 6.2 and 6.3 relate to the future situation are considered at the completion of the business plan. Therefore, the category of criteria "4. Characteristics of areas "of the score is examined annually while the sixth category of criteria is reviewed during the objective achievement year.

4. Audit of tax data.

4.1. Especially for the head of the holding must provide:

The income-tax return sheet (form E1) and a copy of the Statement of Financial Data from Business Activity (form E3).

4.2. Especially for the legal entity a copy of the income tax return is provided.

The above forms' data are checked in terms of permanent work, business activity and the possible existence of a pension. As the tax data of the audit year become available in the tax return submitted in the calendar next year, it goes without saying that for the year 2018, the audits of the tax data remain pending until the year 2019 where the tax return for the data from 1.1.2018 is submitted until 31.12.2018. The same goes for all the following years.

5. Maintaining the status of head of the agricultural holding.

It is considered that the submission of EAE proves the capacity of the head of the agricultural holding.

6. Preservation of permanent residence by the head of the holding and the seat of the legal entity in an area of application of sub-measure 6.1 within the same Region.

A Mayor's certificate is submitted for the permanent residence with a protocol number and a date of issue not earlier than one semester. If there are indications that the permanent residence differs from that of the Mayor's certificate, the permanent residence will be examined and the burden of proof will be borne by the interested party. To this end, supporting documents that indirectly prove the permanent residence must be provided, such as receipts of public benefit organizations. filing a tax return, etc.

7. The legal entities must have a young farmer as their head - legal representative, who participates in the capital of the legal entity with a percentage of at least 51%. The statute of the legal entity and the acts of the board of directors are checked.

8. The beneficiary Legal Entity should profess agriculture as its main activity. The audit is done with the tax data.

9. Start of business or certification of change of operations.

9.1. For the head of the operation, a certificate of commencement of activities is submitted by the competent Tax Office or certificate of change of operations, including a description of the main and secondary activities of the company (KAD).

9.2. For the legal entity, a certificate of commencement of activities is submitted to the competent Tax Office and certificate of changes of operations, including a description of the main and secondary activities of the company (KAD).

Printed personalized information from the integrated information system of the General Secretariat of Information Systems, www.gsis.gr, is also accepted.

10. Beneficiaries must fall within the definition of small and micro-enterprises.

It is reminded that small and very small companies are those that employ up to 50 employees and have an annual turnover of up to 10,000,000 euros.

11. Managers of natural or legal persons must not have overtime employment, permanently dependent or non-dependent. The exercise of administration and business activity in a legal entity with main agricultural activity is not considered non-agricultural non-dependent employment. The tax data of paragraph 4 are checked as well as any other relevant information.

12. Managers of a natural or legal person must not be students from the beginning of the study until the completion of the number of the planned years of study for each school. The EYE PAA performs the above control for all sub-measure beneficiaries, and the results are sent for implementation to the respective bodies of the sub-measure.

13. Managers of natural or legal persons must not receive welfare benefits with a disability rate equal to or greater than 67% and be judged by the competent body (KEPA-DISABILITY CERTIFICATION CENTRE) as incapable of work (livelihood profession). The audit is initially based on tax data. In case of disability verification that was not initially acknowledged, based on the judgment of KEPA, the disengagement of the beneficiary for reasons of force majeure or his stay in the Measure is examined.

14. Managers of natural or legal persons must not be close to retirement under any domestic or foreign pension system. Disability pensions are judged on a case-by-case basis according to the above. The audit is done with the tax data.

15. For the beneficiary legal entity, a certificate of registration in the Register of Farmers and Agricultural Holdings (MAAE) is presented as the agricultural holding owner.

16. Compliance with any recommendations made by the implementing bodies of the measure.

B. Checks related to the first establishment of the beneficiaries

Depending on the date of first settlement of the beneficiary, the following are checked from the year of achievement and every subsequent year until the business plan completion year:

1. Acquisition of the status of "active farmer" within 18 months from the first settlement date and its maintenance until its complete and proper implementation of the business plan. The EAE is examined every year of the implementation. Due to the measure formulation, this condition is considered to have been met when the candidate has acquired the status of newly entered professional farmer, i.e., before joining the measure. In the relevant checklist that accompanies this, the relevant field exists for reasons of completeness. Special mention should be made in the case of beekeepers and pig farmers who are considered active farmers as they utilize agricultural holding (livestock) despite any indication to the contrary that may exist in the personalization form.

2. a) In the case of individual agricultural holdings, the acquisition by the head of the holding within two years from the first establishment of the status of "professional farmer" is checked. The beneficiary is obliged to have registered with the Unified Social Insurance Institution (EFKA)

under relevant insurance conditions as a farmer or breeder or beekeeper within 2 years from the date of first establishment (date of acquisition of the entrant status). The supporting document is the certificate of professional farmer issued by the MAAE, which is released and presented when the data of the 2nd year from the first installation are available.

b) In the case of Legal Entities: the income and employment percentage of the head of the holding is examined (within two years from the first establishment) as part of the legal entity's agricultural operations.

C. Audit of the 1st year of the business plan

In addition to the above A&B audits, during the first year of the beneficiaries' business plan, the start of the business plan's implementation is also checked, which must have been completed within nine (9) months from the date of the acceptance decision. Therefore, the head of the holding must have obtained a certificate of commencement of activities / a certificate of operations from the competent Tax Office no later than 9 months from the date of its decision to join the measure. Printed personalized information from the integrated information system of the General Secretariat of Information Systems, www.gsis.gr, is also accepted.

D. 2nd year business plan audits

In addition to the above A&B audits, the following are audited during the second year of the beneficiaries' business plan:

1. Where required, obtaining a pre-approval permit for an establishment for poultry farms within eighteen (18) months from the acceptance decision date. Beneficiaries who do not include animal breeding in the Single Farm Application (EAE) under consideration and do not have a breeding facility but will obtain it according to their business plan, must obtain a pre-approval permit within eighteen (18) months of the establishment of their holding. In any case, to complete their business plan, they must have an installation permit.
2. If there are objectives whose implementation must start from the second year, the course of implementation and any deviations from the achievement of the objectives according to the type, number and timeframes of the business plan are checked.

E. 3rd year business plan audits

During the third year of the business plan of the beneficiaries, in addition to the above A & B checks, the acquisition of sufficient professional qualifications by the head of the holding is checked, if required, in a period not exceeding 36 months from the date of the acceptance decision. A certificate of sufficient professional competence is submitted after attending vocational training courses with a minimum duration of 150 hours by ELGO "DIMITRA" [6].

During the implementation of the business plan of the beneficiaries, there are cases of participants who either change the orientation of their agricultural holding, or no longer participate in sub-measure 6.1 (dropout due to voluntary departures or force majeure, etc.). The implementing bodies of the sub-measure must inform the ELGO "DIMITRA".

F. Audit in the year of achieving the objectives (3rd or 4th year from accession)

a) During the last year of the business plan, in addition to the above A&B audits, the following are audited:

1. The submission of a request for payment of a second instalment within four years from the acceptance decision issuance.
2. The completeness of the second instalment payment request.
3. Achievement of the goals of the business plan.

At least one business plan goal must be achieved. Supporting documents related to the achievement of the case-by-case objectives are presented, which are indicated, indicatively, in the following:

- Proof documents of the Organization Certificate for Integrated Management or Production of Organic Products (or integration and stay in a Transitional Stage of Organic Production no later than the completion of the second year from its entry). From these documents, the conditions of the objective of paragraph 5.b.ii) of article 9 of no. 8585 / 10-10-2016 YA.
- Contracts for the disposal and sale of the agricultural holding products with a minimum acceptable condition the value of the contract for the delivered product to meet the conditions of the objective of paragraph 5.b.iii) of article 9 of no. 8585 / 10-10-2016 YA.
- If a relevant goal has been set, certificates from recognized bodies (public or private) regarding the attendance or participation of the agricultural holding head in vocational training programs. These must indicate the duration of at least 90 hours, the time and place, as well as the object of training, and be relevant to the holding direction.
- Other documents and documentation for the achievement of the objectives of the business plan and data of the final (future) situation of the agricultural holding that evidence values of scoring criteria defined by the Regions.

4. Business plan completion report.

5. In the case of a poultry farm, a permit for its installation covering its capacity.

6. The acquisition of sufficient professional qualifications by the head of the holding, if required, within a period not exceeding 36 months from the date of the integration decision

7. The heads of natural or legal entities are checked that they have not served prison sentences for all the years of implementing the business plan and until its completion and proper implementation. The Criminal Record of the beneficiary for all the years of the business plan is checked.

8. Supporting documents from which compliance with any recommendations addressed to the beneficiary during the execution of his business plan arises.

9. Copy of the first page of the bank account booklet in which the beneficiary participates and from which IBAN is derived.

10. Official statement of Law 1599/86 stating the following regarding the beneficiaries:

- They fall within the definition of small and micro-enterprises (Commission Recommendation 2003/361 / EC).
- There is no pending procedure for recovery or other imposition of penalties related to advance payment or breach of terms of the transaction.
- During the implementation of the business plan, the eligibility conditions of articles 5, 6 and 7 of the MA have been observed, which apply with the exception of a) upper limit of 100,000 euros referred to in paragraph 2 of Article 6, b) of paragraph 6 of Article 6 and c) paragraph 1.5 of Article 7 of the MA.

b) For a beneficiary legal entity, in addition to the above-supporting documents, the following must be submitted:

1. Supporting documents for the formation of the legal entity, corporation and its registered legal office provided by the current legal framework, together with any amendments that are in force, such as the following:

- Articles of incorporation (LTD, SA), private contract (for OE, IKE, EE) and any amendments thereto together with their registration in the company's share in GEMI [\[7\]](#) (EPE, IKE, OE, EE, SA).
- Relevant Government Gazette of recommendation with the latest codified and published articles of association (for SA).

The above-supporting documents should be clear that the Chief Administrator - legal representative of the legal entity holds at least 51% of the share capital.

2. The acquisition of sufficient professional qualifications by the legal representative of the legal entity, if required, within a period not exceeding 36 months from the accession decision date.
3. Decision of the competent bodies of the legal entity (such as Decision of the Shareholders or the Board of Directors): a) on the appointment of the legal representative and administrator to the natural person of the young farmer and b) on the submission of a request for support to the young farmer extent.
4. For the legal representative, a certificate of registration in the OAEE or another competent insurance body, in accordance with the applicable national provisions, on the conduct of business by a legal entity having an agricultural activity as the primary activity.

G. On-site visit

1. As part of the administrative control, DAOK conducts an on-site visit to the agricultural holding of the beneficiaries to confirm the correct implementation of the business plan according to the objectives and commitments set.
2. The on-site visit takes place in a timely manner throughout the implementation of the business plan and until its completion. It is carried out by an employee of DAOK, an agronomist who cannot be the same as the one who has checked the supporting documents for the same beneficiary.
3. The findings/results of the above on-site visits shall be considered during the administrative audit of the business plan year in which the on-site visit takes place. In case the on-site visit does not confirm the supporting documents related to the implementation of the business plan, the relevant changes in the administrative control results are made.
4. Given that the final payment is paid no later than 5 years from the date of adopting the accession decision, the administrative verification of payment requests must be completed within a period such that the above deadline is not violated.

9 Appendix C - Andalusian Use Case Questionnaire - Organic Olive Farming



AGRICORE Project

Agent-based tool for the development of agriculture policies

The AGRICORE project will provide a tool for modelling and simulating different instruments and measures associated with the Common Agricultural Policy (CAP), both at regional, national and EU level. It will also contemplate the wide diversity that exists between farms located in different geographical areas and/or dedicated to different crops.

The objective of the AGRICORE tool is to be able to test different alternative CAP instruments a priori, i.e. before their approval and implementation, in order to analyse the impact that each of these alternatives could have on the farm economy, on land and agricultural prices, on the environment and on the social development of rural areas in Europe.

To this end, cutting-edge big data mining and fusion techniques will be applied, coupled with mathematical optimisation models and artificial intelligence (AI) algorithms, among others. To ensure that the adjustment of the aforementioned AI algorithms allows the behaviour of farm owners to be reproduced as reliably as possible, it is necessary to obtain, by means of surveys, data on the decision-making processes that these farmers carry out to manage their farms.

This questionnaire is designed to extract some of this information. The survey is conducted anonymously, so it will be impossible to identify you as a respondent or, of course, to associate your answers with your actual farm. Therefore, we ask you to be as honest as possible by providing data that is as accurate as possible. This will enable us to create a tool that is closer to the reality on the ground and thus to better measure the impact of the various alternative measures (premiums, aids, subsidies, etc.).

Through your collaboration, you become part of the process of designing new and improved versions of the CAP, which will ultimately lead to a better standard of living for you and your family, as well as to a reduced impact of farming on the environment.



Questionnaire. Organic Production. Technical Version

Section 1/10. Participatory Research.

This Google Forms questionnaire is the technical version of the Participatory Research for organic olive farming. It is based on the questionnaire provided by Carlos Parra which was conducted by IFAPA for two different studies about the diffusion of organic olive farming in Andalusia, the first one realized in 2005 and the second one in 2007.

The following questions are organised in sections according to several topics. Please, answer the questions honestly and as much accurate as possible. Thank you for your collaboration.

Section 2/10. Personal data of the interviewee.

0.2.1. Age of the interviewee:

0.2.2. Gender:

- ☐ Male.
- ☐ Female.

0.2.3. The highest degree of studies finished by the interviewee:

- ☐ No formal studies.
- ☐ Primary education (E.G.B. or E.S.O).
- ☐ High School Diploma or B.U.P.
- ☐ Professional training.
- ☐ University degree.
- ☐ Postgraduate studies (master and doctorate).

Section 3/10. Agricultural holding data.

The questions of this section must be answered considering the whole agricultural holding or holdings managed by the interviewee.

0.3.1. Mark which of the following activities are carried out in your agricultural holding(s), and then specify the real (or estimated) area in hectares dedicated to each activity. In case you are using a different land area unit, please specify it between brackets in the corresponding answer.

- ☐ Conventional olive farming.
- ☐ Organic olive farming in conversion.
- ☐ Organic olive farming.
- ☐ Other conventional crops.
- ☐ Other organic crops in conversion.
- ☐ Other organic crops.
- ☐ Non-cultivated land.

0.3.2. Land area dedicated to conventional olive farming (ha).

0.3.3. Land area dedicated to organic olive farming in conversion (ha).

0.3.4. Land area dedicated to organic olive farming (ha).

0.3.5. Land area dedicated to other conventional crop(s) (indicate the crop(s) and the area(s) between brackets, ha).

0.3.6. Land area dedicated to other organic crop(s) in conversion (indicate the crop(s) and the area(s) between brackets, ha).

0.3.7. Land area dedicated to other organic crop(s) (indicate the crop(s) and the area(s) between brackets, ha).

0.3.8. Non-cultivated land area(ha).

Section 4/10. Organic olive holding data.

The questions of this section must be answered considering the agricultural holding with the most economically significant organic olive orchard for the olive farmer.

0.4.1. Municipal district which the organic olive holding belongs to. In the case that the organic olive orchard was composed of several SIGPAC enclosures belonging to different municipalities, indicate that municipality which holds the most economically significant organic olive enclosures for the farmer.

0.4.2. Area of the organic olive orchard in the agricultural holding (in hectares). If you use another land area unit, please specify it between brackets.

0.4.3. What percentage of the organic olive orchard belongs to Natura 2000 network? If none of the organic olive orchard pertains to this Network, please indicate "0" in your answer.

0.4.4. What percentage of the organic olive orchard belongs to RAMSAR zones? If none of the organic olive orchard pertains to these zones, please indicate "0" in your answer.

0.4.5. What percentage of the organic olive orchard belongs to Nitrate Vulnerable zones? If none of the organic olive orchard pertains to these zones, please indicate "0" in your answer.

0.4.6. Predominant type of exploitation:

Select the type that closely match your most economically significant olive orchard.

- ☐ Low-yield olive orchard: the olive orchard yield is 775 kg of olives per hectare or less, or it is cultivated in zones with bas soil and climatic conditions or high slope zones.
- ☐ High slope olive orchard: the soil and climatic conditions are better than those of the previous type, but the land slope is equal to or more than 20%. As a result of the high slope, it is not possible to mechanise the olive harvesting.
- ☐ Extensive olive orchard with a density equal to or lower than 150 olive trees per hectare: the land slope is lower than 20%, and the harvesting mechanisation is possible.
- ☐ Extensive olive orchard with medium density: the land slope is lower than 20%, and the planting density is between 150 and 180 olive trees per hectare.
- ☐ Intensive olive orchard: The planting density is between 180 and 325 olive trees per hectare, and it is located in flatlands.
- ☐ Super-intensive olive orchard: the planting density is higher than 325 olive trees per hectare, and it is located in flatlands.

0.4.7. Number of planted olive trees in the organic olive orchard.

0.4.8. Irrigation regime of the olive orchard:

- ☐ Non-irrigated.
- ☐ Trickle irrigation.
- ☐ Sprinkler irrigation.
- ☐ Flood irrigation.
- ☐ Other irrigation system.

0.4.9. Planting year of the olive orchard.

0.4.10. Mean slope of the agricultural holding land.

- ☐ Low (<8%).
- ☐ Medium (8-20%).
- ☐ High (>20%).

0.4.11. Erosion rate of the organic olive orchard soil.

- ☐ Low.
- ☐ Medium.
- ☐ High.

0.4.12. Considering a normal year (neither lowly nor highly productive), please indicate the average yearly olive production of the olive orchard (in Kg) for a normal campaign:

- 1) conventional agriculture;
- 2) transitional period, and
- 3) organic agriculture.

Please, separate the three values with semicolons (;). If you use a unit different than Kg, please specify it between brackets after the third value. *Sample Response:* 4.5; 3.8; 4.2 (tons).

0.4.13. Do you intercrop in your organic olive orchard? Answer yes or no, and if yes, please specify the crop(s). Crops without an economic benefit should not be considered.

0.4.14. Mark with an 'X' the end use(s) of your olive production according to the olive variety.

	COMMERCIAL PURPOSE (THE FARMER HAS AN ECONOMIC BENEFIT FROM ITS SALE)	FARMER USAGE (THE PRODUCTS DERIVED FROM THE HARVESTED OLIVES ARE CONSUMED BY THE FARMER AND HER/HIS FAMILY)	FARM USAGE (LIVESTOCK FEEDING AND SOIL FERTILISATION)	WITHOUT USE (THE OLIVES ARE NOT HARVESTED)
TABLE OLIVE				
OIL OLIVE				

0.4.15. Considering the whole olive production of your olive orchard from 2014 to the present, please indicate the average percentages of TABLE OLIVE dedicated to each of the 4 purposes mentioned in the previous questions (commercial purpose, farmer usage, farm usage and without use).

Please, separate the 4 values with semicolons (;). It is not necessary to add the sign "%" to the answer. *Sample Response:* 80;15;5;0.

0.4.16. Considering the whole olive production of your olive orchard from 2014 to the present, please indicate the average percentages of OIL OLIVE dedicated to each of the 4 purposes mentioned in the previous questions (commercial purpose, farmer usage, farm usage and without use).

Please, separate the 4 values with semicolons (;). It is not necessary to add the sign "%" to the answer. *Sample Response:* 90;10;0;0.

Section 5/10. Interviewee's dedication to agriculture.

The interviewee must have decision-making capacities in the organic olive orchard. These questions must be answered with regard to the same agricultural holding considered in the previous section.

0.5.1. The interviewee is:

- ☐ The owner of the agricultural holding.
- ☐ An unpaid relative of the owner.
- ☐ A paid worker.
- ☐ Leaseholder or sharecropper.
- ☐ Other: _____

0.5.2. How many years have you been dedicated to agriculture?

0.5.3. What kind of tasks do you realize in your agricultural holding?

- ☐ Only management and administration related tasks.
- ☐ Only agricultural tasks.
- ☐ Both.

0.5.4. What percentage of your work time do you dedicate to your farm? (Adding agricultural, management and administration tasks).

0.5.5. What is your agricultural training?

- ☐ Practical experience.
- ☐ Courses, conferences, etc.
- ☐ Professional agricultural training.
- ☐ University agricultural training.
- ☐ None.
- ☐ Other: _____

0.5.6. Indicate your membership to agrarian associative organization(s) related to olive farming: 1) before converting to organic olive farming ("Conventional" column), 2) during that conversion ("Transitional" column) and 3) once converted ("Organic" column).

	<i>Conventional</i>	<i>Transitional</i>	<i>Organic</i>
<i>Agricultural cooperative</i>			
<i>Transformation Agrarian Association (TAS)</i>			
<i>IPA (Integrated Production Associations) (old ATRIA)</i>			
<i>Agricultural trade union</i>			
<i>Association of organic producers</i>			
<i>Ecological association</i>			
<i>Other type of agricultural association</i>			

0.5.7. Do you come from a family dedicated to agriculture in recent generations (any of your parents and/or your grandparents)?

- ☐ Yes.
- ☐ No.

0.5.8. Do you forecast that any of your descendants will continue with the agricultural holding?

- ☐ Yes.
- ☐ No.

Section 6/10. Diffusion process: phases from knowledge to adoption or rejection.

0.6.1. When did you consider the conversion to organic olive farming for the first time?

0.6.2. What year did you begin the conversion to organic olive farming?

0.6.3. If you have received an agricultural subsidy on the occasion of the conversion to organic olive farming, which was the first year you received that subsidy?

0.6.4. Which of the following means was the most influential when you start the conversion to organic olive farming?

- ☐ The media (press, radio, television).
- ☐ Agricultural association (agricultural cooperative, TAS, IPA (old ATRIA), agricultural trade union, control bodies, ecologist association, association of organic producers, Agency of Agricultural Extension or Agricultural Regional Office).
- ☐ Agricultural training (university, courses, specialised literature).
- ☐ Personal experience (research on the Internet, influences of other olive farmers, your own experience, trading houses technicians, independent olive farming professionals).
- ☐ Other sources.

0.6.5. Have you heard about the Columela Plan?

- ☐ Yes.
- ☐ No.

0.6.6. Which of the following means will you use to acquire knowledge about any aspect of organic olive farming?

- ☐ The media (press, radio, television).
- ☐ Agricultural association (agricultural cooperative, TAS, IPA (old ATRIA), agricultural trade union, control bodies, ecologist association, association of organic producers, Agency of Agricultural Extension or Agricultural Regional Office).
- ☐ Agricultural training (university, courses, specialised literature).
- ☐ Personal experience (research on the Internet, influences of other olive farmers, your own experience, trading houses technicians, independent olive farming professionals).
- ☐ Other sources.

0.6.7. Have you made a small-scale test or trial in your olive orchard to experiment the organic cultivation in your olive orchard in order to check the results before starting the conversion?

- ☐ Yes.
- ☐ No.

0.6.8. Do you share your experience as an organic olive farmer with close olive farmers?

- ☐ No.
- ☐ Yes, only with a few olive farmers (less than 10).
- ☐ Yes, with many olive farmers (between 10 and 30).
- ☐ Yes, with a lot of olive farmers (more than 30).

0.6.9. Do you consider abandoning the organic olive farming in the future?

- ☐ Yes, I would stop producing in organic a part of the organic olive orchard.
- ☐ Yes, I would stop producing in organic the whole organic olive orchard.
- ☐ No, I do not envisage abandoning the organic olive orchard.

0.6.10. If you answered affirmatively to the previous questions, what would be the main reason to abandon the organic olive farming?

- ☐ Economic-financial reasons.
- ☐ The bureaucracy that must be followed.
- ☐ The technical difficulty of organic olive farming.
- ☐ Other: _____

Section 7/10. Assessment of the conversion to organic olive farming.

The questions of this section must be answered with regard to the agricultural holding that contains the most economically significant organic olive orchard for the olive farmer.

0.7.1. Indicate the olive orchard's average profitability in €/Kg for conventional agriculture, transitional period and organic agriculture. Please, separate the 3 values with semicolons (";"), and if you use another unit of measure, specify if after the third value between brackets.

0.7.2. Indicate the olive orchard's average costs in €/Ha for conventional agriculture, transitional period and organic agriculture. Please, separate the 3 values with semicolons (";"), and if you use another unit of measure, specify if after the third value between brackets.

Breakdown of the production costs.

The objective of the next question is to break down the mean production costs per hectare associated to some production factors for conventional agriculture, transitional period and organic agriculture. Please, separate the 3 values with semicolons (";"), and if you use another unit of measure, specify if after the third value between brackets.

0.7.2.1. Soil management (sowing of the cover crop, mowing, tillage...).

0.7.2.2. Fertilisation (fertilisers, manures, "alpeorujo").

0.7.2.3. Control of plagues and diseases (prevention treatments, trapping, cares of the ill olive trees...).

0.7.2.4. Workforce in the olive orchard campaigns.

0.7.2.5. Purchase, renting and renovation of the agricultural machinery and tools.

0.7.2.6. Water.

0.7.2.7. Electricity.

0.7.2.8. Fixed costs (land rents, taxes...).

0.7.3. Considering your current annual family budget, indicate the importance that the profit of the olive orchard would have had or has for your family unit for conventional agriculture, transitional period and organic agriculture. Please, separate the 3 values with semicolons (;). It is not necessary to add the sign “%” to the answer.

For example: if the current family budget of an organic olive farmer is 20.000€ and the olive orchard profits were 15.000€ before the conversion, 12.000€ during the conversion and 22.000€ after the conversion, the answer would be 75; 60; 110.

0.7.4. Indicate the average number of annual salaried daily wages in all agricultural year campaigns for conventional agriculture, transitional period and organic agriculture. Please, separate the 3 values with semicolons (;).

0.7.5. Regarding the average number of annual salaried daily wages in all agricultural year campaigns, please indicate how many of them correspond to female workers for conventional agriculture, transitional period and organic agriculture. Please, separate the 3 values with semicolons (;).

0.7.6. Indicate the average number of annual NON-salaried daily wages in all agricultural year campaigns for conventional agriculture, transitional period and organic agriculture. Please, separate the 3 values with semicolons (;).

0.7.7. Regarding the average number of annual NON-salaried daily wages in all agricultural year campaigns, please indicate how many of them correspond to female workers for conventional agriculture, transitional period and organic agriculture. Please, separate the 3 values with semicolons (;).

Assessment of production factors

Mark the importance that the following aspects of the olive farming had or have for you in the conventional agriculture, transitional period and organic agriculture. This importance is indicated with a number between 0 and 5, being 0 no importance at all, and 5 much importance.

0.7.8. Profit.

	0	1	2	3	4	5
Conventional agriculture						
Transitional period						
Organic agriculture						

0.7.9. Not taking much risk.

	0	1	2	3	4	5
Conventional agriculture						
Transitional period						
Organic agriculture						

0.7.10. Personal prestige (understanding it as a distinction achieved by the olive farmer as a consequence of cultivating organically and which is reflected with the European Union labelling to those products derived from her/his organic olive orchard).

	0	1	2	3	4	5
Conventional agriculture						
Transitional period						
Organic agriculture						

0.7.11. Respect for the environment.

	0	1	2	3	4	5
Conventional agriculture						
Transitional period						
Organic agriculture						

0.7.12. Obtaining healthy products.

	0	1	2	3	4	5
Conventional agriculture						
Transitional period						
Organic agriculture						

Section 8/10. Innovatively Elicitation through Multi-Item Scale for Olive Tree Farmers.

0.8.1. Please indicate, for each of the innovative actions defined below, whether you have requested information and/or technical advice, and/or if you have actually made investments during the last 10 years:

Code	Innovative Action	Have you looked for information and/or consultancy? (Y/N)	Approximate amount actually invested in €
Inn1	Erosion control actions		
Inn2	Use of deficit irrigation practices on water-scarce farms		
Inn3	Olive orchard waste composting practices		
Inn4	Disease and/or pest control by plant cover and/or antagonistic fungi		
Inn5	Innovation in automatic and/or smart irrigation systems		
Inn6	Use of integrated equipment for bunching, chopping and management of pruning residues.		
Inn7	Use of mobile applications, including weather forecasting or machinery monitoring, as an aid to agronomic practices.		
Inn8	Use of drones and other equipment for precision farming		
Inn9	Implementation of business lines that represent alternative sources of income (Eco-tourism, Cosmetics, etc.).		
Inn10	Conducting training courses for all types of personnel.		

Section 9/10. Risk Aversion Elicitation.

0.9.1. By means of Multi-item scale (partially based in 'Risk Management in Norwegian cash crop farming'¹).

Code	Risk-Aversion Strategy	Importance given by the farmer (0-10 scale)	Have you realized this strategy in the last 10 agricultural campaigns? (y/n)
RA1	Liquidity – keep cash on hand		
RA2	Prevent/reduce crop diseases and pests		
RA3	Manage debt to ensure solvency		
RA4	Buying farm business insurance		
RA5	Producing at lowest possible cost		
RA6	Take off-farm work		
RA7	Buying personal insurance		
RA8	Renting machinery and/or land is safer than buying them		
RA9	Hiring agronomical consultancies		
RA10	Diversifying agricultural holding activities not to depend only of agricultural yield (rural tourism, eco-cosmetic, etc.)		
RA11	Sharing ownership of equipment or operating jointly with other farmers.		
RA12	Buying productive factors (e.g. fertilisers) when they are cheap and storing them for future use.		
RA13	Hiring economic and or accounting consultancies		
RA14	Ensuring surplus of machinery capacity and/or stock of spare parts.		
RA15	Investing part of the benefits off-farm (stock market, real state, etc.)		
RA16	Organizing the farm as a corporation to reduce exposure of personal equity.		

¹ Koesling, M. et al., (2004), "Risk and Risk Management in Organic and Conventional Cash Crop Farming in Norway," Acta Agric. Scand. Section C, Food Econ., vol. 1, Dec. 2004. doi: 10.1080/16507540410019692.

0.9.2. By means of Lottery-choice scale (adapted from ²).

Suppose you have €4,000 to invest in your olive orchard, and you have to decide between 40 different technical investments. Each of them has a different average profit, and each of them has a probability of obtaining that profit. Therefore, the ones that offer lower returns are safer (more likely to be successful) and the ones that can offer higher returns are less likely.

For every 1000€ you can invest, you have a set of 10 possible alternative investments. Please indicate, for each of these groups, which investment you would choose (remember that you can only choose one column in each table). Please mark your choice with a cross in the white box corresponding to the column of your choice:

1000€	Inv. 1	Inv. 2	Inv. 3	Inv. 4	Inv. 5	Inv. 6	Inv. 7	Inv. 8	Inv. 9	Inv. 10
Prob. of Earning	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
Earnings (€)	1.000	1.120	1.270	1.470	1.730	2.100	2.650	3.560	5.400	10.900
I prefer										

1000€	Inv. 11	Inv. 12	Inv. 13	Inv. 14	Inv. 15	Inv. 16	Inv. 17	Inv. 18	Inv. 19	Inv. 20
Prob. of Earning	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
Earnings (€)	1.000	1.200	1.500	1.900	2.300	3.000	4.000	5.700	9.000	19.000
I prefer										

1000€	Inv. 21	Inv. 22	Inv. 23	Inv. 24	Inv. 25	Inv. 26	Inv. 27	Inv. 28	Inv. 29	Inv. 30
Prob. of Earning	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
Earnings (€)	1.000	1.666	2.500	3.570	5.000	7.000	10.000	15.000	25.000	55.000
I prefer										

1000€	Inv. 31	Inv. 32	Inv. 33	Inv. 34	Inv. 35	Inv. 36	Inv. 37	Inv. 38	Inv. 39	Inv. 40
Prob. of Earning	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
Earnings (€)	1.000	2.200	3.800	5.700	8.300	12.000	17.500	26.700	45.000	100.000
I prefer										

² Sabater-Grande, G. and Georgantzís, N., (2002), "Accounting for risk aversion in repeated prisoners' dilemma games: an experimental test", Journal of Economic Behavior & Organization, 48, issue 1, p. 37-50, <https://EconPapers.repec.org/RePEc:eee:jeborg:v:48:y:2002:i:1:p:37-50>.

Section 10/10. Interviewee's attitude towards organic farming as innovation.

0.10.1. Do you consider yourself risky for investment and management decisions of your agricultural holding? Rate your risk aversion on a scale of 0 to 10.

	0	1	2	3	4	5	6	7	8	9	10	
<i>Non-Risky</i>												<i>Very Risky</i>

0.10.2. Do you think that the organic farming techniques are a profitable investment?

- ☐ Yes, it is a profitable investment in the short run (less than 5 years).
- ☐ Yes, it is a profitable investment in the middle run (between 5 and 10 years).
- ☐ Yes, it is a profitable investment in the long run (more than 10 years).
- ☐ No, it is not a profitable investment.
- ☐ No answer/do not know.

0.10.3. Do you think that cultivating in organic provides or would provide you with certain social prestige?

- ☐ Yes, it is positively perceived.
- ☐ It is irrelevant.
- ☐ No, it is negatively perceived.
- ☐ No answer/do not know.

0.10.4. Do you think that the products derived from your organic olive orchard provide or would provide you with certain social prestige?

- ☐ Yes, it is positively perceived.
- ☐ It is irrelevant.
- ☐ No, it is negatively perceived.
- ☐ No answer/do not know.

0.10.5. In your opinion, the production of industrial and agricultural products that pollute the environment must:

- ☐ Stop immediately.
- ☐ Get to reducing progressively until it disappeared.
- ☐ Get to reducing progressively up to a certain level.
- ☐ Not be reduced, but the pollutant companies should eliminate pollution of pay for it.
- ☐ Not be reduced at all: the danger is not grave.

0. 10. 6. In your opinion, does the erosion influence the production of your olive orchard?

- ☐ Yes, it reduces the production significantly.
- ☐ Yes, it reduces the production slightly.
- ☐ No, it has no influence.

0.10.7. What do you think about the use of synthesis chemical products to produce food and its relation to human health?

- ☐ I think that all used chemical products in the food production must be forbidden.
- ☐ I think that some of them are dangerous and must be forbidden, and the use of the rest of them must be restricted.
- ☐ I think that they may be used safely, but those applied to food must be supervised and controlled.
- ☐ I think that currently they may be used safely and the concern of some consumers is not justified because the issue is under control.

10 Appendix D - Andalusian Use Case Questionnaire - Conventional Olive Farming



AGRICORE Project

Agent-based tool for the development of agriculture policies

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To this end, cutting-edge big data mining and fusion techniques will be applied, coupled with mathematical optimisation models and artificial intelligence (AI) algorithms, among others. To ensure that the adjustment of the aforementioned AI algorithms allows the behaviour of farm owners to be reproduced as reliably as possible, it is necessary to obtain, by means of surveys, data on the decision-making processes that these farmers carry out to manage their farms.

This questionnaire is designed to extract some of this information. The survey is conducted anonymously, so it will be impossible to identify you as a respondent or, of course, to associate your answers with your actual farm. Therefore, we ask you to be as honest as possible by providing data that is as accurate as possible. This will enable us to create a tool that is closer to the reality on the ground and thus to better measure the impact of the various alternative measures (premiums, aids, subsidies, etc.).

Through your collaboration, you become part of the process of designing new and improved versions of the CAP, which will ultimately lead to a better standard of living for you and your family, as well as to a reduced impact of farming on the environment.



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The following questions are organised in sections according to several topics. Please, answer the questions honestly and as much accurate as possible. Thank you for your collaboration.

Section 2/10. Personal data of the interviewee.

C.2.1. Age of the interviewee:

C.2.2. Gender:

- ☐ Male.
- ☐ Female.

C.2.3. The highest degree of studies finished by the interviewee:

- ☐ No formal study.
- ☐ Primary education (E.G.B. or E.S.O).
- ☐ High School Diploma or B.U.P.
- ☐ Professional training.
- ☐ University degree.
- ☐ Postgraduate studies (master and doctorate).

Section 3/10. Agricultural holding data.

The questions of this section must be answered considering the whole agricultural holding or holdings managed by the interviewee.

C.3.1. Mark which of the following activities are carried out in your agricultural holding(s), and then specify the real (or estimated) area in hectares dedicated to each activity. In case you are using a different land area unit, please specify it between brackets in the corresponding answer.

- ☐ Conventional olive farming.
- ☐ Organic olive farming in conversion.
- ☐ Organic olive farming.
- ☐ Other conventional crops.
- ☐ Other organic crops in conversion.
- ☐ Other organic crops.
- ☐ Non-cultivated land.

C.3.2. Land area dedicated to conventional olive farming (ha).

C.3.3. Land area dedicated to organic olive farming in conversion (ha).

C.3.4. Land area dedicated to organic olive farming (ha).

C.3.5. Land area dedicated to other conventional crop(s) (indicate the crop(s) and the area(s) between brackets, ha).

C.3.6. Land area dedicated to other organic crop(s) in conversion (indicate the crop(s) and the area(s) between brackets, ha).

C.3.7. Land area dedicated to other organic crop(s) (indicate the crop(s) and the area(s) between brackets, ha).

C.3.8. Non-cultivated land area (ha).

Section 4/10. Conventional olive holding data.

The questions of this section must be answered considering the agricultural holding with the most economically significant conventional olive orchard for the olive farmer.

C.4.1. Municipal district which the conventional olive holding belongs to. In the case that the organic olive orchard was composed of several SIGPAC enclosures belonging to different municipalities, indicate that municipality which holds the most economically significant organic olive enclosures for the farmer.

C.4.2. Area of the conventional olive orchard in the agricultural holding (in hectares). If you use another land area unit, please specify it between brackets.

C.4.3. What percentage of the conventional olive orchard belongs to Natura 2000 network? If none of the organic olive orchard pertains to this Network, please indicate "0" in your answer.

C.4.4. What percentage of the conventional olive orchard belongs to RAMSAR zones? If none of the organic olive orchard pertains to these zones, please indicate "0" in your answer.

C.4.5. What percentage of the conventional olive orchard belongs to Nitrate Vulnerable zones? If none of the organic olive orchard pertains to these zones, please indicate "0" in your answer.

C.4.6. Predominant type of exploitation:

Select the type that closely match your most economically significant olive orchard.

- ☐ Low-yield olive orchard: the olive orchard yield is 775 kg of olives per hectare or less, or it is cultivated in zones with bas soil and climatic conditions or high slope zones.
- ☐ High slope olive orchard: the soil and climatic conditions are better than those of the previous type, but the land slope is equal to or more than 20%. As a result of the high slope, it is not possible to mechanise the olive harvesting.
- ☐ Extensive olive orchard with a density equal to or lower than 150 olive trees per hectare: the land slope is lower than 20%, and the harvesting mechanisation is possible.
- ☐ Extensive olive orchard with medium density: the land slope is lower than 20%, and the planting density is between 150 and 180 olive trees per hectare.
- ☐ Intensive olive orchard: The planting density is between 180 and 325 olive trees per hectare, and it is located in flatlands.
- ☐ Super-intensive olive orchard: the planting density is higher than 325 olive trees per hectare, and it is located in flatlands.

C.4.7. Number of planted olive trees in the conventional olive orchard.

C.4.8. Irrigation regime of the olive orchard:

- ☐ Non-irrigated.
- ☐ Trickle irrigation.
- ☐ Sprinkler irrigation.
- ☐ Flood irrigation.
- ☐ Other irrigation system.

C.4.9. Planting year of the olive orchard.

C.4.10. Mean slope of the agricultural holding land.

- ☐ Low (<8%).
- ☐ Medium (8-20%).
- ☐ High (>20%).

C.4.11. Erosion rate of the conventional olive orchard soil.

- ☐ Low.
- ☐ Medium.
- ☐ High.

C.4.12. Considering a standard year (neither lowly nor highly productive), please indicate the average yearly olive production of the olive orchard (in Kg) for a normal campaign:

Please, if you use a unit different than Kg, please specify it between brackets after the third value. *Sample Response: 4.5 (tons).*

C.4.13. Do you intercrop in your conventional olive orchard? Answer yes or no, and if yes, please specify the crop(s). Crops without an economic benefit should not be considered.

C.4.14. Mark with an 'X' the end use(s) of your olive production according to the olive variety.

	COMMERCIAL PURPOSE (THE FARMER HAS AN ECONOMIC BENEFIT FROM ITS SALE)	FARMER USAGE (THE PRODUCTS DERIVED FROM THE HARVESTED OLIVES ARE CONSUMED BY THE FARMER AND HER/HIS FAMILY)	FARM USAGE (LIVESTOCK FEEDING AND SOIL FERTILISATION)	WITHOUT USE (THE OLIVES ARE NOT HARVESTED)
TABLE OLIVE				
OIL OLIVE				

C.4.15. Considering the whole olive production of your olive orchard from 2014 to the present, please indicate the average percentages of TABLE OLIVE dedicated to each of the 4 purposes mentioned in the previous questions (commercial purpose, farmer usage, farm usage and without use). Please, separate the 4 values with semicolons (;). It is not necessary to add the sign “%” to the answer. *Sample Response: 80;15;5;0.*

C.4.16. Considering the whole olive production of your olive orchard from 2014 to the present, please indicate the average percentages of OIL OLIVE dedicated to each of the 4 purposes mentioned in the previous questions (commercial purpose, farmer usage, farm usage and without use). Please, separate the 4 values with semicolons (;). It is not necessary to add the sign “%” to the answer. *Sample Response: 90;10;0;0.*

Section 5/10. Interviewee's dedication to agriculture.

The interviewee must have decision-making capacities in the olive orchard. These questions must be answered with regard to the same agricultural holding considered in the previous section.

C.5.1. The interviewee is:

- ☐ The owner of the agricultural holding.
- ☐ An unpaid relative of the owner.
- ☐ A paid worker.
- ☐ Leaseholder or sharecropper.
- ☐ Other: _____

C.5.2. How many years have you been dedicated to agriculture?

C.5.3. What kind of tasks do you realize in your agricultural holding?

- ☐ Only management and administration related tasks.
- ☐ Only agricultural tasks.
- ☐ Both.

C.5.4. What percentage of your work time do you dedicate to your farm? (Adding agricultural, management and administration tasks).

C.5.5. What is your agricultural training?

- ☐ Practical experience.
- ☐ Courses, conferences, etc.
- ☐ Professional agricultural training.
- ☐ University agricultural training.
- ☐ None.

☐ Other:

C.5.6. Indicate your membership to agrarian associative organization(s) related to olive farming:

- ☐ Agricultural cooperative.
- ☐ Transformation Agrarian Association (TAS).
- ☐ IPA (Integrated Production Associations) (old ATRIA).
- ☐ Agricultural trade union.
- ☐ Association of organic producers.
- ☐ Ecological association
- ☐ Other type of agricultural association.

C.5.7. Do you come from a family dedicated to agriculture in recent generations (any of your parents and/or your grandparents)?

- ☐ Yes.
- ☐ No.

C.5.8. Do you forecast that any of your descendants will continue with the agricultural holding?

- ☐ Yes.
- ☐ No.

Section 6/10. Diffusion process: phases from knowledge to adoption or rejection.

C.6.1. Have you ever considered converting to organic olive farming?

C.6.2. If you answered yes to the previous question, When did you consider the conversion to organic olive farming for the first time?

C.6.3. If you have considered the conversion to organic olive farming, which of the following means was the most influential?

- ☐ The media (press, radio, television).
- ☐ Agricultural association (agricultural cooperative, TAS, IPA (old ATRIA), agricultural trade union, control bodies, ecologist association, association of organic producers, Agency of Agricultural Extension or Agricultural Regional Office).
- ☐ Agricultural training (university, courses, specialised literature).
- ☐ Personal experience (research on the Internet, influences of other olive farmers, your own experience, trading houses technicians, independent olive farming professionals).
- ☐ Other sources.

C.6.4. Have you heard about the Columela Plan?

- ☐ Yes.
- ☐ No.

C.6.5. Which of the following means will you use to acquire knowledge about any aspect of organic olive farming?

- ☐ The media (press, radio, television).
- ☐ Agricultural association (agricultural cooperative, TAS, IPA (old ATRIA), agricultural trade union, control bodies, ecologist association, association of organic producers, Agency of Agricultural Extension or Agricultural Regional Office).
- ☐ Agricultural training (university, courses, specialised literature).
- ☐ Personal experience (research on the Internet, influences of other olive farmers, your own experience, trading houses technicians, independent olive farming professionals).
- ☐ Other sources.

C.6.6. Have you made a small-scale test or trial in your olive orchard to experiment the organic cultivation in your olive orchard in order to check the results before starting the conversion?

- ☐ Yes.
- ☐ No.

C.6.7. Do you share your experience as a conventional olive farmer with close olive farmers?

- ☐ No.
- ☐ Yes, only with a few olive farmers (less than 10).
- ☐ Yes, with many olive farmers (between 10 and 30).
- ☐ Yes, with a lot of olive farmers (more than 30).

C.6.8. Do you consider the conversion to organic olive farming in the future?

- ☐ Yes, I would convert to in organic a part of the organic olive orchard.
- ☐ Yes, I would convert to in organic the whole organic olive orchard.
- ☐ No, I do not envisage converting to organic olive orchard.

C.6.9. If you answered affirmatively to the previous questions, what would be the main reason to abandon the conventional olive farming?

- ☐ Economic-financial reasons (reduction of production costs, higher price per kilogramme of organic olive...).
- ☐ Climate awareness.
- ☐ The technical difficulty of conventional olive farming.
- ☐ Social prestige.
- ☐ Production of organic products.
- ☐ Other: _____

Section 7/10. Assessment of the conventional olive orchard.

The questions of this section must be answered with regard to the agricultural holding that contains the most economically significant conventional olive orchard for the olive farmer. Moreover, all the mean values required in this section must be referred from 2014 to the present.

C.7.1. Indicate the olive orchard's average profitability in €/Kg.
Please, if you use another unit of measure, specify it between brackets.

C.7.2. Indicate the olive orchard's average costs in €/Ha.
Please, if you use another unit of measure, specify it between brackets.

Breakdown of the production costs.

The objective of the next question is to break down the mean production costs per hectare (€/Ha) according to some production factors. Please, if you use another unit of measure, specify it between brackets.

C.7.2.1. Soil management (sowing of the cover crop, mowing, tillage...).

C.7.2.2. Fertilisation (fertilisers, manures, "alpeorujó").

C.7.2.3. Control of plagues and diseases (prevention treatments, trapping, cares of the ill olive trees...).

C.7.2.4. Workforce in the olive orchard campaigns.

C.7.2.5. Purchase, renting and renovation of the agricultural machinery and tools.

C.7.2.6. Water.

C.7.2.7. Electricity.

C.7.2.8. Fixed costs (land rents, taxes...).

C.7.3. Considering your current annual family budget, indicate the importance that the mean profit of the olive orchard has on the family level. It is not necessary to add the sign “%” to the answer. In the case that the mean profit of the olive orchard was higher than the current annual family budget, the answer would be percentage higher than 100%.

C.7.4. Indicate the average number of annual salaried daily wages in all agricultural year campaigns.

C.7.5. Regarding the average number of annual salaried daily wages in all agricultural year campaigns, please indicate how many of them correspond to female workers.

C.7.6. Indicate the average number of annual NON-salaried daily wages in all agricultural year campaigns.

C.7.7. Regarding de average number of annual NON-salaried daily wages in all agricultural year campaigns, please indicate how many of them correspond to female workers.

Assessment of production factors

Assess the importance of the following aspects of olive farming. This importance is indicated with a number between 0 and 5, being 0 no importance, and 5 much importance.

C.7.8. Profit.

0	1	2	3	4	5

C.7.9. Not taking much risk.

0	1	2	3	4	5

C.7.10. Personal prestige (understanding it as a distinction achieved by the olive farmer due to her/his cultivation methods and the products derived from her/his olive orchard).

0	1	2	3	4	5

C.7.11. Respect for the environment.

0	1	2	3	4	5

C.7.12. Obtaining healthy products.

0	1	2	3	4	5

Section 8/10. Innovatively Elicitation through Multi-Item Scale for Olive Tree Farmers.

C.8.1. Please indicate, for each of the innovative actions defined below, whether you have requested information and/or technical advice, and/or if you have actually made investments during the last 10 years:

Code	Innovative Action	Have you looked for information and/or consultancy? (Y/N)	Approximate amount actually invested in €
Inn1	Erosion control actions		
Inn2	Use of deficit irrigation practices on water-scarce farms		
Inn3	Olive orchard waste composting practices		
Inn4	Disease and/or pest control by plant cover and/or antagonistic fungi		
Inn5	Innovation in automatic and/or smart irrigation systems		
Inn6	Use of integrated equipment for bunching, chopping and management of pruning residues.		
Inn7	Use of mobile applications, including weather forecasting or machinery monitoring, as an aid to agronomic practices.		
Inn8	Use of drones and other equipment for precision farming		
Inn9	Implementation of business lines that represent alternative sources of income (Eco-tourism, Cosmetics, etc.).		
Inn10	Conducting training courses for all types of personnel.		

Section 9/10. Risk Aversion Elicitation.

C.9.1. By means of Multi-item scale (partially based in 'Risk Management in Norwegian cash crop farming'³).

Code	Risk-Aversion Strategy	Importance given by the farmer (0-10 scale)	Have you realized this strategy in the last 10 agricultural campaigns? (y/n)
RA1	Liquidity – keep cash on hand		
RA2	Prevent/reduce crop diseases and pests		
RA3	Manage debt to ensure solvency		
RA4	Buying farm business insurance		
RA5	Producing at lowest possible cost		
RA6	Take off-farm work		
RA7	Buying personal insurance		
RA8	Renting machinery and/or land is safer than buying them		
RA9	Hiring agronomical consultancies		
RA10	Diversifying agricultural holding activities not to depend only of agricultural yield (rural tourism, eco-cosmetic, etc.)		
RA11	Sharing ownership of equipment or operating jointly with other farmers.		
RA12	Buying productive factors (e.g. fertilisers) when they are cheap and storing them for future use.		
RA13	Hiring economic and or accounting consultancies		
RA14	Ensuring surplus of machinery capacity and/or stock of spare parts.		
RA15	Investing part of the benefits off-farm (stock market, real state, etc.)		
RA16	Organizing the farm as a corporation to reduce exposure of personal equity.		

³ Koesling, M. et al., (2004), "Risk and Risk Management in Organic and Conventional Cash Crop Farming in Norway," Acta Agric. Scand. Section C, Food Econ., vol. 1, Dec. 2004. doi: 10.1080/16507540410019692.

C.9.2. By means of Lottery-choice scale (adapted from ⁴).

Suppose you have €4,000 to invest in your olive orchard, and you have to decide between 40 different technical investments. Each of them has a different average profit, and each of them has a probability of obtaining that profit. Therefore, the ones that offer lower returns are safer (more likely to be successful) and the ones that can offer higher returns are less likely.

For every 1000€ you can invest, you have a set of 10 possible alternative investments. Please indicate, for each of these groups, which investment you would choose (remember that you can only choose one column in each table). Please mark your choice with a cross in the white box corresponding to the column of your choice:

1000€	Inv. 1	Inv. 2	Inv. 3	Inv. 4	Inv. 5	Inv. 6	Inv. 7	Inv. 8	Inv. 9	Inv. 10
Prob. of Earning	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
Earnings (€)	1.000	1.120	1.270	1.470	1.730	2.100	2.650	3.560	5.400	10.900
I prefer										

1000€	Inv. 11	Inv. 12	Inv. 13	Inv. 14	Inv. 15	Inv. 16	Inv. 17	Inv. 18	Inv. 19	Inv. 20
Prob. of Earning	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
Earnings (€)	1.000	1.200	1.500	1.900	2.300	3.000	4.000	5.700	9.000	19.000
I prefer										

1000€	Inv. 21	Inv. 22	Inv. 23	Inv. 24	Inv. 25	Inv. 26	Inv. 27	Inv. 28	Inv. 29	Inv. 30
Prob. of Earning	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
Earnings (€)	1.000	1.666	2.500	3.570	5.000	7.000	10.000	15.000	25.000	55.000
I prefer										

1000€	Inv. 31	Inv. 32	Inv. 33	Inv. 34	Inv. 35	Inv. 36	Inv. 37	Inv. 38	Inv. 39	Inv. 40
Prob. of Earning	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
Earnings (€)	1.000	2.200	3.800	5.700	8.300	12.000	17.500	26.700	45.000	100.000
I prefer										

⁴ Sabater-Grande, G. and Georgantzís, N., (2002), "Accounting for risk aversion in repeated prisoners' dilemma games: an experimental test", Journal of Economic Behavior & Organization, 48, issue 1, p. 37-50, <https://EconPapers.repec.org/RePEc:eee:jeborg:v:48:y:2002:i:1:p:37-50>.

Section 10/10. Interviewee's attitude towards organic farming as innovation.

C.10.1. Do you consider yourself risky for investment and management decisions of your agricultural holding? Rate your risk aversion on a scale of 0 to 10.

	0	1	2	3	4	5	6	7	8	9	10	
Non-Risky												Very Risky

C.10.2. Do you think that the organic farming techniques are a profitable investment?

- ☐ Yes, it is a profitable investment in the short run (less than 5 years).
- ☐ Yes, it is a profitable investment in the middle run (between 5 and 10 years).
- ☐ Yes, it is a profitable investment in the long run (more than 10 years).
- ☐ No, it is not a profitable investment.
- ☐ No answer/do not know.

C.10.3. Do you think that cultivating in organic provides or would provide you with certain social prestige?

- ☐ Yes, it is positively perceived.
- ☐ It is irrelevant.
- ☐ No, it is negatively perceived.
- ☐ No answer/do not know.

C.10.4. Do you think that the products derived from your organic olive orchard provide or would provide you with certain social prestige?

- ☐ Yes, it is positively perceived.
- ☐ It is irrelevant.
- ☐ No, it is negatively perceived.
- ☐ No answer/do not know.

C.10.5. In your opinion, the production of industrial and agricultural products that pollute the environment must:

- ☐ Stop immediately.
- ☐ Get to reducing progressively until it disappeared.
- ☐ Get to reducing progressively up to a certain level.
- ☐ Not be reduced, but the pollutant companies should eliminate pollution of pay for it.
- ☐ Not be reduced at all: the danger is not grave.

C. 10. 6. In your opinion, does the erosion influence the production of your olive orchard?

- ☐ Yes, it reduces the production significantly.
- ☐ Yes, it reduces the production slightly.
- ☐ No, it has no influence.

C.10.7. What do you think about the use of synthesis chemical products to produce food and its relation to human health?

- ☐ I think that all used chemical products in the food production must be forbidden.
- ☐ I think that some of them are dangerous and must be forbidden, and the use of the rest of them must be restricted.
- ☐ I think that they may be used safely, but those applied to food must be supervised and controlled.
- ☐ I think that currently they may be used safely and the concern of some consumers is not justified because the issue is under control.

11 Appendix E - Polish Use Case Questionnaire



AGRICORE Project

Agent-based tool for the development of agriculture policies

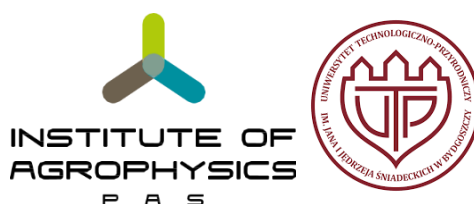
The AGRICORE project will provide a tool for modelling and simulating different instruments and measures associated with the Common Agricultural Policy (CAP), both at regional, national and EU level. It will also contemplate the wide diversity that exists between farms located in different geographical areas and/or dedicated to different crops.

The objective of the AGRICORE tool is to be able to test different alternative CAP instruments a priori, i.e. before their approval and implementation, in order to analyse the impact that each of these alternatives could have on the farm economy, on land and agricultural prices, on the environment and on the social development of rural areas in Europe.

To this end, cutting-edge big data mining and fusion techniques will be applied, coupled with mathematical optimisation models and artificial intelligence (AI) algorithms, among others. To ensure that the adjustment of the aforementioned AI algorithms allows the behaviour of farm owners to be reproduced as reliably as possible, it is necessary to obtain, by means of surveys, data on the decision-making processes that these farmers carry out to manage their farms.

This questionnaire is designed to extract some of this information. The survey is conducted anonymously, so it will be impossible to identify you as a respondent or, of course, to associate your answers with your actual farm. Therefore, we ask you to be as honest as possible by providing data that is as accurate as possible. This will enable us to create a tool that is closer to the reality on the ground and thus to better measure the impact of the various alternative measures (premiums, aids, subsidies, etc.).

Through your collaboration, you become part of the process of designing new and improved versions of the CAP, which will ultimately lead to a better standard of living for you and your family, as well as to a reduced impact of farming on the environment.



I. INFORMATION SHEET OF THE AGRICORE PROJECT QUESTIONNAIRE CONCERNING THE PARTICIPATION IN MEASURE M10 (AGRI-ENVIRONMENT-CLIMATE) OF THE RURAL DEVELOPMENT PROGRAM OF POLISH MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT FOR YEARS 2014-2020.

1.1. What is the purpose of the questionnaire?

The purpose of this questionnaire is to explore the ways in which Measure M10 (Agri-environment-climate) could influence farmers' activities/wellness and the perception of environmental and climatic goals of EU. The questionnaire has been prepared in the frame of AGRICORE HORIZON2020 project and is devoted to the assessment of the possibilities and effects of farmers' decisions to apply for EU funds allocated to ensure sustainable development of rural areas.

1.2. What is the AGRICORE HORIZON2020 project?

The AGRICORE project will provide a tool for modelling and simulating different instruments and measures associated with the Common Agricultural Policy (CAP), both at regional, national and EU level. It will also contemplate the wide diversity that exists between farms located in different geographical areas and/or dedicated to different crops. The objective of the AGRICORE tool is to be able to test different alternative CAP instruments a priori, i.e. before their approval and implementation, in order to analyse the impact that each of these alternatives could have on the economics of farms, on land and agricultural prices, on the environment and on the social development of rural areas in Europe. To this end, cutting-edge big data mining and fusion techniques will be applied, coupled with mathematical optimisation models and artificial intelligence (AI) algorithms, among others. To ensure that the adjustment of the aforementioned AI algorithms allows the behaviour of farm owners to be reproduced as reliably as possible, it is necessary to obtain, by means of surveys, data on the decision-making processes that these farmers carry out to manage their farms. This questionnaire is designed to extract some of this information. The survey is conducted anonymously, so it will be impossible to identify you as a respondent or, of course, to associate your answers with your actual farm. Therefore, we ask you to be as honest as possible by providing data that is as accurate as possible. This will enable us to create a tool that is closer to the reality on the ground and thus to better measure the impact of the various alternative measures (premiums, aids, subsidies, etc.). Through your collaboration, you become part of the process of designing new and improved versions of the CAP, which will ultimately lead to a better standard of living for you and your family, as well as to a reduced impact of farming on the environment.

1.3. Why have I been chosen?

You are someone with meaningful knowledge and experience of agricultural production.

1.4. Do I have to take part?

Participation in the study is voluntary. You have a right to decline the invitation or to withdraw from the study at any time without providing an explanation or incurring any penalty.

1.5. What will happen to me if I take part?

If you agree to take part in the questionnaire, you will be part of a group of people from across Poland with different knowledge and experience of agricultural production problems. This is not a test and there are no right or wrong answers, we are simply interested in your opinions on the topics under discussion. Results will be anonymous (i.e. you will not be identifiable) and will be used for research purposes only.

1.6. Are there any potential benefits of taking part in the study?

There will not be any immediate benefits to those who take part in the study at this stage. During the AGRICORE project, respondents who will take part in the survey will be invited to the stakeholder workshop in Poland paid for under the project. The results of the study will lead to further research into this area with wider groups of individuals and organisations across Europe concerned with agricultural production and with policymakers.

1.7. Confidentiality.

Any information you supply will be held in strict confidence, viewed only by the named researchers and then anonymised. Only the anonymised coded questionnaire will be shared with other researchers.

II. QUESTIONS ABOUT THE ENTITY PARTICIPATING IN THE SURVEY

2.1. Respondent's gender:

- ☐ Female.
- ☐ Male.

2.2. The respondent is:

- ☐ The owner of a farm.
- ☐ A relative of the owner.
- ☐ An employee.
- ☐ A tenant.
- ☐ Has a different function (which).

2.3. Education of the respondent:

- ☐ Primary education.
- ☐ Secondary school.
- ☐ University degree.
- ☐ Postgraduate studies (masters and doctoral studies).
- ☐ Professional courses.

2.4. Type of entity:

- ☐ Individual farm.
- ☐ Production cooperative.
- ☐ Agricultural association.
- ☐ Other.

2.5. Who generally made strategic decisions about which plants/animals to produce during the last growing seasons?

- ☐ Male(s).
- ☐ Female(s).
- ☐ Both female(s) and male(s).

2.6. Who was responsible for taking the final product from your farm to the market and negotiating the sale?

- ☐ Male(s).
- ☐ Female(s).
- ☐ Both female(s) and male(s).

2.7. If any revenue was generated from plant/animal production in the last years, who decided how to spend the revenues?

- ☐ Man.
- ☐ Woman.
- ☐ Both woman and man.

2.8. Age of the farm manager (please mark the appropriate answer).

- ☐ Up to 30 years.
- ☐ 30 - 35 years old.
- ☐ 36 - 40 years old.
- ☐ 41 - 45 years old.
- ☐ 46 - 50 years old.
- ☐ 51 - 55 years old.
- ☐ 56 - 60 years old.
- ☐ over 60 years.

2.9. Working time in agriculture.

- ☐ Less than 5 years.
- ☐ 6 - 10 years.
- ☐ 11 - 15 years.
- ☐ 16 - 20 years.
- ☐ 21 - 25 years.
- ☐ 26 - 30 years.
- ☐ Over 30 years.

2.10. Total number of permanent workers on the farm:

- ☐ None.
- ☐ 1-2 people.
- ☐ 3-5 people.
- ☐ 6-10 people.
- ☐ Over 10 people.

2.11. Total number of seasonal workers on the farm:

- ☐ None.
- ☐ 1-2 people.
- ☐ 3-5 people.
- ☐ 6-10 people.
- ☐ Over 10 people.

2.12. The arable land area of your farm is (indicate in hectares):

2.13. Are there any fields on your farm with an area of more than 1 ha?

- ☐ Yes.
☐ No.⁵

2.14. Share of owned land (indicate in percentage approximately):

2.15. Share of rented land (indicate in percentage approximately):

2.16. Please assess the natural conditions of farming on your farm:

- ☐ Very difficult.
☐ Difficult.
☐ Average.
☐ Good.

2.17. What is the percentage share of soils in the agricultural area of your farm that allow you to achieve stable crops, to a small extent dependent on weather conditions?

- ☐ Less than 20%.
☐ More than 20% and less than 50%.
☐ More than 50% and less than 75%.
☐ Over 75%.

2.18. Which of the following ecosystem components exist on your farm:

- ☐ Grassland.
☐ Landscape elements not used for agricultural purposes.
☐ Forests.
☐ Orchards.

Slopes with a land:

- ☐ Less than 5%.
☐ From 5% to 20%.
☐ Over 20%.

2.19. Your farm is mainly active in the production of:

- ☐ Cereals.
☐ Industrial plants.
☐ Vegetables.
☐ Fruit.
☐ Meat.
☐ Milk.
☐ It is difficult to define unequivocally.

⁵ For agricultural parcels over 1 ha, there is an obligation in M10 Action to leave 15-20% unmown area, which may not necessarily be beneficial for a farmer dealing with livestock production, who cares about forage. You can opt out of this requirement for smaller plots of land.

2.20. To what extent does agricultural income/profit guarantee your family maintenance?

- ☐ Less than 20%.
- ☐ More than 20% and less than 50%.
- ☐ More than 50% and less than 75%.
- ☐ More than 75%.

2.21. When did you last increase your crop acreage?

- ☐ Never.
- ☐ More than 10 years ago.
- ☐ 10 to 5 years ago.
- ☐ One to two years ago.

2.22. Which special areas exist on your farm?

- ☐ NATURA2000 sites.
- ☐ Other protected areas.
- ☐ Habitats of rare species of birds or other animals.
- ☐ If other, please specify: _____

2.23. What farming systems do you use on your farm?

- ☐ Plough cultivation.

One of the types of no-till cultivation:

- ☐ Full surface deep.
- ☐ Full-surface plate.
- ☐ Full plate after sowing.
- ☐ Strip-till.
- ☐ Ridge.
- ☐ Zero-tillage, direct sowing.

2.24. Does the agricultural machinery you use on your farm enable the production focused on environmental and biodiversity protection?

- ☐ Yes.
- ☐ No.

2.25. If the machines in use today are not sufficient for such production, do you plan to buy such machines?

- ☐ Within the next 3 years.
- ☐ Later than 3 years.

2.26. In the period 2014-2020, were you a beneficiary of measure M10?

- ☐ Yes.
- ☐ No.

III. QUESTIONS FOR FARMERS WHO WERE BENEFICIARIES OF MEASURE M10.1

3.1. How would you rate the effects of your participation in the activity M10.1?

- ☐ Positively.
- ☐ Negatively.

3.2. Who decided about participation in the action M10?

- ☐ A man.
- ☐ A woman.
- ☐ Both a woman and a man.

3.3. How did the involvement in the M10 Measure affect the workload on the farm?

- ☐ It increased the workload.
- ☐ It decreased the workload.
- ☐ It did not change the workload.

Economic impact:

3.4. Did your participation in M10 activities affect your income?

- ☐ Yes.
- ☐ No.

If "yes", did your income:

- ☐ Increase.
- ☐ Decrease.

3.5. If it decreased, what increase in the subsidy would be satisfactory to you?

- ☐ 25%.
- ☐ 50%.
- ☐ 100%.
- ☐ More than 100%.

3.6. Did your participation in M10 Measure affect your costs?

- ☐ Yes.
- ☐ No.

If "yes", did your costs:

- ☐ Increase.
- ☐ Decrease.

3.7. If your costs increased, was this due to some of the following changes in agricultural practices:

- ☐ Technological changes.
- ☐ Plant protection changes.
- ☐ Changes in fertilisation.
- ☐ Less productive plant species.
- ☐ Changes in plant varieties.
- ☐ Other changes (please specify): _____

Social/Cultural Impact:

3.8. Did the participation in the M10 Measure improve your prestige?

- ☐ Yes.
- ☐ No.

If "yes", please specify among whom:

- ☐ Within the local community.
- ☐ Among neighbours.
- ☐ In professional groups.
- ☐ Other social groups (please specify): _____

3.9. Does the participation in the M10 Measure improve the image of your product / service in terms of market value?

- ☐ Yes.
- ☐ No.

If "yes", do you think it is happening through the promotion of finished food products, including information about the origin of raw materials from environmentally friendly farms?

- ☐ Yes.
- ☐ No.

If not, you think it's due to:

- ☐ Low public awareness of the subject of sustainable agriculture and eco-services.
- ☐ Poor promotion of farmers' participation in M10 Measure.
- ☐ Distrust of many actors M10.
- ☐ Other (name which): _____

Bureaucratic/institutional factors

3.10. What was the most difficult part of meeting all the commitments for M10 Measure?

- ☐ Carrying out adjustment processes (select which ones):
 - ☐ Changes in the structure of crops.
 - ☐ Changes in technological paths.
 - ☐ Changes in agrotechnical procedures.
 - ☐ Changes in fertilisation.
 - ☐ Changes in plant protection.
 - ☐ Other (name which): _____
- ☐ Record of data necessary to document liabilities.
- ☐ Weak level of support in the implementation of M10 activities and their presentation by advisers.
- ☐ Errors in communication between farmers and supporting institutions (indicate with which):
 - ☐ Agricultural advisory centres.
 - ☐ Audit institutions.
 - ☐ Other entities (please specify): _____

3.11. Did you have any doubts during the implementation of the M10 Measure? What was the biggest one?

- ☐ No doubts.
- ☐ Lack of trust in the EU institutions.
- ☐ Lack of trust in officials of national institutions supervising the activities of M10.
- ☐ Concerns about a refund in the event of poor project audit performance.
- ☐ Others resulting from the questions presented below.

IV. QUESTIONS FOR FARMERS WHO ARE NOT BENEFICIARIES OF MEASURE M10 OR HAVE WITHDRAWN FROM PARTICIPATION IN MEASURE M10.

4.1. I did not participate/resigned from participation in the M10 Measure:

- ☐ Due to a lack of information on such activities.
- ☐ Due to incorrect or incomplete information on such activities.
- ☐ Overly bureaucratic data registration procedures.
- ☐ Bad experience of farmers' neighbours in using subsidies of M10.
- ☐ Due to poor support of agricultural advisors, ARMA officers and other institutions in the preparation of the application.
- ☐ Due to expected unprofitable activity due to high natural and business risk due to profound changes in the farm to meet the necessary obligations of M10 and the resulting lower profits than losses.
- ☐ Due to a lack of trust and belief that my personal positive behaviour and decisions supporting pro-environmental and climate change will change anything at local, regional, national and/or global level, because other farmers do not have the same values and beliefs as me.
- ☐ Other (please specify): _____

Specific questions connected with some requirements of the M10 measure

4.2. Can you accept required dates of catch crops cultivation (i.e. sowing dates by October 1 and not resuming agro technical operations before 15th February) in a view of changing weather conditions during the several last years?

- ☐ Yes.
☐ No.

4.3. Do you expect any legal problems with the lease of meadows because of the M10 Measure obligation to preserve all permanent grassland and landscape elements being unused for agricultural purposes and constituting refuges of wild nature

- ☐ Yes.
☐ No.

4.4. Should the post-harvest analysis of chemical compounds in the soil be the only premise to prepare annual fertilisation plan without possibility to change it during a season?

- ☐ Yes.
☐ No.

4.5. Do you plan to make changes to the size of the arable land acreage more than 15%?

- ☐ Yes.
☐ No.

V. QUESTIONS FOR FARMERS WHO INTEND TO APPLY IN FUTURE FOR FUNDS WITHIN MEASURES SIMILAR TO THE M10 MEASURE

5.1. Are you able not to use plant protection products if required?

- ☐ Yes.
☐ No.⁶

5.2. Are you able to use a minimum of 4 crops in the main crop in a given year on arable land on the farm?

- ☐ Yes.
☐ No.⁷

⁶ in the case of botanical and ornithological packages, their use is completely prohibited (there are a few exceptions to selective measures, but farmers do not use them anyway)

⁷ Is the area of arable land able to ensure this condition, if it has targeted production on the farm, e.g. pig production, then it is known that he will care more about the cultivation of cereal crops, therefore the question about having animals will also be important

5.3. Do you plan to fallow any arable land within the 5-years commitment? (Sustainable agriculture package).

- ☐ Yes.
- ☐ No.⁸

5.4. Are you able to keep rotating at least 3 crop groups within 5 years of fulfilling the obligation (sustainable agriculture package)?

- ☐ Yes.
- ☐ No.⁹

5.5. Do you plan to make changes to the size of the arable land acreage more than 15%?

- ☐ Yes.
- ☐ No.

⁸ there is a ban on fallow arable land in package 1.1

⁹ Obligation to pass 3 groups of plants through each plot within 5 years, and it is difficult to determine what trends will determine future production - 1.1

VI. INNOVATIVELY ELICITATION THROUGH MULTI-ITEM SCALE AND RISK AVERSION ELICITATION (FOR ALL).

6.1. Please indicate, for each of the innovative actions defined below, whether you have requested information and/or technical advice, and/or if you have actually made investments during the last 10 years:

Code	Innovative Action	Have you looked for information and/or consultancy? (Y/N)	Approximate amount actually invested in PLN
Inn1	Erosion control actions.		
Inn2	Use of irrigation practices on water-scarce farms.		
Inn3	Treatments preventing from air pollution by external factors.		
Inn4	Treatments preventing from soil pollution by external factors or soil degradation as a result of improper soil management.		
Inn5	Assuring animal breeding standards taking into account proper organic waste management and processing of methane.		
Inn6	Disease and/or pest control by plant cover and/or antagonistic fungi.		
Inn7	Innovation in automatic and/or smart field operations and/or smart animal production systems.		
Inn8	Use of integrated equipment for bunching, chopping and management of postharvest residues.		
Inn9	Use of mobile applications, including weather forecasting or machinery monitoring, as an aid to agronomic practices.		
Inn10	Use of drones and other equipment for precision farming.		
Inn11	Implementation of business lines that represent alternative sources of income (Eco-tourism, Cosmetics, etc.).		
Inn12	Conducting training courses for all types of personnel.		

6.2. By means of Multi-item scale (partially based in 'Risk Management in Norwegian cash crop farming'¹⁰.

Code	Risk-Aversion Strategy	Importance given by the farmer (0-10 scale)
RA1	Financial liquidity (keeping cash on hand).	
RA2	Prevent/reduce crop diseases and pests.	
RA3	Manage debt to ensure solvency.	
RA4	Buying farm business insurance, especially concerning the natural risks of farming.	
RA5	Producing at lowest possible cost.	
RA6	Take off-farm work.	
RA7	Buying personal insurance.	
RA8	Renting machinery and/or land is safer than buying them.	
RA9	Hiring agronomical and environmental consultancies	
RA10	Diversifying agricultural holding activities not to depend only of agricultural yield (rural tourism, eco-cosmetic, etc).	
RA11	Sharing ownership of equipment or operating jointly with other farmers.	
RA12	Buying productive factors (e.g. fertilisers, pesticides, drugs for animals) when they are cheap and storing them for future use.	
RA13	Hiring economic and or accounting consultancies	
RA14	Ensuring surplus of machinery capacity and/or stock of spare parts.	
RA15	Investing part of the benefits off-farm (stock market, real state, etc).	
RA16	Organizing the farm as a corporation to reduce exposure of personal equity.	

¹⁰ Koesling, M. et al., (2004), "Risk and Risk Management in Organic and Conventional Cash Crop Farming in Norway," Acta Agric. Scand. Section C, Food Econ., vol. 1, Dec. 2004. doi: 10.1080/16507540410019692.

6.3. By means of Lottery-choice scale (adapted from¹¹).

Suppose you have 16,000PLN to invest in your farm, and you have to decide between 40 different technical investments. Each of them has a different average profit, and each of them has a probability of obtaining that profit. Therefore, the ones that offer lower returns are safer (more likely to be successful) and the ones that can offer higher returns are less likely.

For every 4000PLN you can invest, you have a set of 10 possible alternative investments. Please indicate, for each of these groups, which investment you would choose (remember that you can only choose one column in each table). Please mark your choice with a cross in the white box corresponding to the column of your choice:

4000PLN	Inv. 1	Inv. 2	Inv. 3	Inv. 4	Inv. 5	Inv. 6	Inv. 7	Inv. 8	Inv. 9	Inv. 10
Prob. of Earning	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
Earnings PLN	4.000	4.480	5.080	5880	6920	8400	10600	14240	21600	43600
I prefer										

4000PLN	Inv. 11	Inv. 12	Inv. 13	Inv. 14	Inv. 15	Inv. 16	Inv. 17	Inv. 18	Inv. 19	Inv. 20
Prob. of Earning	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
Earnings PLN	4000	4800	6000	7600	9200	12000	16000	22800	36000	76000
I prefer										

4000PLN	Inv. 21	Inv. 22	Inv. 23	Inv. 24	Inv. 25	Inv. 26	Inv. 27	Inv. 28	Inv. 29	Inv. 30
Prob. of Earning	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
Earnings PLN	4000	6664	10000	14280	20000	28000	40000	60000	100000	220000
I prefer										

4000PLN	Inv. 31	Inv. 32	Inv. 33	Inv. 34	Inv. 35	Inv. 36	Inv. 37	Inv. 38	Inv. 39	Inv. 40
Prob. of Earning	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
Earnings PLN	4000	8800	15200	22800	33200	48000	70000	106800	180000	400000
I prefer										

¹¹ Sabater-Grande, G. and Georgantzis, N., (2002), "Accounting for risk aversion in repeated prisoners' dilemma games: an experimental test", Journal of Economic Behavior & Organization, 48, issue 1, p. 37-50, <https://EconPapers.repec.org/RePEc:eee:jeborg:v:48:y:2002:i:1:p:37-50>.

12 Appendix F - Greek Use Case Questionnaire



AGRICORE Project

Agent-based tool for the development of agriculture policies

The AGRICORE project will provide a tool for modelling and simulating different instruments and measures associated with the Common Agricultural Policy (CAP), both at regional, national and EU level. It will also contemplate the wide diversity that exists between farms located in different geographical areas and/or dedicated to different crops.

The objective of the AGRICORE tool is to be able to test different alternative CAP instruments a priori, i.e. before their approval and implementation, in order to analyse the impact that each of these alternatives could have on the farm economy, on land and agricultural prices, on the environment and on the social development of rural areas in Europe.

To this end, cutting-edge big data mining and fusion techniques will be applied, coupled with mathematical optimisation models and artificial intelligence (AI) algorithms, among others. To ensure that the adjustment of the aforementioned AI algorithms allows the behaviour of farm owners to be reproduced as reliably as possible, it is necessary to obtain, by means of surveys, data on the decision-making processes that these farmers carry out to manage their farms.

This questionnaire is designed to extract some of this information. The survey is conducted anonymously, so it will be impossible to identify you as a respondent or, of course, to associate your answers with your actual farm. Therefore, we ask you to be as honest as possible by providing data that is as accurate as possible. This will enable us to create a tool that is closer to the reality on the ground and thus to better measure the impact of the various alternative measures (premiums, aids, subsidies, etc.).

Through your collaboration, you become part of the process of designing new and improved versions of the CAP, which will ultimately lead to a better standard of living for you and your family, as well as to a reduced impact of farming on the environment.



I. INFORMATION SHEET OF THE AGRICORE PROJECT QUESTIONNAIRE CONCERNING THE SUB-MEASURE M6.1 (STARTUP AID FOR YOUNG FARMERS) WHICH IS INCLUDED IN THE NATIONAL RURAL DEVELOPMENT PROGRAM FOR THE PERIOD 2014-2020

1.1. What is the purpose of the questionnaire?

The purpose of this questionnaire is to analyse the M6.1 impact on Greece, focusing on the socio-economic aspects. The questionnaire has been prepared in the frame of AGRICORE HORIZON2020 project and is devoted to the ex-post and ex-ante analysis of the above-mentioned instrument which aims to the establishment of farmers -entrepreneurs and the increase of agricultural holdings' competitiveness through age-based and higher-skilled renewal.

1.2. Why have I been chosen?

You are someone with meaningful knowledge and experience of agricultural production.

1.3. Do I have to take part?

Participation in the study is voluntary. You have a right to decline the invitation or to withdraw from the study at any time without providing an explanation or incurring any penalty.

1.4. What will happen to me if I take part?

If you agree to take part in the questionnaire, you will be part of a group of people from across Greece with different knowledge and experience of agricultural production problems. This is not a test and there are no right or wrong answers, we are simply interested in your opinions on the topics under discussion. Results will be anonymous (i.e. you will not be identifiable) and will be used for research purposes only.

1.5. Are there any potential benefits of taking part in the study?

There will not be any immediate benefits to those who take part in the study at this stage. However, the results of the study will lead to further research into this area with wider groups of individuals and organisations across Europe concerned with agricultural production and with policymakers.

1.6. Confidentiality

Any information you supply will be held in strict confidence, viewed only by the named researchers and then anonymised. Only the anonymised coded questionnaire will be shared with other researchers.

Please, answer the questions honestly and as much accurate as possible.

Thank you for your collaboration.

II. Questionnaire about socio-economic variables, financial and accounting variables and beneficiaries and non-beneficiaries of setting up measure evolution.

2.1. Gender.

☐ Male.

☐ Female.

2.2. Age.

2.3. Marital status.

☐ Single

☐ Married

2.4. Educational level.

☐ < 9 years (Basic)

☐ 9-12 years (High School)

☐ 12- 14 years (College)

☐ 15-16 years (Higher)

2.5. Annual income.

☐ <10,000 €

☐ 10,001 to 20,000 €

☐ 20,001 to 30,000 €

☐ >30,001€

2.6. Previous occupation.

☐ Private employee

☐ Public employee

☐ Self-employed

☐ Unemployed

☐ High school student

☐ Farmer

2.7. Percentage of annual income from agricultural activities.

☐ <50%

☐ 51 to 75%

☐ 76 to 100%

2.8. Standard output of agricultural holding.

☐ <8,000 €

☐ 8,001 to 16,000 €

☐ 16,001 to 25,000 €

☐ >25,000 €

2.9. Annual Work Units.

☐ <1

☐ 1 to 3

☐ 3 to 5

☐ >5

2.10. Farm size (hectares).

☐ <3

☐ 3 to 5

☐ 5 to 10

☐ >11

2.11. Owned land (percentage approximately).

2.12. Rented land (percentage approximately).

2.13. Competitiveness of agricultural holdings of supported farmers has improved.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2.14. The share of the final price of agriculture products retained with primary producers has increased.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2.15. The added value of agricultural products of supported farmers has increased.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2.16. Implementation of quality schemes of supported farmers has increased.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2.17. Participation of supported farmers in short circuit schemes, quality-oriented producer group and/or inter branch organization has increased.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2.18. The young farmer payment would make me feel more secure in my role.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2.19. The young farmer payment would improve my quality of life.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2.20. The young farmer payment would decrease the stress levels experienced by young farmers.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2.21. The young farmer payment would influence my decision to remain in farming.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2.22. The young farmer payment would encourage greater variety of cropping and stocking.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2.23. The young farmer payment would offset the risk and uncertainty in the farming sector.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2.24. The young farmer payment would be sufficient to keep me in farming.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2.25. The young farmer payment would lead to more environmentally friendly farming practices.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2.26. The young farmer payment would allow me to improve the productivity of the farm.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2.27. The young farmer payment would increase my motivation to succeed in the farming industry.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2.28. The young farmer payment would compensate for the high levels of debt on my farm.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2.29. Low profit levels would enable me staying in the farming industry.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

III. Risk Aversion Elicitation by means of Lottery-choice scale (adapted from¹²).

Suppose you have €4,000 to invest in your olive orchard, and you have to decide between 40 different technical investments. Each of them has a different average profit, and each of them has a probability of obtaining that profit. Therefore, the ones that offer lower returns are safer (more likely to be successful) and the ones that can offer higher returns are less likely.

For every 1000€ you can invest, you have a set of 10 possible alternative investments. Please indicate, for each of these groups, which investment you would choose (remember that you can only choose one column in each table). Please mark your choice with a cross in the white box corresponding to the column of your choice:

1000€	Inv. 1	Inv. 2	Inv. 3	Inv. 4	Inv. 5	Inv. 6	Inv. 7	Inv. 8	Inv. 9	Inv. 10
Prob. of Earning	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
Earnings (€)	1.000	1.120	1.270	1.470	1.730	2.100	2.650	3.560	5.400	10.900
I prefer										

1000€	Inv. 11	Inv. 12	Inv. 13	Inv. 14	Inv. 15	Inv. 16	Inv. 17	Inv. 18	Inv. 19	Inv. 20
Prob. of Earning	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
Earnings (€)	1.000	1.200	1.500	1.900	2.300	3.000	4.000	5.700	9.000	19.000
I prefer										

1000€	Inv. 21	Inv. 22	Inv. 23	Inv. 24	Inv. 25	Inv. 26	Inv. 27	Inv. 28	Inv. 29	Inv. 30
Prob. of Earning	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
Earnings (€)	1.000	1.666	2.500	3.570	5.000	7.000	10.000	15.000	25.000	55.000
I prefer										

1000€	Inv. 31	Inv. 32	Inv. 33	Inv. 34	Inv. 35	Inv. 36	Inv. 37	Inv. 38	Inv. 39	Inv. 40
Prob. of Earning	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
Earnings (€)	1.000	2.200	3.800	5.700	8.300	12.000	17.500	26.700	45.000	100.000
I prefer										

¹² Sabater-Grande, G. and Georgantzis, N., (2002), "Accounting for risk aversion in repeated prisoners' dilemma games: an experimental test", Journal of Economic Behavior & Organization, 48, issue 1, p. 37-50, <https://EconPapers.repec.org/RePEc:eee:jeborg:v:48:y:2002:i:1:p:37-50>.