agricore

AGENT-BASED SUPPORT TOOL FOR THE DEVELOPMENT OF AGRICULTURE POLICIES

NEWSLETTER

Issue 6: July 2023

In this issue:

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Agricultural use cases encompass a range of applications that leverage technology and practices to enhance farming efficiency. These use cases include precision farming for data-driven decision-making, automated machinery for increased productivity, smart irrigation for optimized water usage, and crop monitoring for early detection of issues. By adopting these advancements, farmers can improve yields, conserve resources, and make informed choices for sustainable agriculture.
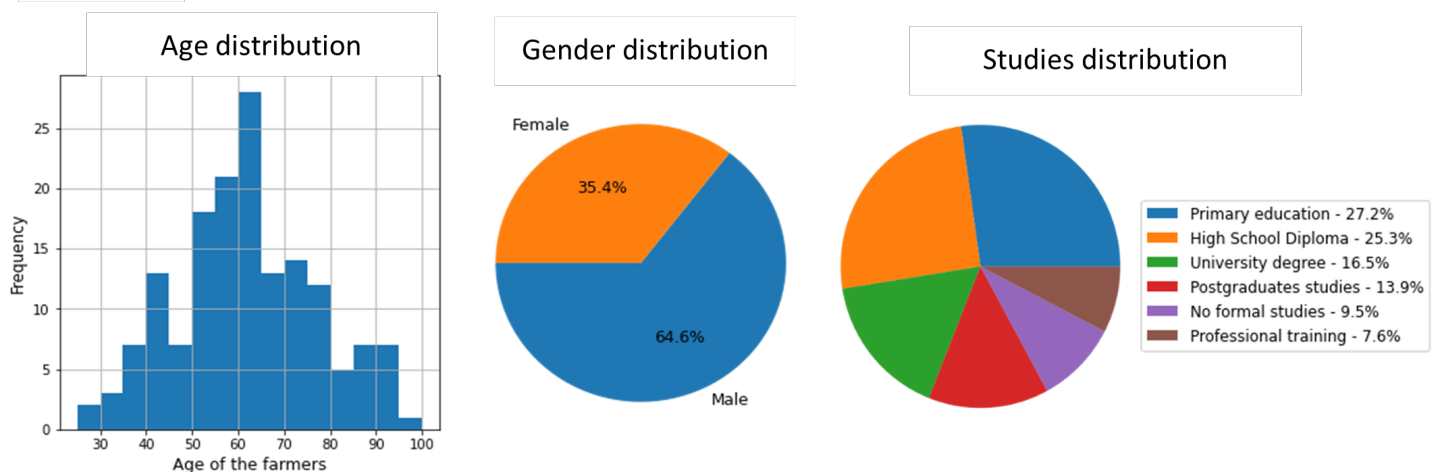
Andalusian Use Case

SUMMARY OF THE RESULTS

1. Personal Data and position distribution
The average age of the farmers is around 60-65 years old, and more than 35% are women. Regarding the educational level and the farmer's role in olive exploitation, there is a 50% equally distributed between primary and secondary education [Figure 1].

Figure 1

Age distribution

Gender distribution

Studies distribution

Female
35.4%
Male
64.6%

Primary education - 27.2%
High School Diploma - 25.3%
University degree - 16.5%
Postgraduates studies - 13.9%
No formal studies - 9.5%
Professional training - 7.6%

On the other hand, the situation of the farmers was analysed in terms of their position and work on the farm. More than 80% of the respondents are the owners of the farms, and more than 50% are involved in management, administration, and technical work on the farm [Figure 2-3].
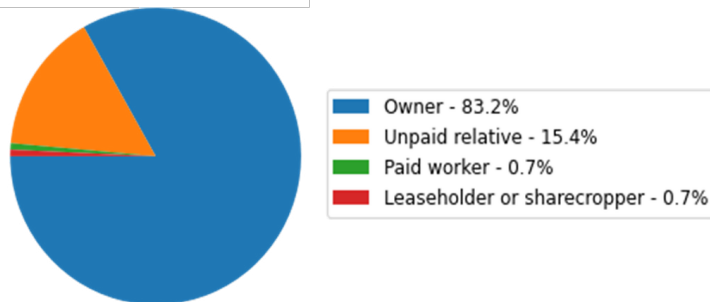
Figure 2

Position on the farm

Owner - 83.2%
Unpaid relative - 15.4%
Paid worker - 0.7%
Leaseholder or sharecropper - 0.7%

Figure 3

Work on the farm

Management - 42.7%
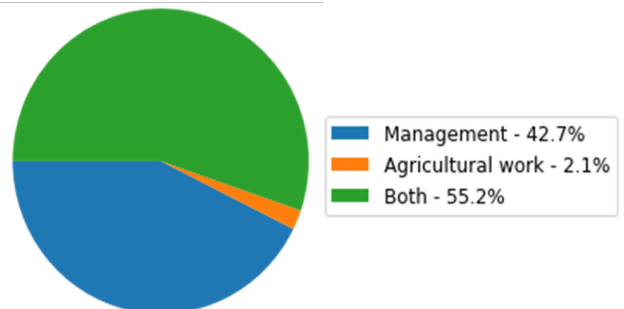Agricultural work - 2.1%
Both - 55.2%

Figure 2 - 3: Andalusian Use-Case,Position and Work on the farm

2. Cultivated crop

The farms under study had different characteristics from each other in terms of territory, with 74% dedicated to the production of organic olive groves. They were also classified according to the type of irrigation, the age of the tree, the slope of the land and the percentage of erosion on the farm.

Figure 4

Production destination

3. Production

It was evaluated and quantified whether organic olive farms are profitable, observing an average production of 1000-2000 kg/ha, with more than 88% destined for mill oil production [Figure 4].

Exclusively for olive oil - 78.1%
Mainly for olive oil (>50%) - 9.6%
Exclusively for table oil - 6.2%
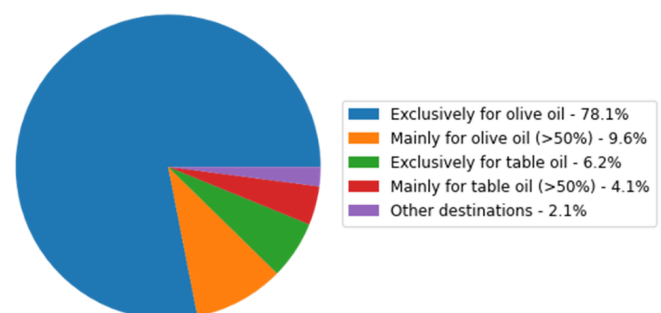Mainly for table oil (>50%) - 4.1%
Other destinations - 2.1%

Figure 4: Andalusian Use-Case ,Production destination

4. Acceptance of the measure

It was analysed whether farmers considered abandoning organic farming on their farms in the future, obtaining a negative answer from 87% of respondents. For those who did, the main reason for abandonment was economic-financial (63%).

5. Farmer's Knowledge

There is a significant lack of knowledge about the land categories asked to the farmer-owners, with more than 50% of the answers being answers from the farm technicians or not answered. Only 30-40% of farmer-owners know whether their farm belongs to these categories.

6. Innovation & Risk aversion

Two "Multi-item" scales were used, one with 10 types of innovations and the other with 16 risk management strategies. Regarding the first one, a large number of farmers were interested in training courses, the use of mobile applications and the use of integrated equipment; they also attached considerable importance to actions to combat erosion and control pests or diseases. However, only 10% of farmers invest in innovations. Regarding the second one, the most relevant strategies they invest in are take-off farm work, producing at the lowest possible cost and hiring agronomical consultancies.

Greek Use Case

The AGRICORE Greek use case focuses on assessing the socio-economic aspects of the M6.1 measure and the perceptions of young farmers. It aims to understand the impact of start-up aid for young farmers and address the challenges faced by the agricultural sector in Greece.

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Greece has regions classified as less developed, transitional, and more developed. With a population of 10.75 million, the country has a significant agricultural sector employing around 1.2 million people. However, farms in Greece are generally smaller, with an average size of 4.8 hectares and a low presence of young farmers.

The selected instrument for analysis is the "M6.1: Start-up aid for young farmers" sub-measure, aimed at increasing competitiveness and supporting young farmers. The study will focus on the socio-economic impact of the measure, using data from various sources and conducting participatory research.
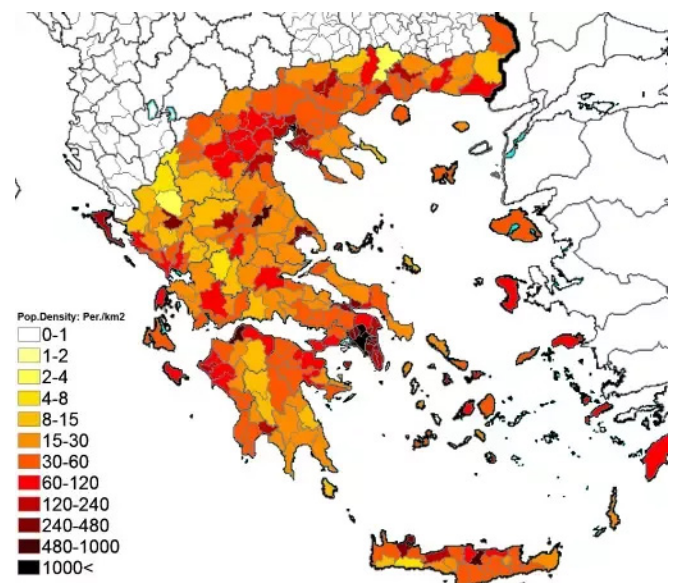
Figure 5: Greek Use-Case ,
Density of population person/ha nation

**Table 1. Socio-economic profile of Sub-Measure 6.1 beneficiaries**

Profile/Characteristics	
Total number of beneficiaries	13.905
Age	AVG ≈ 28.5 years
Sex	About 2/3 are men (61%)
Unemployment (at the time of application)	AVG ≈ 17.5 months
Personal income (yearly at the time of application)	AVG ≈ 1300 €
Family income	AVG ≈ 5000 €
Level of education	- More than 80% are at least high school graduates - 11% are university degree holders
Type of activity	About 3/4 are crop- or mixed-oriented (78%)
Average size of agricultural holding	AVG ≈ 5.2 Ha
Grant	AVG ≈ 19.250 Euros

Agriculture contributes to Greece's economy, employment, and exports, but the number of agricultural holdings has decreased, and the presence of young farmers is limited. The Young Farmers Aid Programme aims to address this by providing access to finance, land, and knowledge. The Greek Use Case of AGRICORE examines the effectiveness of sub-measure 6.1 in promoting the start-up of agricultural holdings.

The socio-economic profile of sub-measure 6.1 beneficiaries reveals characteristics such as male farmers with an average age of 28.5 and an average yearly income of approximately 1300 Euros. A questionnaire highlights that while the financial aid from the sub-measure serves as motivation, it is not seen as sufficient to ensure viability in farming.

**Table 2. Beliefs and perceptions of Sub-Measure 6.1 beneficiaries
and non-beneficiaries concerning the received financial aid from the sub-measure.**
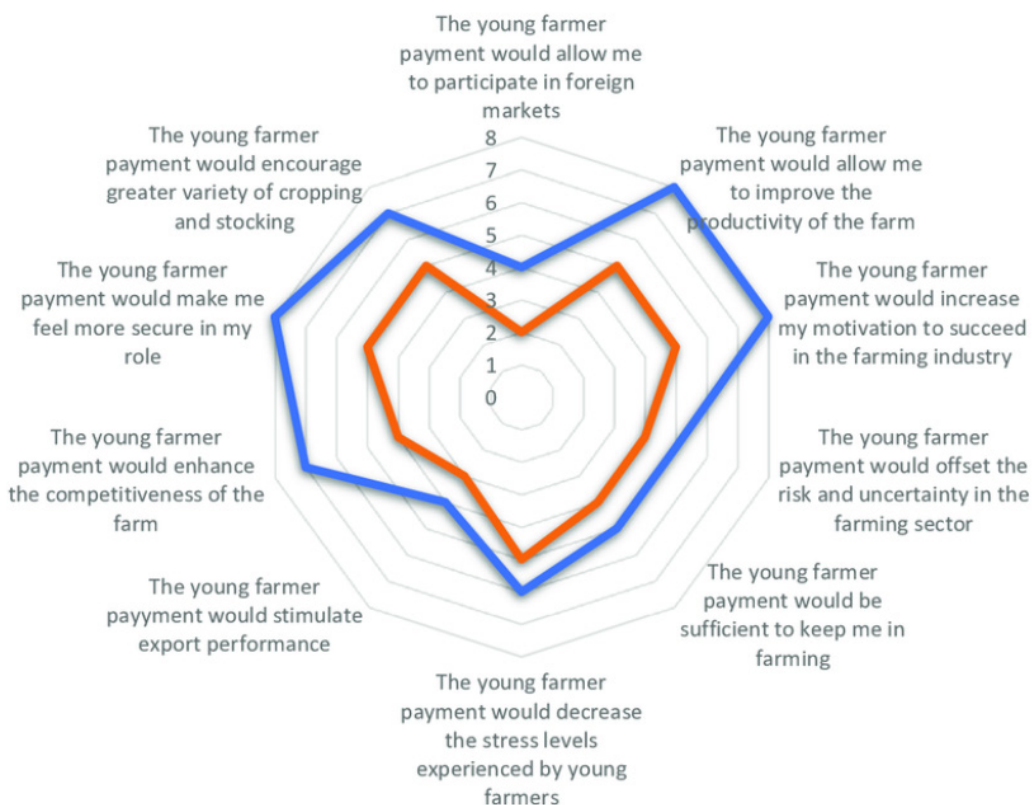
Polish Use Case

The AGRICORE Polish use case examines the influence of the M10.1 measure on Poland, focusing on enhancing ecosystem services and addressing environmental challenges. It highlights the importance of sustainable land management and the preservation of natural resources in the agricultural sector.

Poland, with a population of 38.43 million and 39% residing in rural areas, has six administrative regions. Forests cover about 30% of the country's surface, while agriculture occupies 46%. Challenges such as erosion, low humus levels, and nitrate pollution affect 19.4% of arable land, with 62.5% classified as areas with natural constraints. The "M10.1: Agri-environment-climate commitments" measure supports sustainable land management and the protection of natural habitats. It provides payments to farmers who commit to specific agri-environment-climate practices. The AGRICORE Polish use case analyzes the measure's impact on enhancing ecosystem services and addressing environmental and climate effects.

By 2020, nearly 430,000 applications were submitted, resulting in subsidies totaling 1,085 million EUR. This support targets farmers operating in natural areas with specific habitats. The analysis utilizes data from various sources, including the Central Statistical Office of Poland and the Agency for Restructuring and Modernisation of Agriculture (ARMA).
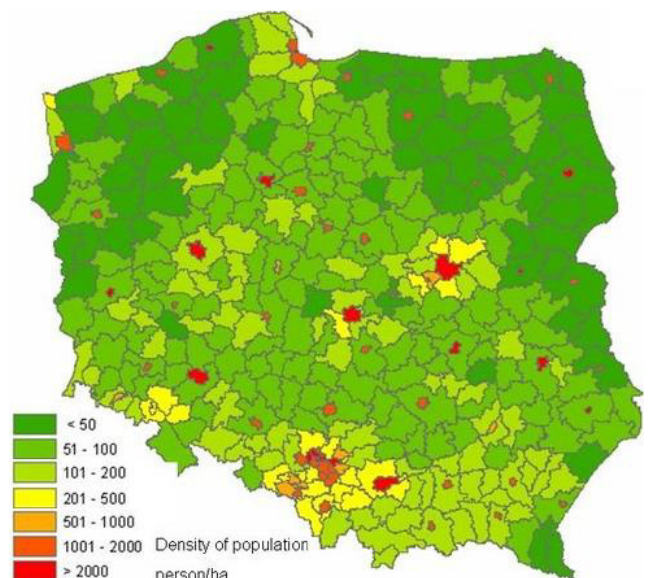

Figure 6: Polish Use-Case , Density of population person/ha

Summary of Activities

The ex-post analysis of this use case has been marked by participatory research consisting of two fundamental elements. On the one hand, all the information was gathered from all possible and available European, national, and regional databases. On the other hand, the questionnaires addressed directly to farmers, the main objective of which was to set all the information important for establishing a framework of the analyzed scenarios, and was not available in the databases, were developed and implemented.

The aim was to obtain all the information gaps through a survey campaign with information directly related to the project interest. The missing information gaps are based on the following points:

- Risk aversion
- Innovativeness willingness
- Age, gender, education of decision-makers responsible for strategic decisions
- The 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 that guarantee farmer's families' 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 the M10 action
- Social/cultural impact being a barrier/chance to access M10 action
- Bureaucratic/institutional factors being barrier/chance to access M10 action

1. Results of Use Cases

The development of this activity is defined and described in D1.8 of the AGRICORE project. The design and development of the participatory research aimed to select a representative sample of the Polish farms' population to be surveyed.

Analysis of charts no. 1 and 2 (from Figure 7) shows the distribution of gender and age (within the sample of PR and population of farms in Poland) and indicate their high compatibility and similar representativeness of the data collected during PR. In case of farmers' age one can see some differences although in some intervals they are not so essential, older and middle-aged farmers predominate.

Chart no. 3 (from Figure 8) shows that distributions of beneficiary and not beneficiary of M.10 action within the sample and total population of farmers in Poland are essentially different. One can think that it can be explained by a fact, that respondents are more opened for new challenges including a share within such survey like AGRICORE, so they are also more open for participation in M10 action.
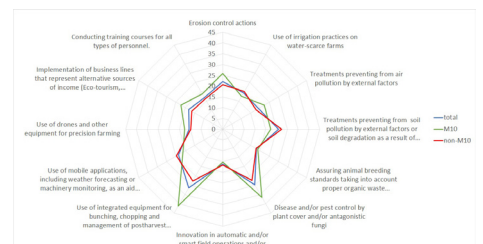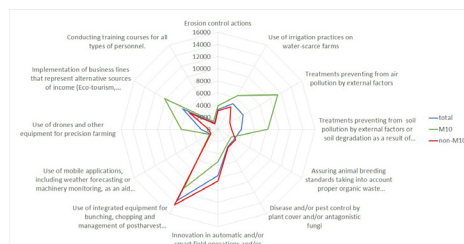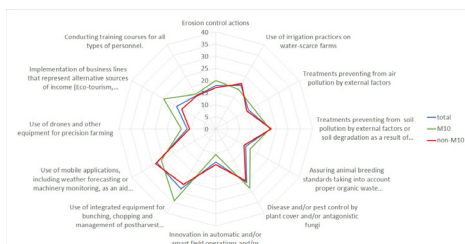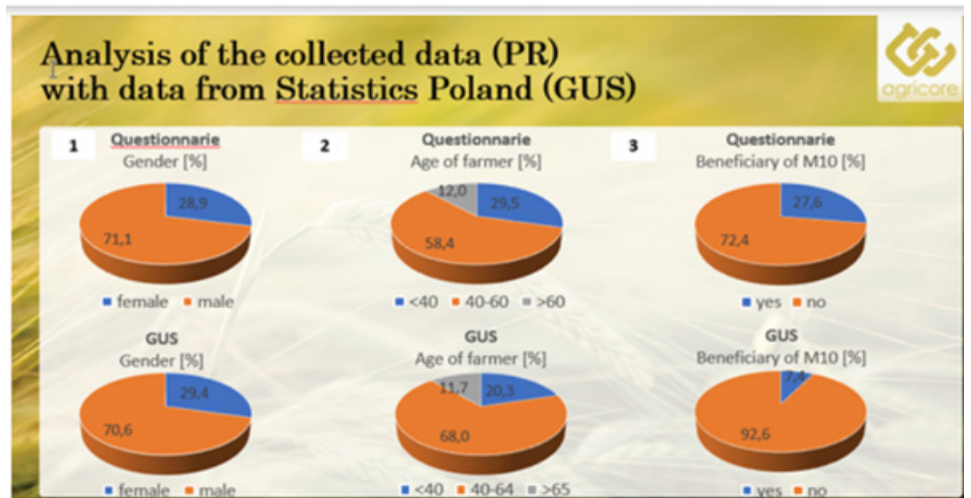
* Figure 7: Polish Use-Case, analysis of the collected data (PR) with data from Statistics Poland (GUS) Analysis of the collected data (PR) with data from Statistics Poland (GUS)

* Figure 8 : Polish Use-Case ,Parameters characterising openness of farmers to innovations according to access to M10 action

Figure 9 Polish Use-Case , Risk aversion of participants & non-participants of M10 action
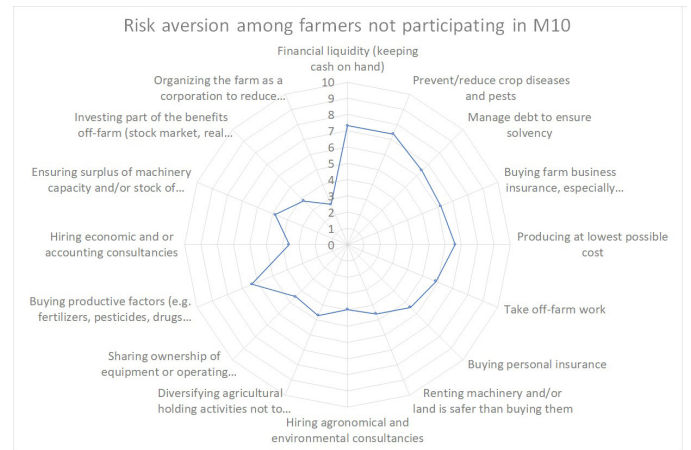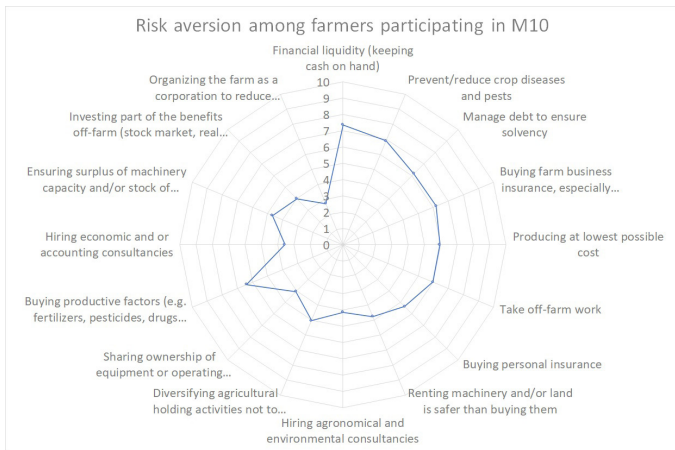
Ayesa is a leading provider of technology and engineering services worldwide with over 11,500 employees and a direct presence in 23 countries across Europe, America, Africa, and Asia. Ayesa excels in developing and implementing innovative digital and engineering solutions for both private companies and public administrations.

1. "What were your main reasons for getting involved in the project? What excites you the most about this project?"

The main reason for getting involved in the AGRICORE project is the use of cutting-edge technology, such as a Data warehouse which are new concepts for Ayesa to explore and learn from. The AGRICORE project is appealing for its interdisciplinary approach bringing together fields like agriculture, technology and data science.

2. "What could be the benefits/take-home messages for all stakeholders involved in such an initiative?"

Stakeholders can gain valuable insights and knowledge through collaboration with experts from various the different fields named before, learning about the latest agricultural technologies, innovative practices, and research findings.

3. "What aspects of the project are you most looking forward to seeing come to fruition?"

From Ayesa's point of view, the most interesting aspect is to look at the long-term effects of the use and application of the Agricore project, knowing that their contributions can lead to meaningful and sustainable changes in the industry.

AGRICORE is a Research and Innovation Action funded by the European Commission under the call RUR-04-2018 whose objective is to design and build an Agent-based-modelling tool to carry out impact assessments of different measures and instruments alternatively implementable within the Common Agricultural Policy (CAP).

These impact assessments fall into three main categories (socio-economic, environmental and delivery of ecosystem services). They will both assess a posteriori the effects of measures already implemented (ex-post analysis) and predict a priori the impact of measures in the design phase (ex-ante analysis).

Depending on the policy instrument whose impact is to be assessed, it is necessary to detect and access data that enable the assignation of values to the set of attributes of interest that make up each agent.

This information must be statistically representative of the set of real farm holdings to be synthesised, precisely those that are affected by the policy measure under study in terms of their typology (technical-economic orientation), size (economic dimension) and location (geographical and administrative scope).

For this purpose, the AGRICORE project provides the Agricultural Research Data Index Tool (ARDIT), previously referred to European data sources index module, as a web application with two well-defined objectives for the project.

The first is to deliver an open data portal where researchers can publicly access an index of available agricultural data sources. The platform serves the metadata of the datasets and the links to their origin or download URLs; this means that ARDIT does not store the indexed datasets.

The second objective is to use this tool within the project to provide data necessary to fill the attributes of the farm agents that compose the synthetic populations used in agent-based modelling.

For all the previous descriptions, we can resume the Agricultural Research Data Index Tool (ARDIT) as a platform created in the framework of the AGRICORE Project to index characterisations of datasets that can be used for the analysis and research of the agri-food chain.

Registered users can incorporate these characterisations of datasets (or dataset catalogues) through web-based forms built based on the AGRICORE-DCAT 2.0 ontology, allowing characterisation down to the level of the variables in each dataset.

The ARDIT tool has been designed using a REST (Representational State Transfer) architecture. This type of architecture is characterised by the complete separation between the web client (frontend) and web server (backend), unlike monolithic web applications, where the frontend and the backend are fully embedded, combining the user interface, business logic and

data access layer in the same project or code base. In this way, different applications, users or developers, whether through other websites, mobile applications or any other software, can access or modify the same data regardless of the platform they use.

The importance of providing ARDIT with a REST API lies in the possibility of giving users and

researchers a way to access and redistribute the data stored on the platform without the need to use a user interface or enabling the possibility to build their own interfaces that consume the API and process the characterisations of the datasets available on the platform freely. Promoting research, innovation, re-utilisation, and creating a community of users specialised in agricultural datasets.

ARDIT

The Agricultural Research Data Index Tool (ARDIT) is a platform created in the framework of the AGRICORE Project to index characterisations of datasets that can be used for the analysis and study of the agri-food chain. These characterisations of datasets (or dataset catalogues) can be incorporated by registered users through web-based forms built on the basis of the AGRICORE-DCAT 2.0 ontology, which allows characterisation down to the level of the variables contained in each dataset. ARDIT has a body of editors who verify the proposals for new additions and correct existing ones. The characterisation of each dataset has a comments section where registered users and editors can suggest and discuss corrections or changes, thus allowing peer review of the ARDIT tool.

The AGRICORE Project is an H2020 Programme project (Grant Agreement No 816078) that aims to design a simulation tool based on heterogeneous agents (down to the farm level) to analyse the potential impact that different public agricultural policy alternatives would have on them. The ultimate goal is to improve the Common Agricultural Policy (CAP) design process through a suite of impact assessment tools that are detailed yet simple and transparent, incorporating the affected sectors in their construction and validation.

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Don't have an account? Sign up

Access as guest

4. Progress

AGRICORE went through a very fruitful period during the last months!
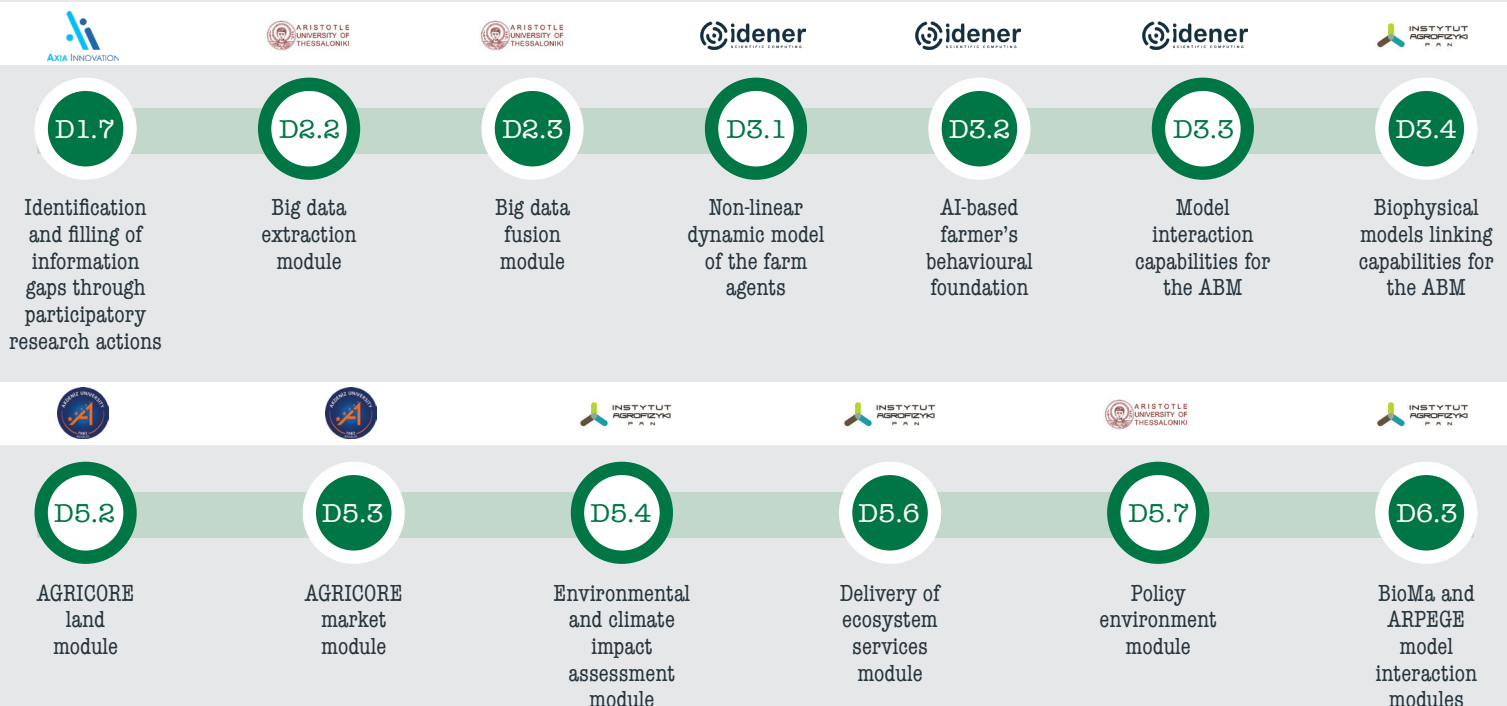
During the period from July 2022 to May 2023, a total of 13 crucial deliverables were submitted by working on the AGRICORE project. AXIA Innovation with the support of all Partners led D1.7, which involved identifying and filling information gaps through participatory research actions. The Aristoteles University of Thessaloniki (AUTH) led two deliverables, D2.2 and D2.3, which included the big data extraction and fusion modules, respectively.

IDENER led three deliverables related to the development of non-linear dynamic models of farm agents D3.1, AI-based farmer's behavioural foundations D3.2, and model interaction capabilities for the ABM D3.3. The Institute of Agrophysics (IA PAS) contributed to the project by leading two deliverables, D3.4 and D6.3, D3.4 focused on biophysical models linking capabilities

for the ABM, while D6.3 involved the BioMa and ARPEGE model interaction modules.

The Akdeniz University led D5.2, which focused on the development of the AGRICORE land module, while D5.3 focused on the market module. In addition, IA PAS led two more deliverables related to the assessment of environmental and climate impacts D5.4 and the delivery of ecosystem services D5.6. AUTH also contributed to the project by leading the policy environment module D5.7.

Overall, these deliverables demonstrate the significant progress made by the AGRICORE project teams towards achieving their goals during the period from July 2022 to May 2023. The collaborative efforts made by the different teams have resulted in the successful completion of these crucial deliverables.

D1.7 — Identification and filling of information gaps through participatory research actions

D2.2 — Big data extraction module

D2.3 — Big data fusion module

D3.1 — Non-linear dynamic model of the farm agents

D3.2 — AI-based farmer's behavioural foundation

D3.3 — Model interaction capabilities for the ABM

D3.4 — Biophysical models linking capabilities for the ABM

D5.2 — AGRICORE land module

D5.3 — AGRICORE market module

D5.4 — Environmental and climate impact assessment module

D5.6 — Delivery of ecosystem services module

D5.7 — Policy environment module

D6.3 — BioMa and ARPEGE model interaction modules

AGRICORE at the 182ⁿᵈ EAAE Seminar 14-15, 2022.

AGRICORE participated in the 182ⁿᵈ EAAE Seminar in Chania, Crete, on September 14-15, 2022. The seminar aimed to bring together scholars and researchers to discuss the latest biodiversity, sustainability, and agri-food supply chain developments. The ultimate objective was to assist policymakers in making informed decisions in the agriculture and agri-food industry of the global economy.

During the seminar, our partners from AUTH presented their research on "CAP start-up aid for young farmers does reflect EU's biodiversity policies?" and "Young Farmers Schemes: An Exploratory Study of Farmers' Attitudes, Beliefs, and Perceptions." We are delighted to have had the opportunity to share our research efforts and results with other experts and professionals in the agricultural research field.

AGRICORE at the Smart Agrifood Summit 2022

Cooperativas Agro-alimentarias de Andalucía partners participated in the Smart Agrifood Summit 2022 in Malaga, Spain, on September 29-30. The summit was an international benchmark event in the sector, held both in-person and virtually, providing networking, financing, and internationalization channels, as well as presenting new products, services, and innovative projects.

During the summit, our partners had the

opportunity to showcase the AGRICORE tool, its modelling capabilities, and innovative features for improving agricultural policy development and design. We believe that the summit was the perfect opportunity to discuss the AGRICORE tool with other experts in the field and share our insights on how it can contribute to improving agricultural policies.

We are excited about the opportunity to participate in events such as the Smart Agrifood Summit and showcase our work to a wider audience. We look forward to further engagements with key stakeholders in the agricultural industry and sharing our innovative solutions for developing and improving agricultural policies.

AGRICORE at the Fruit Attraction trade fair 2022

AGRICORE was represented at the Fruit Attraction trade fair 2022 in Madrid, Spain! Fruit Attraction is rapidly becoming one of the most efficient fruit and vegetable commercial platforms worldwide, consolidating Southern Europe as a fundamental hub for international fresh produce marketing. This fair provided a platform and commercial meeting point for the global fruit and vegetable community. Our partners from the Cooperativas Agro-alimentarias de Andalucía had a booth with roll-ups and flyers of AGRICORE, translated into Spanish for regional dissemination and engagement purposes. We received an overwhelming response from professionals in the sector who showed interest in our project and its results achieved so far, allowing us to exchange ideas and feedback

with one of the target groups of AGRICORE! We believe that events like Fruit Attraction are essential for showcasing our work, learning from others, and exchanging ideas with key stakeholders in the agricultural industry.
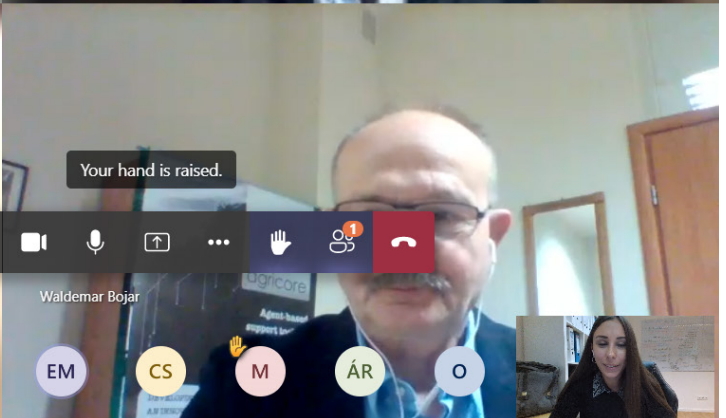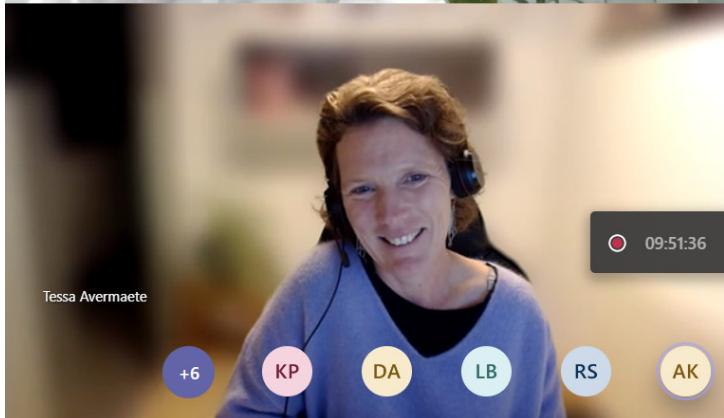
AGRICORE had its 36M Review Meeting

On November 23rd, 2022, AGRICORE reached a major milestone: our 36-month review meeting with REA. The meeting was highly productive and fruitful, with the entire consortium actively progressing in most of the project's tasks and sharing our results with the project officer and reviewers.

We went through all the project's work packages, discussing challenges and next steps planned to ensure a qualitative and impactful delivery of work and results. The meeting was attended by all AGRICORE partners and provided an excellent opportunity to understand possible gaps and focus on success stories achieved within our work.

As we head toward the last phase of our project, we're excited to intensify our efforts and deliver the best version of the AGRICORE tool. Our goal is to address the needs of policymakers and other stakeholders such as researchers, modellers, farmers, and the wider public. We look forward to sharing our progress with you in the coming months.

5. News Update

AGRICORE at the IAERE annual conference

At the IAERE annual conference in Naples on February 23rd, Lisa Baldi and Sara Calzolai presented one of the AGRICORE modules: the short period Agent-Based Model (ABM). This model was developed to evaluate the efficiency of the new Communitarian Agricultural Policy (CAP 2023-2027) measures by simulating farmers' behavior. The objective is to optimize their production functions while reducing environmental drawbacks by exchanging production factors such as land and rights to pollute. The ABM is based on a Mathematical Programming Model (PMP) and captures interactions between farmers, assuming non-full rationality in production preferences.

AGRICORE at VI Congreso de Cooperativas Agro-alimentarias de Andalucía

Our partners from Cooperativas Agro-alimentarias held the VI Congress of Agri-food Cooperatives of Andalusia on April 12th and 13th in Cordoba. The congress focused on the consumer and the beginning and end of the work of the families dedicated to agriculture and livestock that make up the agrarian social economy.

Cooperativas showcased our latest digital poster with the newest results and advances of AGRICORE, disseminating our progress and engaging with various agricultural stakeholders. We're proud to be part of such an important event and to ensure that our research meets the needs of farmers and agricultural production.

Download our poster here: https://agricore-project.eu/dissemination-material

AGRICORE 42M meeting in Lublin

The consortium had its 42-month project meeting in Lublin, Poland, on May 10th and 11th. During these two days, we had the opportunity to meet in person and discuss the final actions toward the completion of AGRICORE.

We focused on modelling techniques, synthetic population generation, and use case progress over the last few months to align our efforts for the proper engagement and involvement of policymakers at regional and national levels. We're looking forward to the last year of AGRICORE and are excited to see our research creating an impact and contributing to society.

We would like to extend our gratitude to our partners from the Institute of Agrophysics (PAS) for the excellent organization and warm hospitality in Lublin.

AGRICORE was present at EXPOLIVA 2023

The AGRICORE Project recently participated in the EXPOLIVA 2023, the International Extra Virgin Olive Oil Exhibition held in Jaén, Spain, from May 10th to 13th. The event provided a platform for the exhibition and sensory analysis of supreme quality oils, focusing on highly specialized products oriented towards the market.

AGRICORE's representative from Cooperativas Agro-alimentarias de Andalucía represented the project at the exhibition, distributing flyers and presenting the Andalusian use case of the AGRICORE

project. This participation at EXPOLIVA 2023 allowed AGRICORE to showcase its work and engage with stakeholders in the olive oil industry.

6. AGRIMODELS Cluster

Read the news from our sister projects BESTMAP and MINDSTEP forming the AGRIMODELS Cluster!

OTHER CLUSTERING PROJECTS

BESTMAP

OUR MOST RECENT ACHIEVEMENTS

1. During late March, the BESTMAP team met at the University of Basel with Dr. Peter Witzke of Eurocare, Bonn, to discuss how the outputs of CGE/PE models be utilised as an input to the BESTMAP agent-based models, and how our experience with the BESTMAP ABM can improve technology adoption in CGE/PE such as CAPRI.

2. Also during March, BESTMAP participated in the 97th Annual Conference of the Agricultural Economics Society (AES) at the University of Warwick UK, as part of a joint workshop with the Agrimodels cluster. Dr. Alena Schmidt of the University of Basel, presented on "Benefits & challenges to linking CGE/PE models with agent-based models," in which she shared results from a workshop hosted by BESTMAP in May of 2022 on linking CGE/PE models with agent-based models.

3. In late May, BESTMAP Coordinator Prof. Guy Ziv travelled to Seville to meet with Prof Ignacio Perez-Dominguez at the European Commission Joint Research Centre. They discussed the results of BESTMAP modelling activities, our plans for the upcoming policy dashboard and how BESTMAP models can be best utilised by JRC. Dr John Helming of the MIND STEP project also joined this discussion.

4. Dr. Tomás Václavík of UPOL, Czech Republic, will represent BESTMAP at two upcoming conferences.
At the 6th International Research Workshop on Archetype Analysis in Sustainability Research, 7-9 June 2023, in Lund, Sweden, he will present a workshop on "Farming System Archetypes for modelling impacts of agricultural policies".
And at the International Association for Landscape Ecology (IALE) 2023 World Congress, 10-15 July 2023, in Nairobi, Kenya, he will present on "The impact of agri-environment-climate measures on farmland biodiversity."

6. AGRIMODELS Cluster

Read the news from our sister projects BESTMAP and MINDSTEP forming the AGRIMODELS Cluster!

OTHER CLUSTERING PROJECTS

MINDSTEP Highlights

1. MIND STEP will have the MIND STEP final stakeholder meeting in Brussels on 26th of October 2023. This will be a full -day event hosted by the Representation of the State of Lower Saxony!

2. MINDSTEP also prepared a 2021-22022 recap video in March, you can find here:

www.youtube.com/watch?v=dqtIjfQNVgM&t=6s

3. Finally, MINDSTEP hosted their project meeting in Halle in March, you can find it in the news item here.

More info click here

7. Who we are

agricore

The AGRICORE project builds on the strong knowhow and expertise of its partners in the addressed scientific and industrial areas. The consortium is comprised of 11 European partners from 6 countries. AGRICORE is a well-balanced project between industry and academia ensuring and speeding up the successful implementation of all the actions towards its fruitful results.

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1 Research and Technology Organisation
(IAPAS)

1 Large Company
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