# D3.2. Smart AKIS Regional Report

Greek Innovation Hub







# **Document Summary**

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## **Abstract**

This report presents the results derived by the 3 Regional Innovation Workshops organised in Greece.



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## 1. Executive Summary

The stakeholders of the Regional Innovation Workshops (RIW) held in Greece, were farmers and farmers' cooperatives, researchers (universities, research centres), agronomists, "agritech" companies, funding bodies and sponsors including banks, foundations, the Athens Exchange Group as well as the Ministry of Rural Development and Food. A number of agronomy students and media agents participated in the RIWs.

Greece was between the seven countries where the WP2 survey was also conducted, which had the lowest Smart Farming Technology (SFT) adoption rates. SFT adoption is relatively low, possibly due to limited access to these technologies and due to lack of appropriate infrastructure. Moreover, a number of farmers from smaller farms (the predominant type and size of farms) stated that their farms were too small for the currently available SFT and that SFTs are too costly. The farm characteristics and infrastructure, which work as influencing features for the SFT adoption, are the physical size of the farm considered together with the cropping system as the business volume is limited e.g. olive/fruit cultivation on a small area.

Reducing harvest losses and water use are the challenges that are perceived as most important to overcome in Greece (89% and 77%, respectively), especially on small-sized farms <2 ha. The above is further influenced by the climate and the predominant cropping systems. During the survey, autonomous machines and robots were most frequently chosen as useful for conducting monotonous field tasks corresponding to the prevalent cropping systems. Most probably, in Greece the vineyard, orchard, and vegetable growers express interest in these technologies to avoid high personnel costs accrued due to high manual work needs. In Greece with the lowest adoption rates, there seems to be the highest perception that SFT increase income. The majority of the farmers surveyed were non-adopters, yet 1/3 of them agreed that SFT could increase farm income.

The SFTs selected from the inventory to be presented and discussed during the RIWs covered a great variety of technologies, relative to the major needs identified in Greece. Specifically, the categories were: (i) Precision agriculture technologies and ergonomic technologies; (ii) Precision agriculture services and applications for agricultural optimization; (iii) Variable rate fertilization, pesticides application and irrigation systems; (iv) Satellite Remote Sensing and GPS systems; (v) Drones; (vi) Internet of Things; (vii) FMIS.

The communication strategy followed to engage stakeholders to the Greek RIWs was mostly direct, personal communication. All categories of stakeholders such as researchers, farmers, farmers associations, companies, journalists were informed for the upcoming event through e-mail and phone calls. The Smart-AKIS team members (AUA & CERTH) had a personal communication with contacts from their existing address books (gathered contacts of past and current attendees) and from Internet search when needed. By considering the attendees demographics, the effective communication channels were selected to update the attendees on all important details, and these were phone calls, email and social media.

The results of D2.2 were confirmed in all RIWs in Greece. The major issue raised in all 3 RIWs was that farmers need to be well educated and trained. Currently, even if an agronomist or a technology provider provides suggestions on SFT use, it is not guaranteed farmers will follow these suggestions. The question arose was "how are they going to follow the instruction given by a system, an application or machine?" Universities, research centres, advisory and extension services should provide farmers with the necessary knowledge to utilize them for optimum results ensuring SFT adoption. Finally, it is crucial to prove them through pilot use cases that the systems or equipment suggested actually works.

Farmers mentioned the need of reducing agricultural labour and that precision agriculture should be able to be implemented in small farms. The cost of the equipment used in Precision Agriculture is often higher than what the farmers can afford based on their farm size. Government intervention is needed in the form of subsidies or reduced loan rates, but growers should also be introduced to the idea of sharing equipment to reduce initial and operating costs. Finally, farmers supported the notion that a complete SFT system is needed



and not separate innovations from different companies (at least compatible). Companies should collaborate to adopt a holistic approach to analyse and evolve a solution to each problem and manufacture a complete product.

It should be noted that private funding sources (banks, stock market) showed their interest in this new field of opportunity, but they pointed out that these initiatives are still in low TRL and not mature enough for funding based on their tools. They pointed out that they will follow the development of this sector and when mature ideas comes to the table of discussion, they are very keen to participate again.

The main recommendations from the three RIWs in Greece related to SFTs adoption are as follows:

- Farmers need to be well educated and trained.
- Government intervention is needed in the form of subsidies or reduced loan rates.
- Growers should be introduced to the idea of sharing equipment to reduce the initial and operating costs.
- Companies should collaborate to adopt a holistic approach to evolve a solution to each problem.

#### Dates and attendance of target groups to the three Regional Innovation Workshops:

| Regional Innovation Workshops | Place and date                            | Nº of participants (and type) |
|-------------------------------|---|-------------------------------|
| 1 <sup>st</sup> RIW           | Giannitsa, 29 <sup>th</sup> of May 2017   | 45                            |
| 2 <sup>nd</sup> RIW           | Nikea, 25 <sup>th</sup> of October 2017   | 84                            |
| 3 <sup>rd</sup> RIW           | Athens, 20 <sup>th</sup> of February 2018 | 53                            |

#### Summary of the results of the Regional Innovation Workshops, following this table:

| KPI   | Result           |
|---|------------------|
| Nº of stakeholders participating in RIWs        | (45+84+53) = 182 |
| Nº of SFT solutions presented in RIWs           | (7+7+6) = 20     |
| Nº of SFT solutions adopted by practitioners    | All              |
| Nº of project ideas captured                    | (4+6+3) = 13     |
| № of INNOVATION project ideas                   | 11               |
| № of TECHNOLOGY TRANSFER project ideas          | (1+0+1) = 2      |
| № of MARKET UPTAKE project ideas                | 0                |
| Nº of multi-actor projects funded               | none             |
| Nº of multi-actor cross-border projects started | none             |



#### 2. Innovation Process

#### **Communication Strategy**

The communication channels used to disseminate the Regional Innovation Workshops events in Greece were the project's and AUA's website, the news media such as newsletters, magazines and articles at specialised media, social media like Facebook and Twitter. Dr. Fountas (AUA) and Dr. Balafoutis (CERTH) also presented the upcoming workshops on other events, through their participation in conferences and other national and EU funded projects. The communication strategy also involved direct, personal communication with the different categories of stakeholders such as researchers, farmers, farmers associations, companies, journalists from newspapers who were informed for the upcoming event through e-mail and phone calls.

The registration tools used to register in advance participants to the three workshops held in Greece were the traditional phone calls and emails, which have proved to be simple and effective. The Smart-AKIS representatives had a personal contact with all the different stakeholders to ask them to participate in the upcoming workshop.

#### Dates and attendance per group to the three Regional Innovation Workshops:

| Regional Innovation<br>Workshops |   | Nº of participants per group: <u>users</u> (farmers, coops and agrifood industry), <u>SFT industry</u> , <u>research</u> , advisors & <u>others</u> (policy, etc.) |  |  |  |
|----------------------------------|---|--|--|--|--|
| 1 <sup>st</sup> RIW              | Giannitsa, 29 <sup>th</sup> of May 2017   | 45 (25, 11, 5, 4)  |  |  |  |
| 2 <sup>nd</sup> RIW              | Nikea, 25 <sup>th</sup> of October 2017   | 84 (31, 9, 14, 30)   |  |  |  |
| 3 <sup>rd</sup> RIW              | Athens, 20 <sup>th</sup> of February 2018 | 53 (3, 19, 15, 16)   |  |  |  |

#### **Target Groups needs and expectations**

The findings from regional farmers' needs surveyed in WP2 have been taken into consideration for the selection of the SFTs to be presented, the definition of the target groups to address as well as the programme or agenda of RIWs.

Greece is one of the countries around Europe, examined through the Smart-AKIS WP2 survey, with the lowest SFT adoption rates. The farm characteristics and infrastructure that work as influencing features for the adoption of SFTs are the physical size of the farm considered together with the cropping system. A number of farmers from smaller farms (the predominant type and size of farms in the country) stated that their farms were too small for the currently available SFT and that SFTs are too costly. Thus, in Greece precision agriculture should be able to be implemented in small farms.

Reducing harvest losses and water use are the challenges that are perceived as most important to overcome in Greece compared to other countries, especially on small-sized farms <2 ha. The above is further influenced by the climate and the predominant cropping systems in Greece. Orchards and vineyards are the main cropping systems in Greece. During the survey, autonomous machines and robots were most frequently chosen as useful for conducting monotonous field tasks corresponding to the prevalent cropping systems. Most probably, in these countries the vineyard, orchard, and vegetable growers express interest in these technologies to avoid high personnel costs accrued due to high manual work needs. Farmers mentioned the need of reducing agricultural labour and so during the RIWs the SFTs presented were aiming to promote labour reduction.

Finally, it is crucial to prove the growers through pilot use cases that the technologies and equipment suggested actually works.

#### **Selection of Smart Farming Technologies**

For the selection of SFTs of interest to the regional stakeholders, the main challenges and issues related to agriculture in Greece have been taken into consideration as well as the findings from regional farmers' needs surveyed in WP2.



VRT technologies used for irrigation, pesticides, herbicides and fungicides spraying as well as for fertilization are of great importance in all agricultural areas. This is why VRT technologies were selected to be presented during the workshops.

- Water is considered as the most critical resource for sustainable development in Greece, as agriculture is
  responsible for 80% of water used, while the efficiency of irrigation is very low. In order to overcome water
  shortage in agriculture it is essential to increase the water use efficiency. Innovative irrigation practices can
  optimize water usage (reducing overwatering, underwatering, and run-off) through the customization of
  water application based on topographic data, soil maps and other information gathered on the field from
  sensors.
- The economic benefits of using variable rate spraying are directly attributed to the cost savings due to reduction of the inputs. For example, in order to spray pesticides in an average orchard, 400 liters of plant protection products per hectare are required, while an average reduction of 30% was estimated through SFTs for variable pesticides, herbicides and fungicides spraying. Moreover, the better-targeted application of plant protection products sprayed could greatly diminish many of the related environmental problems. This will help to protect water reserves (underground and surface) from contamination and minimize the health risks associated with the consumption of chemicals by humans. At the same time collateral damage to beneficial and non-target organisms will be minimized.
- Satellite remote sensing, dealing with large surface terrestrial observation through satellite imagery, is currently very popular in Greece, but at the same time there is a high disbelief that such systems can provide credible results for the farmers and the advisors and there is need to share satellite capabilities with them during the workshops.
- Grain stored on farms is another issue that can is also considered as an important investment. Protecting the grain from insect attack can be regarded as an exercise in income protection. Thus, placing sensors in a silo is a technological solution presented during the RIWs.
- Modeling and prediction for infectious disease epidemiology was also chosen to be one of the SFTs discussed thoroughly, as the disease expansion and especially mycological diseases are of high interest for Greek agriculture, because it increases year by year and chemical crop protection is increasing constantly. In addition, using models coming from other countries is not offering a solution to the problem, as the prediction is not accurate and in many cases it is not enough to prevent spreading of the disease with destructive results. The models need to be adjusted in regional conditions and optimized.
- Finally, productivity gains in the agricultural industries are being driven by the adoption of new technical products and processes. It is the responsibility of scientists, extension specialists and advisory services to make sure that farmers hear about these technologies and processes. With the rapid increase in the complexity of the technology of farming, there is now a recognized need to improve the skills and education of our farmers the human capital of agriculture. Farmers now have access to a wide range of information related to their farming systems, but many of them often lack the skills necessary to use that information to improve their farm profitability and sustainability through technical innovation. The purpose of current FMIS is to meet the increased demands to reduce production costs, comply with agricultural standards, and maintain high product quality and safety. Knowledge and skills go hand-in-hand with informed management, and it is in better management that increased productivity will be found, thus subjects related to farmers' education, improvement of extension and advisory services in Greece and the use of FMIS were also chosen to be presented during the workshops.

| Nº | Name of SFT   | SFT Category | Cropping system  | Purpose  |
|----|---|--------------|--|--|
| 1. | "Modern precise agriculture technology trimble"  TractorGPS |              | <ul><li>Arable</li><li>Tree</li><li>Vegetables</li><li>Vineyards</li><li>Grassland</li></ul> | <ul><li>Mapping/recording</li><li>Variable rate technology</li><li>Guidance/Controlled Traffic</li></ul> |
| 2. | "Precision agricult   | e • Research | Arable   | Mapping/recording  |



|     | services non-telescopic means"  ECODEVELOPMENT SA  | result  | <ul><li>Tree</li><li>Vegetables</li><li>Vineyards</li><li>Grassland</li></ul>                | Farm management information system   |
|-----|--|---|--|--|
| 3.  | "Applications for agricultural optimization" AGENSO  | • Product   | <ul><li>Arable</li><li>Tree</li><li>Vegetables</li><li>Vineyards</li><li>Grassland</li></ul> | <ul> <li>Mapping/recording</li> <li>Reacting/Variable rate technology</li> <li>Farm management information system</li> <li>Robot or smart machine</li> </ul> |
| 4.  | "Precision agriculture and ergonomic technologies"  KONDELLIS SA   | • Product   | <ul><li>Arable</li><li>Tree</li><li>Vegetables</li><li>Vineyards</li><li>Grassland</li></ul> | Guidance/Controlled Traffic  |
| 5.  | "APOLLO application"  DRAXIS   | <ul><li>Product</li><li>Research result</li></ul> | <ul><li>Arable</li><li>Tree</li><li>Vegetables</li><li>Vineyards</li></ul>                   | Farm management information system   |
| 6.  | "Agrostis: Company's products and services presentation"  AGROSTIS   | <ul><li>Product</li><li>Research result</li></ul> | <ul><li>Tree</li><li>Vegetables</li></ul>  | <ul> <li>Reacting/Variable rate technology</li> <li>Farm management information system</li> <li>Robot or smart machine</li> </ul>                            |
| 7.  | "New technologies in the preparation of the spraying liquid and management procedure of the empty plastic plant-protection products " ESYF | Research result                                   | <ul><li>Arable</li><li>Tree</li><li>Vegetables</li><li>Vineyards</li></ul>                   | Farm management information system   |
| 8.  | "Smart monitoring of<br>stored goods using<br>Internet of Things<br>technologies"<br>Centaur Analytics                                     | • Product   | <ul><li>Arable</li><li>Tree</li><li>Vegetables</li><li>Vineyards</li></ul>                   | Robot or smart machine   |
| 9.  | "Apps for agricultural production optimization"  AGENSO  | • Product   | <ul><li>Arable</li><li>Tree</li><li>Vegetables</li><li>Vineyards</li><li>Grassland</li></ul> | <ul> <li>Mapping/recording</li> <li>Reacting/Variable rate technology</li> <li>Farm management information system</li> <li>Robot or smart machine</li> </ul> |
| 10. | "Modern precision agriculture technologies by Trimble"  TractorGPS   | • Product   | <ul><li>Arable</li><li>Tree</li><li>Vegetables</li><li>Vineyards</li><li>Grassland</li></ul> | <ul><li>Mapping/recording</li><li>Variable rate technology</li><li>Guidance/Controlled Traffic</li></ul>   |
| 11. | "Integrated platform for agricultural advisory   | <ul> <li>Research result</li> </ul>               | <ul><li>Arable</li><li>Tree</li></ul>  | <ul> <li>Farm management information system</li> </ul>   |



|     | services "  |   | <ul> <li>Vegetables</li> </ul>   |   |
|-----|---|---|--|---|
|     | DRAXIS  |   | <ul><li>Vegetables</li><li>Vineyards</li></ul>   |   |
| 12. | "Development of a variable rate fertilization system for cereals"  Agile Agriculture  Technologies        | • Product   | <ul><li>Arable</li><li>Tree</li><li>Vegetables</li><li>Vineyards</li><li>Grassland</li></ul> | Robot or smart machine  |
| 13. | "Innovation & new technologies in agricultural production — AGRENIO app"  MATRIX INFORMATION TECHNOLOGIES | • Product   | <ul><li>Tree</li><li>Vegetables</li><li>Vineyards</li></ul>                                  | Farm management information system  |
| 14. | "Presentation of the ICT-AGRI results"  GRNET S.A.  | Research result                                   | <ul><li>Arable</li><li>Tree</li><li>Vegetables</li><li>Vineyards</li><li>Grassland</li></ul> | <ul> <li>Mapping/recording</li> <li>Reacting/Variable rate technology</li> <li>Guidance/Controlled Traffic</li> <li>Farm management information system</li> <li>Robot or smart machine</li> </ul> |
| 15. | "Satellite Remote Sensing in Irrigation"  Prof. Gemtos  | • Product   | <ul><li>Arable</li><li>Tree</li><li>Vegetables</li><li>Vineyards</li></ul>                   | <ul> <li>Mapping/recording</li> <li>Reacting/Variable rate technology</li> <li>Farm management information system</li> </ul>  |
| 16. | "A holistic approach to<br>Variable Rate Irrigation<br>(VRI)"<br>Panagiotis<br>Stamatelopoulos            | • Product   | <ul><li>Arable</li><li>Tree</li><li>Vegetables</li><li>Vineyards</li></ul>                   | <ul><li>Mapping/recording</li><li>Reacting/Variable rate technology</li></ul>   |
| 17. | "Variable Rate Fertilization<br>with biological-based<br>fertilizers"<br><b>Dr. Panagiotis Ilias</b>      | • Product   | <ul><li>Arable</li><li>Tree</li><li>Vegetables</li><li>Vineyards</li></ul>                   | <ul> <li>Mapping/recording</li> <li>Reacting/Variable rate technology</li> <li>Robot or smart machine</li> </ul>  |
| 18. | "Spraying Drone" Mr. Giorgos Bourodimos   | • Product   | <ul><li>Arable</li><li>Tree</li><li>Vegetables</li><li>Vineyards</li><li>Grassland</li></ul> | <ul> <li>Mapping/recording</li> <li>Reacting/Variable rate technology</li> <li>Robot or smart machine</li> </ul>  |
| 19. | "Modelling and prediction<br>for infectious disease<br>epidemiology"<br>Mr. Giorgos Galousis              | <ul><li>Product</li><li>Research result</li></ul> | <ul><li>Arable</li><li>Tree</li><li>Vegetables</li><li>Vineyards</li></ul>                   | Farm management information system  |
| 20. | "Remote sensing and VRA with the use of GPS in orchards"  Mr. Aris Zamidis                                | • Product   | <ul><li>Tree</li><li>Vineyards</li></ul>   | <ul> <li>Mapping/recording</li> <li>Reacting/Variable rate technology</li> <li>Guidance/Controlled Traffic</li> </ul>   |



Robot or smart machine

#### **Sources of funding for Project Ideas**

From the discussion in RIW3 it was shown that at this stage in Greece, the best way to provide financial support to Smart Farming development is through the state funds. This could be done through three ways:

- 1. Research Projects through Measure 16 for Operational Group (OG) creation and Innovation research projects between OGs members of the Ministry of Agriculture and the General Secretariat of Research & Development initiative «Research-Create-Innovate», where funds are directed to only companies (with farmers), consortium of companies with research entities and farmers in the field of agrifood sector and to consortiums that have already mature research results and there is need for higher and persistent dissemination to create business out of it.
- 2. Infrastructure subsidies from the Ministry of Agriculture through Measure 4, where there is a bonus category of Smart Farming equipment purchase. It should be noted that private funding sources (banks, stock market) showed their interest in this new field of opportunity, but they pointed out that these initiatives are still in low TRL and not mature enough for funding from their tools. They pointed out that they will follow the development of this sector and when mature ideas comes to the table of discussion, they are very keen to participate again.
- 3. RIS3 funding opportunities from the 13 Prefectures of Greece Some additional ways to provide financial support:
- Prima: including European Member States (Cyprus, France, Greece, Italy, Luxembourg, Malta, Portugal, Czech Republic, Spain) and countries of the Mediterranean basin, which are not European member states (Egypt, Jordan, Lebanon, Morocco, Tunisia e Turkey). In the light of such premises Prima aims at developing innovative solutions and promote their adoption for improving the efficiency and sustainability of food productions and water provision, in order to support an inclusive well-being and socio-economic development in the Mediterranean Area, within the framework of a reinforced Euro-Mediterranean cooperation.
- EUREKA: European network developing cooperation between SMEs, research centres and universities for industrial innovation aims at enhancing European competitiveness through its support to pan-European projects to develop innovative products, processes and services.
- Eurostars: is a joint programme between EUREKA and the European Commission, co-funded from the national budgets of 36 Eurostars Participating States and Partner Countries and by the European Union through Horizon 2020. Supports international innovative projects led by research and development-performing small- and medium-sized enterprises (R&D-performing SMEs). With its bottom-up approach, Eurostars supports the development of rapidly marketable innovative products, processes and services that help improve the daily lives of people around the world.
- IoF 2020 project internal call funding

# Funding source – grants and open calls



| Nο | Name of<br>grant (and<br>link) | Funding body   | Geographical scope                    | Eligible projects*                             | Eligible<br>beneficiaries  | Eligible<br>expenses  | Aid intensity (%)  | Coming deadlines                       | Other info |
|----|--------------------------------|--|---------------------------------------|--|--|---|--|--|------------|
|    | Measure 16                     | Ministry of<br>Rural<br>Development<br>and Food  | Regional<br>National<br>International | Operational<br>Groups Calls                    | Individuals,<br>research<br>institutes,<br>NGOs,<br>Innovation<br>brokers  |   | Up to 90% (including Measure 4)  | Multiple -<br>all year<br>round        |            |
|    | Measure 4                      | Ministry of<br>Rural<br>Development<br>and Food  | National                              | • Investment grant for equipment modernisation | Farmers or groups of farmers, SMEs   | The purchase or lease-purchase of new machinery and equipment , general costs, water metering costs etc | €150,000<br>excluding<br>VAT,<br>by part-<br>financing of<br>eligible costs<br>up to 50% | Open until<br>31st<br>December<br>2020 |            |
|    | RIS3                           | European Regional Development Fund (ERDF) and the European Social Fund (ESF)- 13 Prefectures of Greece | Regional<br>National                  | Operational<br>Groups Calls<br>under RDPs      | Support of R&I<br>Structural<br>Funds<br>Managing<br>Authorities,<br>policy-makers<br>and regional<br>development<br>professionals |   |  | Not<br>applicable                      |            |
|    | Prima                          | European<br>Union through<br>Horizon 2020  | International                         | • General individual and collaborative         | R&I activities   |   |  | 17.04.2018<br>15.09.2018               |            |



|                             |                                     |                           | R&D&I projects  • agri-food specific R&D&I grants programmes  |   |  |   |   |  |
|-----------------------------|-------------------------------------|---------------------------|---|---|--|---|---|--|
| EUREKA                      | European<br>Union                   | Regional<br>International | <ul> <li>General<br/>individual and<br/>collaborative<br/>R&amp;D&amp;I projects</li> <li>agri-food<br/>specific R&amp;D&amp;I<br/>grants<br/>programmes</li> </ul> | SMEs, small<br>and large<br>industry,<br>research<br>institutes and<br>universities | Rules<br>applying to<br>each EU<br>country | First prize<br>6,000 Euros<br>&<br>promotional<br>support | Open all year  23.04.2018 30.04.2018 30.05.2018 |  |
| Eurostars                   | EUREKA and<br>European<br>Comission | Regional<br>International | <ul> <li>General<br/>individual and<br/>collaborative<br/>R&amp;D&amp;I projects</li> <li>agri-food<br/>specific R&amp;D&amp;I<br/>grants<br/>programmes</li> </ul> | Research-<br>performing<br>SMEs   | Rules<br>applying to<br>each EU<br>country | 1.7M € average project cost                               | 13.09.2018                                      |  |
| IoF 2020-<br>internal calls | EU through<br>Horizon 2020          | Regional<br>International | <ul> <li>General<br/>individual and<br/>collaborative<br/>R&amp;D&amp;I projects</li> <li>agri-food<br/>specific R&amp;D&amp;I<br/>grants<br/>programmes</li> </ul> |   |  |   |   |  |

<sup>\*</sup>General individual and collaborative R&D&I projects, agri-food specific R&D&I grants programmes, Operational Groups Calls under RDPs, Innovation vouchers for the purchase of external expertise, Proof of concept support for research results, Investment grant for equipment modernisation, Public procurement process.



# Funding source – financial instruments

| <b>Ν</b><br><u>0</u> | Name of programme (and link)  | Funding body                            | Geographical<br>scope     | Instrument category*                                     | Eligible<br>beneficiaries  | Financial<br>aid<br>support  | Coming deadlines              | Other<br>info |
|----------------------|---|---|---------------------------|--|--|------------------------------|-------------------------------|---------------|
|                      |   |   | National, regional, local |  |  |                              |                               |               |
|                      | The egg (https://www.theegg.gr/el)  | Eurobank and The<br>Hellenic Initiative | National                  | Acceleratio<br>n/incubatio<br>n service<br>for start-up  | Everyone who has a smart business idea, aged 18-49 with a degree from an accredited university | Loan up<br>to<br>€12,500     | 23.04.2018                    |               |
|                      | ORANGE GROVE (https://orangegrove.eu/)  | The Netherlands<br>Embassy<br>in Athens | National                  | Acceleratio<br>n/incubatio<br>n service<br>for start-up  | OG Startups  | Up to €15.000 each quarter   | -                             |               |
|                      | ACEin (https://acein.aueb.gr/en/)   |   | Local                     | Acceleratio<br>n/incubatio<br>n service<br>for start-up  | Researchers<br>and potential<br>young<br>entrepreneu<br>rs                                     | -                            | 18.04.2018<br>-<br>23.04.2018 |               |
|                      | Business Angels Europe (http://www.businessangelseurope.com/SitePages/default.aspx) |   | Regional                  | Leading business angel networks and groups across Europe | Business<br>angel<br>networks<br>and groups  | -                            | 17.04.2018<br>28.11.2018      |               |
|                      | NBG Business Seeds  | National Bank of<br>Greece              | National                  | Equity<br>(seed<br>capital),                             | Start-up,<br>SMEs,<br>services,  | Prizes:<br>First<br>€ 20,000 | Will be<br>announced          |               |



|                    |                    |         |          | loans,<br>warranties                                 | Spin-off,<br>Spin-out   | Second |   |  |
|--------------------|--------------------|---------|----------|--|---|--------|---|--|
| act4Greece program | National<br>Greece | Bank of | National | Equity<br>(seed<br>capital),<br>loans,<br>warranties | Support for innovative entrepreneu rship through crowdfundin g. | -      | - |  |

<sup>\*</sup>Acceleration/incubation service for start-up, spin-off and entrepreneurs on agri-food sector, financial instruments: equity (seed capital), loans, warranties; crowdfunding platform, prize/challenge contest.

#### Funding source – other instruments and tools for supporting multi-actor collaboration

| Νº | Name of programme (and link) | Promoter body | Geographical<br>scope     | Eligible<br>collaborations<br>* | Eligible<br>beneficiaries | Eligible<br>expenses (if<br>any) | Aid intensity<br>(%) | Coming deadlines (if any) | Other info |
|----|------------------------------|---------------|---------------------------|---------------------------------|---------------------------|----------------------------------|----------------------|---------------------------|------------|
|    | OG's created from Measure 16 |               | National, regional, local |                                 |                           |                                  |                      |                           |            |

<sup>\*</sup>Own experimental programmes from advisory services, technical institutes, agricultural departments or farmers associations, coops or unions; agreements between advisors/technical institutes or farmers/coops and private companies to develop/demonstrate/test SFTs; peer-to-peer learning: early adopters support laggards in SFT uptake.



## 3. Findings

## 3.1. Identification of barriers and incentives for adoption of SFTs

Economic barriers are the most frequently mentioned factors influencing the SFT adoption. SFTs are usually expensive. The possibility of financing an investment is low. Greek farmers stated they consider an investment, if a positive return on investment is achieved within a time frame of 4 years. They usually face a long time lag between their investment in the SFT and the payback. Some younger farmers are willing to take a greater risk, as they believe these new technologies will facilitate their agricultural practices and their lives in general.

Since farmers' income is relatively low, subsidies in agricultural products are needed so that they will be able to buy SFT. However, funding of new high-tech equipment to support Smart Farming techniques is very rare the last 8 years, due to the economic crisis in Greece. Additionally, subsidies are given for the machinery but not for the creation of databases, which limits the information availability. The crisis reduced significantly the availability of funds, while farmers resigned from any kind of investments due to the instability they experience. Therefore, while other countries in EU have a slow but continuous progress in this field, Greece is still in its infancy.

The small farm sizes, is one of the most discussed barriers during the three RIWs, affecting the SFT adoption in Greece. The farm size belongs to the agro-ecological factors. The majority of the farms are small-scale farms composed of multiple plots. Therefore, Precision Agriculture cannot be easily implemented. It is often considered that fragmentation coupled with small-size farms is a barrier to increasing yields. Small farms do not have the capacity to absorb costs and risks and those factors are not easily diffused over a greater productive base. Another matter that is crucial for Greek agriculture and is related to the small size of farms, is the difficulty of small growers (the majority of Greek farmers) to cooperate that reduces their power to transit from traditional practices to Smart Farming. For example, concerning information management, farmers are interested in investing on information systems but due to the existence of small farms this is challenging because of the cost of buying individually access to the databases. Farmers need to collaborate with other farmers, agricultural specialists and stakeholders, and buy access as a team but for now there is no trust among them. They are willing, though, to coordinate in the future in order to get access to SFTs and reduce the cost of the production as well as improve the product. The case of Pigasos farmers' union (table grapes) and Nileas cooperative (olive oil) that participated in RIW3 are excellent examples of the positive results of cooperation in the agricultural sector.

During the workshop, an extended discussion took place about the use of software, which is licensed on a subscription. Farmers hesitate to use the subscription-based apps. They mentioned that they could use a "trial" of the software and then decide if they would like to proceed to the subscription.

It is difficult to create methodologies and models to be applied to the Greek farming reality. There are no models capable of describing the current status of adopting new technologies in Greece. Some of the barriers identified are the spatial variability and lack of knowledge of the different needs, the need to predict results and undertake the responsibility to manage the data collected from the field. A methodology should be produced and the system should be trained using Artificial Intelligence.

Another barrier on the use of SFT mentioned was the farmers' educational attainment. It is generally true, that farmers in Greece lack education and training. For example, the application of irrigation, fertilization and pesticide spraying is still the most of the times done according to the individual's personal experience. They also lack access to the necessary equipment and organized extension services, mainly by the government and universities. Lack of formal education attainment, is expected to be negatively related to the adoption of SFT. One more socio-economic factor is farmers and agriculture related entrepreneurs' hesitation to progress and to adopt new technologies. They resist change, avoid taking risks, changing practices and trying new methods. It is challenging to "persuade" farmers to follow different practices, than the ones they are used to. Finally, farmers very intensively expressed their need to see real examples of the already adopted SFT by other farmers so it is proved that a specific technology they are planning to use is actually working. There is a need for the right information about the different technological products. Additionally, consultant agencies could



advise the farmers on the appropriate SFT for their needs.

## 3.2. Interest on existing SFTs – most demanded SFTs

Greek farmers mentioned the need of reducing agricultural labour. During the workshops, attendees showed an increased interest and highlighted the need for "Advisory on SFTs", through platforms and other FMIS systems. They pointed out that all SFTs should be shown in real conditions in pilot farms, as Greek farmers are difficult to accept new things in their farm without proof of concept.

The technologies discussed the most were the following:

VRT (Precision Irrigation, Spraying Drone): As in other countries, all participants mentioned VRT technologies as the solution for reduced input costs and increased quality of product without increased environmental impact. However, all participants agreed that these technologies have to be adjusted in Greek agriculture, as there is high variability in pedoclimatic conditions, even in farms that are very close to each other.

Satellite remote sensing: This idea of dealing with large surface terrestrial issues through satellite imagery was really popular, but at the same time there was a high disbelief that such systems can provide credible results for the farmers and the advisors.

Modelling and prediction for infectious disease epidemiology: This case was discussed thoroughly as the disease expansion and especially mycological diseases are of high interest for Greek agriculture, because it increases year by year and chemical crop protection is increasing constantly. In addition, it was said that using models coming from other countries is a big problem, as the prediction is not accurate and in many cases it is not enough to prevent the spreading of the disease with destructive results. The models need to be adjusted in regional conditions and optimised at least for 3 years before going in use.

Finally, farmers supported the notion that a complete system of SFT is needed and not separate innovations from different companies. Companies should collaborate to bring together their ideas and manufacture a complete product.

#### 3.3. Research needs in Smart Farming

New ideas for research are the following:

- Assessment of ripening of the edible products (e.g. peas, cherries) by image processing technique
  using satellites and their harvest during the optimum period of time. Similarly, satellite data and GIS
  can be used for soil mapping and capability assessment.
- For Variable Rate Irrigation (VRI) a holistic approach is needed to analyse and develop the hardware
  and software that evolves a solution to the irrigation problem, which ensures every step, from water
  drilling to application. Establishment of the right methodology and the standards according to which
  Variable Rate Fertilization with biological-based fertilizers can be performed and the optimum
  amount of bio-fertilizers will be applied to the field.
- For performing aerial pesticides, herbicides, and fungicides spraying, with the use of drones, research should be done so that the drone will be balanced with the extra weight of the container it carries, and the potential wind forces. Use of autonomous robotic weed control systems with laser.
- Using satellite sensors that at the moment are used for other purposes (e.g. radar) for agricultural purposes could be a support on the field to promote the use of other SFTs.

New uses of existing SFTs:

• Multicopter Drones have been mainly used for crop imagery. The idea of using them for crop protection purposes, performing aerial pesticides, herbicides, and fungicides spraying seems very interesting for orchards of semi- and mountainous areas in Greece. The majority of olive and citrus groves in the country are in such areas where conventional pesticide equipment cannot reach. AGROMA owner, a pesticide equipment company, shared with the rest of the participants that in Albania where he has a lot of customers, the citrus orchards are only reached by hose and lance providing a very low quality result with huge amounts of pesticide spill. Such customers, see spraying drones as an excellent solution.



# 3.5. Potential collaborations identified

| No. | Category of collaboration (Innovation, uptake or transfer: see definition in guidelines) | Related SFT  | Cropping<br>system                                      | Short description of potential collaboration   | Funding source matched with   | Are you bringing this idea to Serbia? |
|-----|--|--|---|--|---|---------------------------------------|
| 1   | Innovation   | A holistic approach<br>to Variable Rate<br>Irrigation (VRI) using<br>Satellite Remote<br>Sensing and Sensors | Arable<br>Tree<br>Vegetables<br>Vineyards<br>Grasslands | Create a complete irrigation system. A holistic approach to analyse and evolve a solution to the irrigation problem, which ensures every step, from water drilling to application.  (Farmer, Advisory Industry -Sensors and VRI, Software for VRI, Informative Platform)   | Measure 16, Primarily an OG can be assembled  | YES                                   |
| 2   | Innovation   | Integrated System<br>for table grape<br>vineyard crop<br>protection  | Tree<br>Vineyards                                       | The project will focus on the optimization of crop protection strategies in table grape vineyards in Peloponnese.  (Farmers Cooperative -the end-user and the demo farm of the project, Industry -GNSS and satellite imagery, spraying technology, Research -spraying machinery inspection, satellite imagery, technological solutions for precision spraying) | Measure 16, Ministry of Agriculture   | YES                                   |
| 3   | Technology<br>transfer   | Integrated<br>Agriculture Advisory<br>Services   | Arable<br>Tree<br>Vegetables<br>Vineyards<br>Grasslands | The ultimate goal of this proposed project is to enhance farmers' knowledge by strengthening agricultural extension and advisory services within Greece.  (Farmers and Farmers' Associations, Research, Extension Services and Advisory, Industry)   | Measure 16, Ministry of<br>Agriculture and the<br>General Secretariat of<br>Research & Development<br>initiative «Research-<br>Create-Innovate» | YES                                   |



| No. | Category of collaboration (Innovation, uptake or transfer: see definition in guidelines) | Related<br>SFT  | Cropping<br>system  | Short description of potential collaboration  | Funding source matched with | Are you bringing this idea to Serbia? |
|-----|--|---|---|---|-----------------------------|---------------------------------------|
| 1   | Innovation   | Satellite<br>Remote<br>Sensing in<br>Irrigation                         | Arable<br>Vegetables<br>Grasslands                          | The main objectives of this project are to estimate the needs for irrigation water, check which farmers irrigate the most as well as control their irrigation practices through remote sensing. (Research to enact the irrigation rules, Advisory services, Industry to provide the satellite data needed, Farmers) |                             |                                       |
| 2   | Innovation   | A holistic<br>approach<br>to<br>Variable<br>Rate<br>Irrigation<br>(VRI) | Arable<br>Orchards<br>Vegetables<br>Vineyards<br>Grasslands | A holistic approach to analyse and evolve a solution to the irrigation problem, which ensures every step, from water drilling to application. (Farmers, Agricultural cooperatives, Research and advisory services, Industry)  |                             |                                       |
| 3   | Innovation   | Variable Rate Fertilizati on with biological -based fertilizers         | Tree<br>Vineyards   | The goal of this project is to establish the right methodology and the standards according to which the optimum amount of bio-fertilizers will be applied at specific locations, different "management zones", for specific crops. (Farmer, Research, Industry, Advisory)   |                             |                                       |
| 4   | Innovation   | Spraying<br>Drone   | Arable<br>Tree<br>Vegetables<br>Vineyards                   | The main objective of this project is to be able to proceed to aerial pesticides, herbicides, and fungicides spraying, with the use of drones. (Farmer, Research, Industry, Advisory)   |                             |                                       |
| 5   | Innovation   | Modelling   | Arable  | The models for infectious epidemics should  |                             |                                       |



|   |            | and<br>prediction<br>for<br>infectious<br>disease<br>epidemiol<br>ogy    | Tree<br>Vegetables<br>Vineyards | simulate spatial and temporal patterns of disease spread on a specific time basis for application at wider agricultural areas.  (Farmer, Research, Industry, Advisory)  |  |
|---|------------|--|---------------------------------|---|--|
| 6 | Innovation | Remote<br>sensing<br>and VRA<br>with the<br>use of<br>GPS in<br>orchards | Tree<br>Vineyards               | Data can be collected for targeted individual trees or a portion of the orchard. The estimation of the tree row canopy is possible so that the appropriate amount of crop protection products can be applied.  (Farmer, Research, Industry, Advisory) |  |



#### 4. Recommendations

## 4.1. Sustainability and mainstreaming of Smart-AKIS results

AUA and CERTH is very much interested and is planning to capitalize on Smart-AKIS activities and results to promote the use of SFT in Greece, starting from the University itself and the most direct contacts that have already been informed on the use of precision agriculture, SFT and FMIS through the Regional Innovation Workshops. The communication with the relative stakeholders (farmers, institutes, technology providers and national organizations) has already been intensified. Both entities have been in close contact with the NRDN and RIS3 of most prefectures of Greece in order to promote Smart Farming and prepare proposals for research projects on this sector. The Technology Cards are already disseminated in companies and stakeholders and this will continue in the next period. It could be the case that the platform will be hosted in AUA's servers after approval by the administration.

## 4.2. Adoption of Smart Farming Technologies

Many influential factors related to the adoption of Smart Farming Technologies are associated with information, learning and management demands and these present opportunities for effective intervention. This includes the role of agronomy advisers and support for precision agriculture in assisting growers to achieve the common goal of maintaining simplicity in farming operations.

To be able to foster the adoption of SFTs in Greece we should first:

- Increase knowledge and understanding of levels and trends in adoption of key practices in the farming sector, in this case precision agriculture-related practices, through the analysis of socio-economic and practice use data collected from Greek growers.
- 2. Identify key factors influencing capacity and decisions to adopt or not adopt key practices and approaches, including the role of advisers.
- 3. Inform strategies for increasing the capacity of growers to adopt new practices and achieve more rapid farming systems improvement.

4.

## 4.3. Strengthening Innovation in Agriculture

AUA and CERTH have good contacts from collaborative projects with farmers, companies, research institutes and other organizations and thus are able to maintain and strengthen the multi-actor collaboration in the field of SFTs. Through these contacts, both entities will be able to emerge innovation-driven projects supporting them financially with public, private and combined funding sources. The most interesting OGs from the Ministry of Agriculture, Measure 16 will act as the core for projects production with SFTs.

In order these to be leveraged and improved, the Ministry of Agriculture and the Ministry of Economy, Development and Tourism should cooperate on some mutual projects.

## 4.4. Smart Farming R&D agenda

VRT (Precision Irrigation, VR fertilization and pesticide application with Spraying Drone): The most pressing needs for research around SFT in the short-term are on VRT, as the solution for reduced input costs and increased quality of product without increased environmental impact. However, these technologies have to be explored in the long-term and adjusted in the Greek agriculture reality, as there is high variability in pedoclimatic conditions, even in farms that are very close to each other.



Satellite remote sensing: This idea of dealing with large surface terrestrial issues through satellite imagery is really popular, but at the same time research has to be done to prove such systems can provide credible results for the farmers and the advisors.

Modelling and prediction for infectious disease epidemiology: using epidemiological models coming from other countries is a big problem for Greek agriculture, as the prediction is not accurate and in many cases it is not enough to prevent the spreading of the disease with destructive results. Thus, the models need to be explored in the long-term, adjusted in regional conditions and optimised at least for 3 years before going in use.

Basic research in Smart Farming Technologies should be sufficient to explore them in the both short-term and long-term.



#### **Annexes**

# 5.1. Minutes of the Regional Innovation Workshops

The "minutes" documents of the three Regional Innovation Workshops are included in the e-mail sent.

## 5.1.1 RIW1

SMART AKIS 1<sup>st</sup> REGIONAL INNOVATION WORKSHOP **GREECE** 29<sup>th</sup> of MAY 2017, GIANNITSA

# **RIW1 Programme**



Agenda - 1st Regional Innovation Workshop in Greece «Application of new technologies in agriculture»

Pellas Farmers' Association, D. & M. Papadopoulou 9, Giannitsa 29th of May, 2017 Contact persons

Thanos Balafoutis Office. +30 2105294053 Mobile, +30 5977262730 Spyros Fountas Office: +30 2105294035 Mobile, +30 6947819600



















# May 29th, 2017

09:30 - 10:00 - Welcome and coffee

10:00 - 10:15 - Short presentation of Smart-AKIS

Spyros Fountas, Coordinator - Agricultural University of Athens (www.aua.gr)

10:15 - 10:30 - Smart Farming Platform and Survey regarding Farmers' Adoption of New Technologies in the EU

Thanos Balafoutis, Project Manager – Agricultural University of Athens (www.aua.gr)

10:30 - 11:45 - Presentation of selected new SFT

- "Modern precision agriculture technologies by Trimble"
   Aris Zamidis, CEO TractorGPS (www.tractorgps.gr)
- "Precision agriculture services through remote sensing means"
   Georgos latrou, Vice-President ECODEVELOPMENT SA (www.ecodev.gr)
- "Apps for agricultural production optimization"
   Zisis Tsiropoulos, Director-General AGENSO (www.agenso.gr)
- "Precision agriculture and tractor ergonomics technologies"
   Michalis Tsagkaropoulos KONDELLIS SA (www.condellispaul.gr)
- "APOLLO app"
   Machi Simeonidou DRAXIS (www.draxis.gr)
- "Agrostis: Company's products and services presentation"
   Thanasis Sapounas, Chairman and Chief Executive Officer AGROSTIS (www.agrostis.gr)
- "New technologies in the preparation of the spraying liquid and management procedure of the empty plastic plant-protection products"
   Frantzeska Hydraiou, Agricultural Engineer MSc, Director General - ESYF (www.esyf.gr)

11:45 - 12:15 - Coffee break

12:15 - 13:30 - Parallel Working Groups
All participants

13:30 - 13:45 - Presentation of the results of the working groups - Conclusions

Team coordinators

13:45 - 15:00 - Light lunch



## **RIW1** Power Point presentations

"Modern precision agriculture technologies by Trimble"

Aris Zamidis, CEO – TractorGPS (www.tractorgps.gr)

















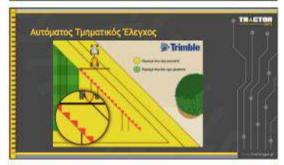














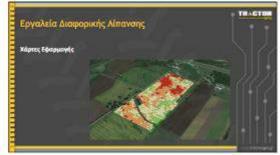








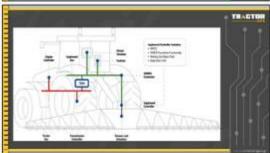








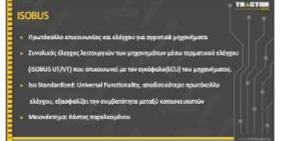
















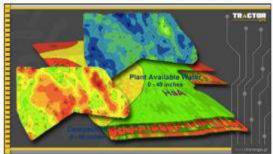












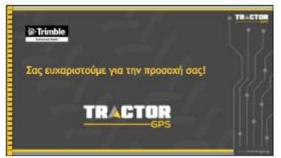














"Precision agriculture services through remote sensing means "Georgos latrou, Vice-President - ECODEVELOPMENT SA (<u>www.ecodev.gr</u>)

# "Apps for agricultural production optimization "

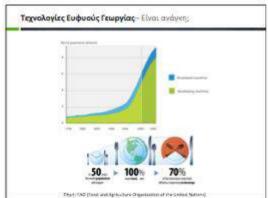
Zissis Tsipropoulos, Director-General - AGENSO (www.agenso.gr)







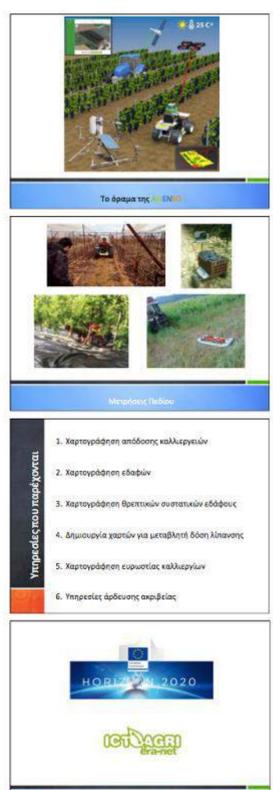






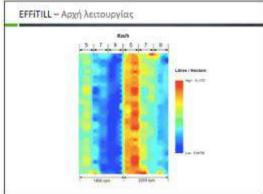


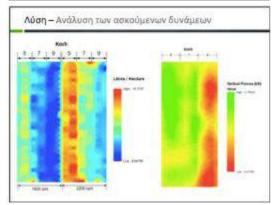






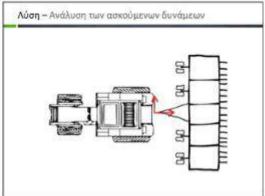




















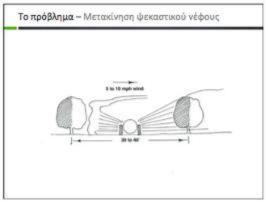




























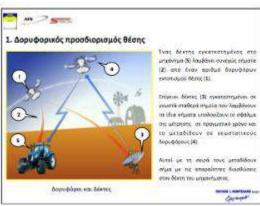




## "Precision agriculture and tractor ergonomics technologies "

Michalis Tsagkaropoulos - KONDELLIS SA (www.condellispaul.gr)

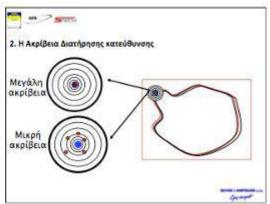










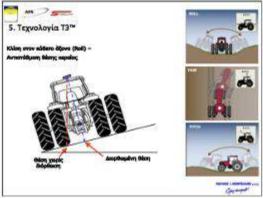






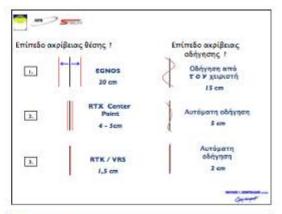


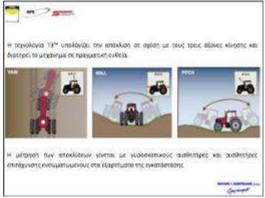


















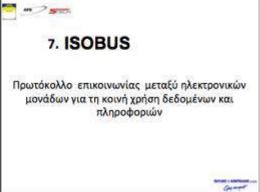














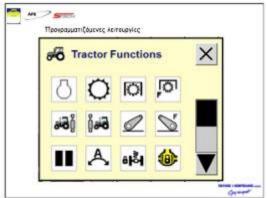








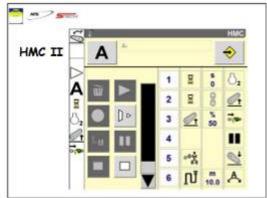




















### "APOLLO app"

Machi Simeonidou - DRAXIS (www.draxis.gr)

























# "Agrostis: Company's products and services presentation"

Thanasis Sapounas, Chairman and Chief Executive Officer – AGROSTIS (www.agrostis.gr)

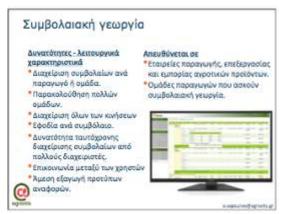






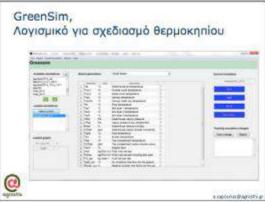
























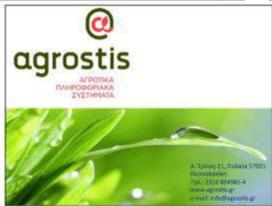














"New technologies in the preparation of the spraying liquid and management procedure of the empty plastic plant-protection products "

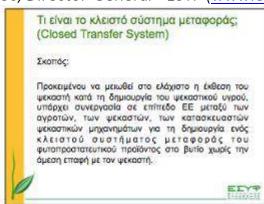
Frantzeska Hydraiou, Agricultural Engineer MSc, Director-General - ESYF (www.esyf.gr)











### Τι είναι το κλειστό σύστημα μεταφοράς; (Closed Transfer System)

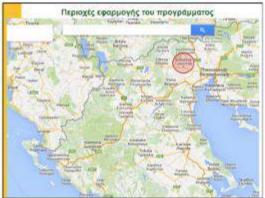
- Η ανάπτυξη και ενσωμάτωση τέτοιων συστημάτων στην ορθή γεωργική πρακτική, μπορεί να αποτελέσει τον ασφαλέστερο τρόπο μη έκθεσης των ψεκαστών αλλά και του περιβάλλοντος
- Απαιτείται ωστόσο ακόμη πολλή δουλειά και συνεργασία μεταξύ των εμπλεκομένων προκειμένου το τελικό σύστημα μεταφοράς να είναι εύκολα εφαρμόσιμο

























# **RIW1 Attendance Sheets**

Due to confidentiality reason, the list is not provided.

# **RIW1 Pictures**

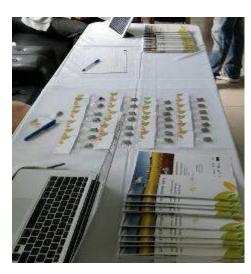




Figure 1 Registration table



Figure 2 Smart-AKIS introduction







Figure 3 and 4 Presentation of selected new SFT







Figure 5 and 6 Parallel working groups



### **RIW1 Findings**

On top of the multi-actor collaborations that are to emerge from the RIWs, other outputs are expected as a result of bringing together stakeholders into the RIWs. One of the overall objectives of Smart-AKIS is to capture these outputs in order to produce recommendations for fostering the penetration of SFT in Europe.

This section of the "minutes" document provides a number of headlines, covering different aspects that could emerge in the discussion in the RIWs (both in plenary but also in the Work Groups). Hub partners are encouraged to pay careful attention to the discussions taking place in the RIWs in order to identify these "findings". As suggested in the Guidelines, the Work Groups can be tape recorded in order to better grasp the discussion taking place. These "findings" will be included on the "Smart AKIS Report" to be produced by each Hub partner after RIWs 1 and 2 and presented at the 1<sup>st</sup> Transnational Innovation Workshop.

### Findings regarding the needs and ideas identified in WP2

Are the users' needs identified in D2.2 confirmed by the RIW findings for your Hub? Can other needs regarding SFTs be identified from the discussions in the RIW? These can be technological needs, but also others, such as need for training, need for improved advisory, etc. Can these needs be addressed by setting up collaborations (for example, by a collaboration project) or are there to be addressed at the political level (for example, by setting up a subsidy for SFTs)? Do attendees have ideas regarding the use of SFT to your Hub?

Precision agriculture promotes the decision-making on the field.

Some of the ideas identified during the RIW are the following:

- The use of GPS for the distribution of fertilizer as growers do not know how and where exactly to apply fertilizers on the field.
- Weed control through the spraying of herbicides or the use of autonomous robotic weed control systems.
- For those who already use GPS, a database that contains all mapping information is very much needed so that farmers do not need to do the mapping themselves.
- During the discussion a farmer mentioned the need of automatic steering of farm vehicles using GPS on inclined plane. Precision inclination sensors that measure the incline or tilt angle should be used to improve the autonomous GPS positioning for tractors.
- The need of storage facilities in order the farmer to be able to sell the product in a higher price. In Greece precision agriculture should be able to be implemented in small farms.

### Identification of barriers and incentives for adoption of SFTs.

Are the barriers identified in D2.3 confirmed by the RIW findings for your Hub (i.e. farm size, cropping system, farmers' age and education/training, etc)? Can other barriers for SFT adoption be identified that are specific to your Hub?

Economic barrier: SFT are usually expensive. Farmers in Greece face a long time lag between their investment in the SFT and the payback. The use of subsidies is needed so that the growers will be able to buy SFT. Subsidies are given for the machinery but not for the creation of databases, which limits the information availability.

Additionally, Greece is mostly consistent of small farms and this means that precision agriculture cannot be easily implemented. Regarding information management, farmers are interested in



investing on information systems but due to the existence of small farms this is challenging because of the cost of buying individually access to the databases. Farmers need to collaborate with other farmers, agricultural specialists and stakeholders, and buy access as a team but for now there is no trust among them. They are willing, though, to coordinate in the future in order to get access to SFTs and reduce the cost of the production as well as improve the product.

Farmers also complained that product prices are decreasing as more and more automation in agriculture takes place. Farmers complained that the price of the product is not always equivalent of the product quality.

Another barrier on the use of SFT mentioned was the farmers' educational attainment.

Finally, farmers very intensively expressed their need to see real examples of the already adopted SFT by other farmers so it is proved that a specific technology they are planning to use is actually working. There is a need for the right *information* about the different technological products. Additionally, consultant agencies could advise the farmers on the appropriate SFT for their needs.

For the industry, it is difficult as the market is "small and shallow" as the representative of ECODEVELOPMENT stated. Moreover, it was mentioned the price of specific SFT might be slightly higher in Greece than in other places around Europe as the companies have invested time and money so that their staff has become expert on the specific SFT. This way there is constant and easily access support on how to use the SFT for the farmers, as they do not usually spend time on reading the manual or getting familiar with the software.

# Relevance and interest on adoption and transfer of presented SFTs, ranking of the highest scored SFTs

Do attendees show a special interest towards specific SFTs? Are these SFTs in the market yet or are they being developed (TRL<9)? Have attendees provided feedback to SFT industry in the RIW for improving the SFTs or adjusting them to the specific regional conditions so as to bring them into practice?

Farmers mentioned the need of reducing agricultural labour. The most needed agricultural equipment as prioritized by the farmers is as follows:

GPS, Tractor with GPS and autonomous spraying, seeding and fertilizer distribution.

Attendees showed an increased interest on map or sensor based VRAs (application in seeding, irrigation, fertilization, spraying and weed control), on GPS on farm vehicles using GPS on inclined plane and on the creation of databases where mapping information exists.

Finally, farmers supported the notion that a complete system of SFT is needed and not separate innovations from different companies. Companies should collaborate to bring together their ideas and manufacture a complete product.

### Potential new uses for existing SFTs.

Have new uses been identified for the SFTs presented (i.e. SFT presented for arable crops that can be adapted for vineyard).

### Potential inputs for research.

Are there specific needs that can be addressed through research (it can be basic research on i.e. development of a new remote sensing index, but also applied research on, i.e. application of a specific SFT to a new environment)? Have attendees (SFT industry, farmers) provided feedback to research results regarding specific SFT?



New ideas for research are the following: assessment of ripening of the edible products (e.g. peas, cherries) by image processing technique using satellites and their harvest during the optimum period of time. Similarly, satellite data and GIS can be used for soil mapping and capability assessment. A comment from the farmers' side was the fact that within the same field, the yield is sometimes different even though the same cultivation processes take place. This is due to different soil texture.

### **RIW1 Project Ideas**

Industry

| Category of project   | Smart Farming Technology | Crop system |  |  |
|---|--------------------------|-------------|--|--|
| Technology transfer   | Holistic project for     | -           |  |  |
|   | information and training |             |  |  |
| Promoter/s name/s   |                          |             |  |  |
| Mr. Zamidis from TractorGPS and Mr. Tsagkaropoulos from KONDELLIS SA                            |                          |             |  |  |
| Short description of project  |                          |             |  |  |
| The need of creating a local communication platform for precision agriculture.                  |                          |             |  |  |
| AUA and three more organizations in Greece the Association of Machine Representatives Importers |                          |             |  |  |
| (SEAM), the Association of Manufacturers of Agricultural Machinery in Greece (EKAGEM) and the   |                          |             |  |  |
| Association of Information Technology & Communications of Greece (SEPE) should cooperate and be |                          |             |  |  |
| able to inform and train farmers and everyone else interested on matters related to SFT.        |                          |             |  |  |
| Multi-actor collaboration   |                          |             |  |  |
| Partners interested in developing the project:  |                          |             |  |  |
| Farmer  |                          |             |  |  |
| Research  |                          |             |  |  |
|   |                          |             |  |  |

| Category of project                               | Smart Farming Technology | Crop system   |  |  |
|---|--------------------------|---------------|--|--|
| Innovation  | VRA                      | Arable (rice) |  |  |
| Promoter/s name/s                                 |                          |               |  |  |
| Mr. Karydas from ECODEVELOPMENT                   |                          |               |  |  |
| Short description of project                      |                          |               |  |  |
| The use of VRA of fertilizers for rice production |                          |               |  |  |
| Multi-actor collaboration                         |                          |               |  |  |
| Partners interested in developing the project:    |                          |               |  |  |
| Farmer  |                          |               |  |  |
| Research  |                          |               |  |  |
| Industry  |                          |               |  |  |

| Category of project  | Smart Farming Technology | Crop system        |  |  |
|--|--------------------------|--------------------|--|--|
| Innovation   | VRA                      | Arable (pea)       |  |  |
|  |                          | Tree (cherry tree) |  |  |
| Promoter/s name/s  |                          |                    |  |  |
| Mr. Karydas from ECODEVELOPMENT  |                          |                    |  |  |
| Short description of project   |                          |                    |  |  |
| The use of VRA to identify ready to harvest crops (peas and cherries). |                          |                    |  |  |
| Multi-actor collaboration  |                          |                    |  |  |



Partners interested in developing the project:
Farmer
Research
Industry

| Category of project  | Smart Farming Technology | Crop system       |  |  |
|--|--------------------------|-------------------|--|--|
| Innovation   | VRA                      | Tree (olive tree) |  |  |
|  |                          | Vineyard          |  |  |
| Promoter/s name/s  |                          |                   |  |  |
| Mr. Karydas from ECODEVELOPMENT  |                          |                   |  |  |
| Short description of project   |                          |                   |  |  |
| The use of VRA to spot Infected trees by fungus verticillium wilt on olive orchard and terroir on vineyard |                          |                   |  |  |
| Multi-actor collaboration  |                          |                   |  |  |
| Partners interested in developing the project:   |                          |                   |  |  |
| Farmer   |                          |                   |  |  |
| Research   |                          |                   |  |  |
| Industry   |                          |                   |  |  |



# **RIW1** Evaluation

Information summing up the results from the Evaluation Form voluntarily filled in by attendees.

An Evaluation Form in English is proposed but partners are free to tailor it to their needs and to use a local language form.

| Interest                      | Average score   | 4.3 |  |  |
|-------------------------------|---|-----|--|--|
|                               | More interesting presentations  Precision agriculture, GPS, w/ telescopic means           |     |  |  |
| Organization                  | Average score   | 4.4 |  |  |
|                               | Improvement areas More space, better information  |     |  |  |
| Methodology                   | Average score   | 4.3 |  |  |
|                               | Improvement areas Present existing examples, time management, broader variety of SFT      |     |  |  |
| Smart Farming<br>Technologies | Average score   | 4.5 |  |  |
|                               | Top Smart Farming Technologies  Precision agriculture, GPS, w/ telescopic means           |     |  |  |
|                               | Average rate of intended use of Smart AKIS database                                       | 77% |  |  |
| Project Ideas                 | Average score   | 4.0 |  |  |
|                               | Top Project Ideas Agricultural information systems  |     |  |  |
|                               | Average rate in (% over all RIW attendees) of attendees planning to take part on projects | 70% |  |  |
| Open suggestions              |   |     |  |  |



### 5.1.2. RIW2

# SMART AKIS 2<sup>st</sup> REGIONAL INNOVATION WORKSHOP Greece

25th of October 2017, Nikea

## **RIW2 Programme**



# Agenda – 2<sup>nd</sup> Regional Innovation Workshop in Greece «Application of new technologies in agriculture»

Cultural Centre of Nikea, Kileler Municipality, Ethnarchou Makarlou 181, Nikea 415 00, Greece 25<sup>th</sup> of October, 2017

#### Contact persons

Thanos Balafoutis Office. +30 2105294053 Mobile. +30 6977262730 Email. abalafoutis@aua.gr Spyros Fountas Office. +30 2105294035 Mobile. +30 6947819600 Email. sfountas@aua.gr































### October 25th, 2017

09:30 - 10:00 - Welcome and coffee

10:00 - 10:15 - Short presentation of Smart-AKIS

Spyros Fountas, Coordinator - Agricultural University of Athens (www.aua.gr)

10:15 - 10:30 - Smart Farming Platform

Thanos Balafoutis, Project Manager - Agricultural University of Athens (www.aua.gr)

#### 10:30 - 12:00 - Presentation of selected new SFT

- "Smart monitoring of stored goods using Internet of Things technologies"
   Antonis Tzounis, Dimitris Chalatsis Centaur Analytics (http://centaur.ag)
- "Apps for agricultural production optimization"
   Zisis Tsiropoulos, Director-General AGENSO (www.agenso.gr)
- "Modern precision agriculture technologies by Trimble"
   Aris Zamidis, CEO TractorGPS (www.tractorgps.gr)
- "Integrated platform for agricultural advisory services"
   Dimitra Perperidou DRAXIS (www.draxis.gr)
- "Development of a variable rate fertilization system for cereals"
   Dimitris Evangelopoulos, COO Agile Agriculture Technologies (http://agileagr.com)
- "Innovation & new technologies in agricultural production AGRENIO app"
   Hara Koutalou, MATRIX INFORMATION TECHNOLOGIES (http://www.matrix-it.gr)
- "Presentation of the ICT-AGRI results"
   Xenophon Tsilibaris, Programme Manager and Administrator GRNET S.A.
   (https://grnet.gr)

12:00 - 12:30 - Coffee break

#### 12:30 - 14:30 - Parallel Working Groups

- Group 1 Precision Irrigation
- Group 2 Variable Rate Fertilization
- Group 3 -Precision Crop Protection
- Group 4 Remote Sensing Guidance





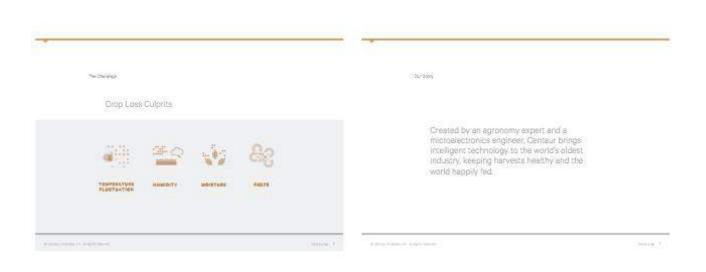
### RIW2 Power Point presentations

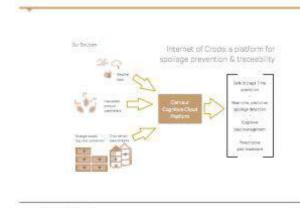
"Smart monitoring of stored goods using Internet of Things technologies ""

Antonis Tzounis, Dimitris Chalatsis - Centaur Analytics (http://centaur.ag)



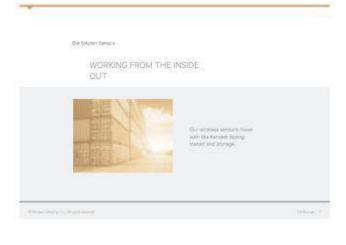
After leaving the field, 17% of the world's harvests spoil. In developing countries, loss skyrockets to more than 30%.

















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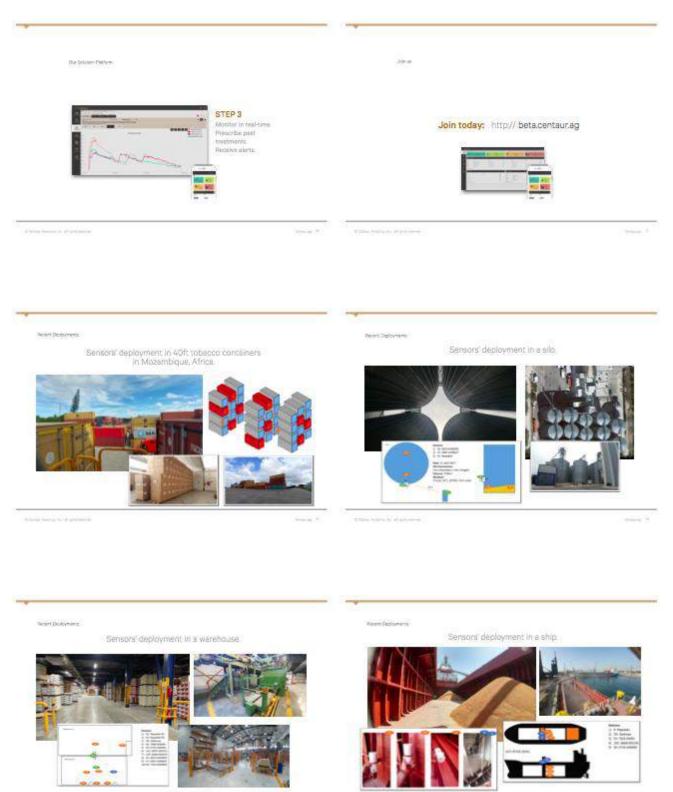


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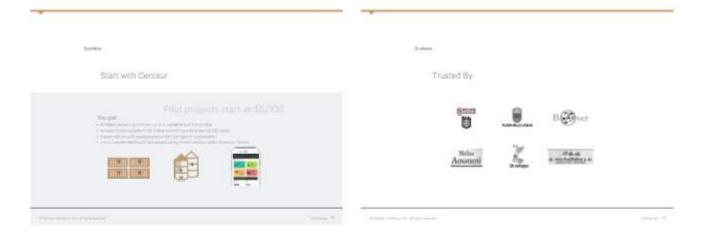
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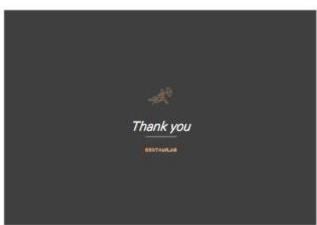














# "Apps for agricultural production optimization"

Zisis Tsiropoulos, Director-General - AGENSO

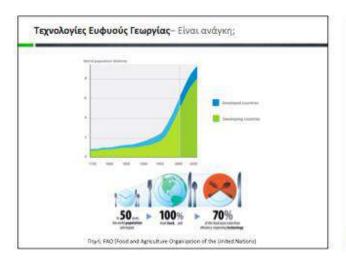
(www.agenso.gr)













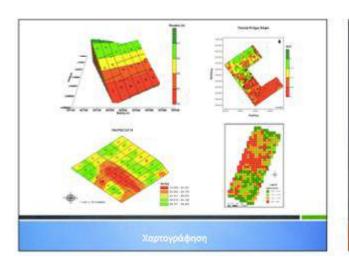














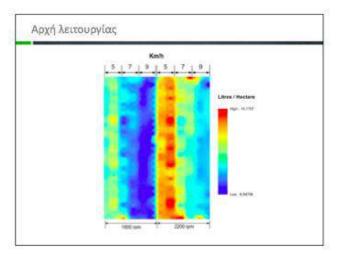


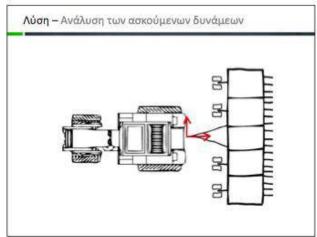




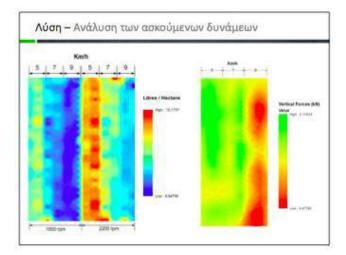








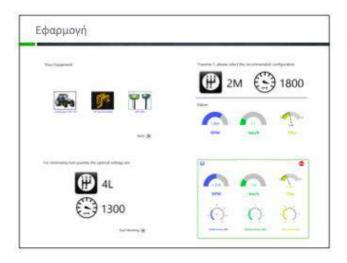












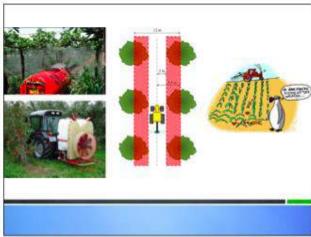


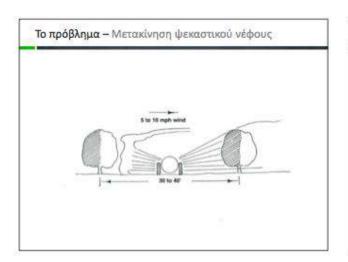








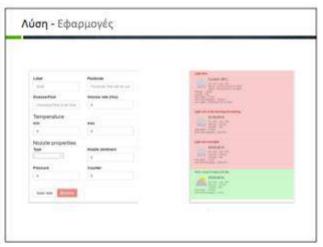




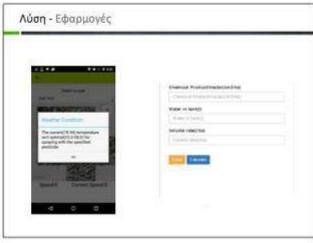


















# "Modern precision agriculture technologies by Trimble" Aris Zamidis, CEO – TractorGPS (www.tractorgps.gr)

































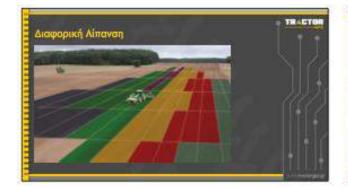


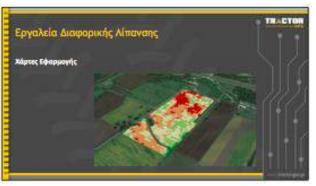






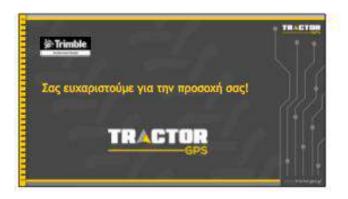














### "Integrated platform for agricultural advisory services "

Dimitra Perperidou – DRAXIS

(www.draxis.gr)













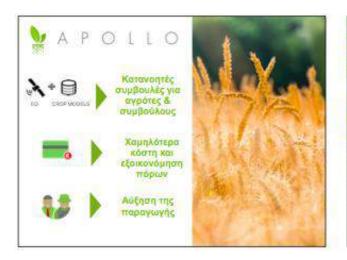










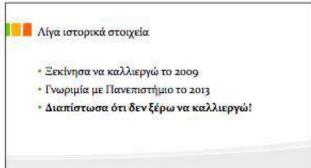


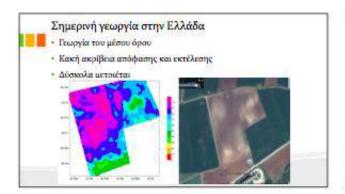


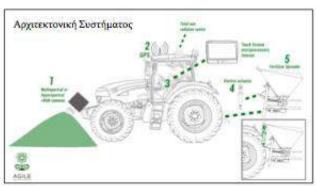


# "Development of a variable rate fertilization system for cereals" Dimitris Evangelopoulos, COO - Agile Agriculture Technologies (http://agileagr.com)





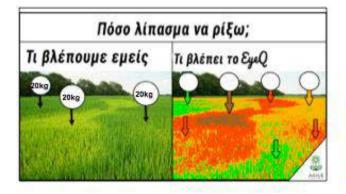


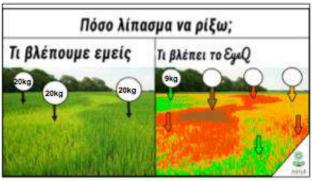


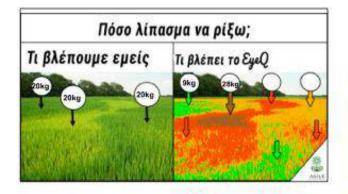


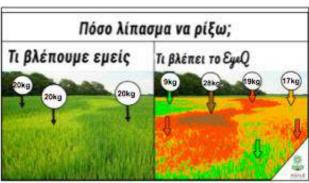
















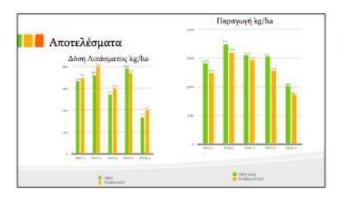








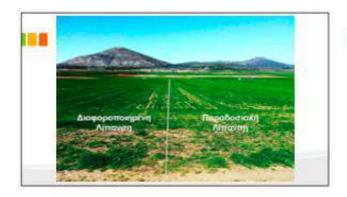


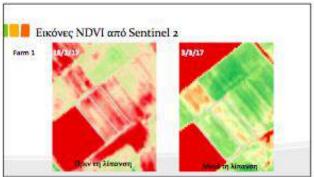




### **Smart AKIS Report**







Ψάχνουμε για αγρότες που πιστεύουν πως δεν ξέρουν να καλλιεργούν όπως εμείς και θέλουν να εισάγουν την τεχνολογία και τη λήψη δεδομένων στην καθημερινότητά τους
 Δημήτρης Ευαγγελόπουλος
 Τηλ: 696 698 6798
 σναρχείορισιοκάλεμιστ.com
 www.apdeagr.com



### "Innovation & new technologies in agricultural production – AGRENIO app"

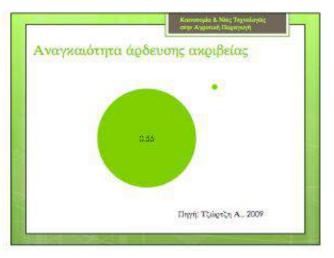
Hara Koutalou, MATRIX - INFORMATION TECHNOLOGIES (http://www.matrix-

it.gr)























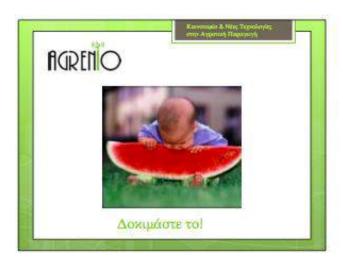










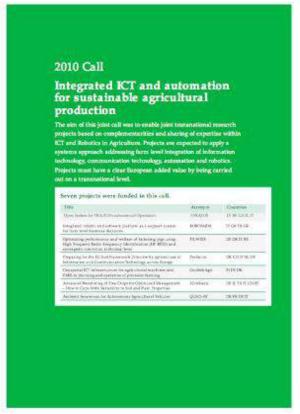




### "Presentation of the ICT-AGRI results"

Xenophon Tsilibaris, Programme Manager and Administrator - GRNET S.A. (https://grnet.gr)





Open System for TRAcTOr's autonomouS Operations (STRATOS)



Integrated robotic and software platform as a support system for farm level business decisions



(ROBOFARM)

- Terrani
   Tree Mar
   Innets
   Servers



### Optimizing performance and welfare of fattening pigs using High Frequent Radio Frequency Identification (HF RFID) and synergistic control on individual level (PIGW ISE)







### Topics

### Preparing for the EU Soil Framework Directive by optimal use of Information and Communication Technology across Europe (PredICTor)



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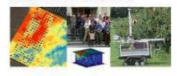
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### Geospatial ICT infrastructure for agricultural machines and FMIS in planning and operation of precision farming (GeoWebAgri)



### Outputs:

### Advanced Monitoring of Tree Crops for Optimized Management - How to Cope With Variability in Soil and Plant Properties (3D-Mosaic)



- Description
   One parties
   One parti

See Opposes, Moses Opens



### Ambient Awareness for Autonomous Agricultural Vehicles (QUAD-AV)



### Topics:

### Outputs:

# The call aimed at utilizing KCT and automation in primary agriculture for austainable use of natural resources, reduction of agricultures embinamental footprint, mitigation of diffinite change while securing factor economy and good working conditions, food supply, quality and security, and animal welface. tight projects are funded in this cell. Arrent The State Application of Abertralian try busings on Depter April 2019 Approximate of a foreign some to a functional approximate. ET for large and proof of a foreign systems. Lar of ET was foreign systems of a foreign systems are a functional and a foreign systems of a function of ADMINION .

### Application of information technologies in Precision Apiculture (ITApic)



Topics: Transc Apolius (history Sekepty)

### Smart Integrated Livestock Farming: integrating user-centric & ICT-based decision support platform (SILF)



2012 Call

ICT and Automation for a Greener Agriculture

the times April Distinguist April Sections:

### **Smart AKIS Report**



Fusion of multi-source and multisensor information on soil and crop



### for optimised crop production system (FarmFUSE)

### Outputs:

- Catiputs:

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User-centric adoption of sustainable farming operation involving ICT and robotics



- Case: Grassland harvesting operations for biogas and bio refinery plants (GrassBots)

Impact:
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### Advanced cattle feeding on pasture through innovative pasture management (i-LEED)



- Topics\*

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### ICT in large and small dairy systems (DairyICT)



- Dury Seeing Deta bengrata Securi systems

### Ches Roght, Extracolysis Combages (Senaral)



Information and Communication Technologies

Project scale lies: 1997 Project dates: 1 694, 2017 or 10 May 2018

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### Use of ICT tools to capture grass data and optimize grazing management (ICTGRAZINGTOOLS)



### Impact:

Production on grace-bases systems a context to degree or game utilization. This is influence by his instead gracely in a full primary be encappered if that growth. Neighbor instead present of a game passauries, so a feet a feet growth for the production and so that the production and softwarf for the production and softwarf for the production and softwarf for the production of the Test grade in constraints of the decision.

### Topics:

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### Outputs:

- This project will be the promitted for Debtor, betting measurement with a spatial Dimension. How allowing more an abusance of best using CDI inchmings to be a complished through Aveloped RCI to the a smart phose and a gravilate measurement Decision Support Door (DSI).
- Subsequent integration with minimal times' inclinating will be unabased experimentally. This approach will reduce the skell requirement amount gives massectments, between available information, provide at ICT determine and

USability of Environmentally sound and Reliable techniques in Precision Agriculture (USER-PA)



### Immed-

The main expective of the USER-PApropert is to develop and demonstrate a trageled and reliable Precision Agricultural solution for ordinate and violeyands considering spatial information on impation and harvest management.

USDFUM proposes a conceptual homework, an impositive federated and federate, and the enabling between their field allowed to image a copy and full sensors with recolar and addited the acquisition systems, and full server that will serve federate and proposed and acquisition of the acquisition of the control of the contr

### Outputs:

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### 2014 Call

### Services & Applications for Smart Agriculture

The call is in collaboration with the Future leternet Accelerate project Smart Agrifsod. The objective for Smart Agrifsod is to accelerate the use of SHWARI internet technologies for smart services and upplications, while the propose of the NCT AGRI engagement is to contribute with agricultural knowlegds and

Eithy projects are funded in this call, herof nine projects with ICT-ACRI (destand-participalish)

Junia Co. See Fournal Andrea Age (2018)

| Dirtia-Ca         | Fertil Folkitchil Anklieria App   | CETE:     |
|-------------------|---|-----------|
| HappyCon          | Consultant Popul (Alphy Con   | SUBER     |
| Agreptiona        | Agraphina, "The Internet of Robb", stores & mobile laws<br>management and work + III devices - Ing data | BE        |
| MINI-DHI:         | Sustainable Small Running in Terrolog Council Repport System  | CR AU DR  |
| Ageill            | Agriculture more future branch  | -08.06.93 |
| TI-CRUMA          | Future Internet - Occurrie Accounts Microgenium System  | CHOKIE    |
| Ospesic Agriffase | Organic Agriculation on application for the organic agriculture community                               | CROK      |
| FEAP              | Smart Gred Agricultural Plantiers   | THUXON    |
| TERM              | Beld Radiness Indicator System  | DEBL      |
| -                 |   |           |

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Services and Applications for Smart Agriculture Farm Financial Analysis App (ifarma-ffa)



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1 (2)

### **Smart AKIS Report**



### Connecterra: Project Happy Cow (HappyCow)



### Topics:

### Agroptima, "The Internet of Fields": mobile farm management software





## Happy Goats: a Sustainable Small Ruminants Farming Decision Support System (SSRF-DSS)



### Agriculture meets Future Internet (AgriFI)



### **Smart AKIS Report**



Future Internet - Orchards Automated Management System (FI-ORAMA)



### Outputs

## Organic-AgriWare: an application for the organic agriculture community (Organic-AgriWare)



### Topics-

Outputs:

### Smart Good Agricultural Practices (S-GAP)



Smart Good Agricultural Practices





### Field Readiness Indicator System (FERIA)



- Topks:

  Malicup

  H-MI

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2015 Call

### **Enabling Precision Farming**

Precision Farming is a key element in sustainable intensification, i.e. increasing food production with smaller environmental footpriets. Although Precision Farming has been studied and developed for more than two decades, adoption of the technology in primary agriculters is still behind experications. From eart, therefore, needs for research, development and innovation concerning the adoption of Precision Farming in primary agriculture.

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| INCAN       | Benathanous Salms and Sarraping for Californias or<br>Approximated Whiches   | DECE OF CH   |
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## Precision Agriculture -Methodologies for Cost benefit analysis (PAMCoBA)



### Simultaneous Safety and Surveying for Collaborative Agricultural Vehicles (S3CAV)

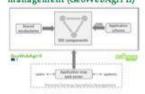


- Octputs:

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### Geospatial ICT infrastructure for precision farming operations management (GeoWebAgri II)



### **Smart AKIS Report**



### Putting sensors to work - Targeted application of nutrients and pesticides (Targ\_App)



### Variable Rate Operations for Orchards (VAROS)



- Outputs

  Paid application will be careful our in functions estable eros singuistic for Security and the Security and the Security and the Security and the security of the

### The DockWeeder robot enables organic dairy farming by controlling grassland weeds (DockWeeder)





### Mainstreaming Controlled Traffic Techniques and Optimization of Movements (CTF-OptiMove)



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Development of ground based and Remote Sensing, automated 'realtime' grass quality measurement techniques to enhance grassland management information platforms (GrassQ)







### Impact:

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### Topics

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### Outputs

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### **RIW2 Attendance Sheets**

Due to Confidentiality reasons, the list is not provided.

### **RIW2 Pictures**

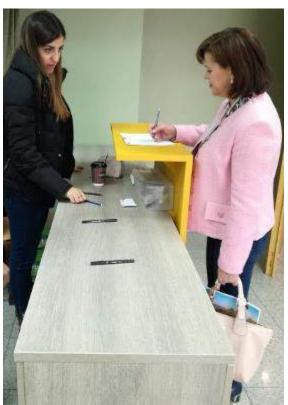


Figure 4 Registration desk





Figure 5 The venue







Figure 6 Presentation of selected new SFTs







Figure 5 and 6 The discussion continues





Figure 7 Light lunch provided



### **RIW2 Findings**

On top of the multi-actor collaborations that are to emerge from the RIWs, other outputs are expected as a result of bringing together stakeholders into the RIWs. One of the overall objectives of Smart-AKIS is to capture these outputs in order to produce recommendations for fostering the penetration of SFT in Europe.

This section of the "minutes" document provides a number of headlines, covering different aspects that could emerge in the discussion in the RIWs (both in plenary but also in the Work Groups). Hub partners are encouraged to pay careful attention to the discussions taking place in the RIWs in order to identify these "findings". As suggested in the Guidelines, the Work Groups can be tape recorded in order to better grasp the discussion taking place. These "findings" will be included on the "Smart AKIS Report" to be produced by each Hub partner after RIWs 1 and 2 and presented at the 1<sup>st</sup> Transnational Innovation Workshop.

### Findings regarding the needs and ideas identified in WP2

Are the users' needs identified in D2.2 confirmed by the RIW findings for your Hub? Can other needs regarding SFTs be identified from the discussions in the RIW? These can be technological needs, but also others, such as need for training, need for improved advisory, etc. Can these needs be addressed by setting up collaborations (for example, by a collaboration project) or are there to be addressed at the political level (for example, by setting up a subsidy for SFTs)? Do attendees have ideas regarding the use of SFT to your Hub?

Some of the project ideas discussed during the 2<sup>nd</sup> RIW are the following... Technological needs:

- A holistic approach to Variable Rate Irrigation (VRI)
- Variable Rate Fertilization with biological-based fertilizers
- Spraying of pesticides and herbicides with drones.
- Use of autonomous robotic weed control systems with laser.
- Satellite Remote Sensing in Irrigation
- Remote sensing and VRA with the use of GPS in orchards

Farmers need to be well educated and trained. Universities, research centers and advisory and extension services should take the responsibility to provide them with the necessary knowledge so that they will consider proceeding to the adoption of new technologies more easily.

The cost of the equipment used in Precision Agriculture is often higher that what the farmers can afford. Government intervention in agriculture is needed in the form of subsidizes or reduced loan rates.

Growers expressed the desire that companies work together, to adopt a holistic approach to analyze and evolve a solution to each problem.

### Identification of barriers and incentives for adoption of SFTs.

Are the barriers identified in D2.3 confirmed by the RIW findings for your Hub (i.e. farm size, cropping system, farmers' age and education/training, etc)? Can other barriers for SFT adoption be identified that are specific to your Hub?



The small farm sizes, is one of the most discussed barriers during the 2nd RIW, affecting the SFT adoption in Greece. The farm size belongs to the agro-ecological factors. The majority of the farms are small-scale farms composed of multiple plots. Therefore Precision Agriculture cannot be easily implemented. It is often considered that fragmentation coupled with small-size farms is a barrier to increasing yields. Small farms do not have the capacity to absorb costs and risks and those factors are not easily diffused over a greater productive base.

It is generally true, that farmers in Greece lack education and training. For example, the application of irrigation, fertilization and pesticide spraying is the most of the times done according to the individual's personal experience. They also lack access to the necessary equipment and organized extension services, mainly by the government and universities. Lack of formal education attainment, is expected to be negatively related to the adoption of SFT. One more socio-economic factor is farmers and agriculture related entrepreneurs' hesitation to progress and to adopt new technologies. They resist change, avoid taking risks, changing practices and trying new methods. It is challenging to "persuade" farmers to follow different practices, than the ones they are used to.

Economic barriers are the most frequently mentioned factors influencing the SFT adoption. These new technologies are usually expensive. The possibility of financing an investment is low. Greek farmers stated they consider an investment, if a positive return on investment is achieved within a time frame of 4 years. They usually face a long time lag between their investment in the SFT and the payback. Some younger farmers are also willing to take a greater risk, as they believe these new technologies will facilitate their agricultural practices and their lives in general. Since farmers' income is relatively low, subsidies in agricultural products are needed so that they will be able to buy SFT. During the workshop, an extended discussion took place about the use of software, which is licensed on a subscription. Farmers hesitate to use the subscription-based apps. They mentioned that they could use a "trial" of the software and then decide if they would like to proceed to the subscription. It is difficult to create methodologies and models to be applied to the Greek farming reality. There are no models capable of describing the current status of adopting new technologies in Greece. Some of the barriers identified are the spatial variability and lack of knowledge of the different needs, the need to predict results and undertake the responsibility to manage the data collected from the field. A methodology should be produced and the system should be trained using Artificial Intelligence.

## Relevance and interest on adoption and transfer of presented SFTs, ranking of the highest scored SFTs

Do attendees show a special interest towards specific SFTs? Are these SFTs in the market yet or are they being developed (TRL<9)? Have attendees provided feedback to SFT industry in the RIW for improving the SFTs or adjusting them to the specific regional conditions so as to bring them into practice?

### In the specific region of Greece (Central Greece) where the RIW took place,

In this workshop, attendees seemed to be more interested on map or sensor based Variable Rate Application (VRA) of fertilizers, pesticides and irrigation. The ideal scenario is to also use Satellite Remote Sensing and guidance systems to achieve the above. They mentioned the need of reducing agricultural labour.

Finally, farmers supported the notion that a complete system of SFT is needed and not separate innovations from different companies. Companies should collaborate to bring together their ideas and manufacture a complete product.



### Potential new uses for existing SFTs.

Have new uses been identified for the SFTs presented (i.e. SFT presented for arable crops that can be adapted for vineyard).

Drones can be used for crop protection purposes in order to increase crop production, additionally to monitoring crop growth. Drones will perform aerial pesticides, herbicides, and fungicides spraying.

### Potential inputs for research.

Are there specific needs that can be addressed through research (it can be basic research on i.e. development of a new remote sensing index, but also applied research on, i.e. application of a specific SFT to a new environment)? Have attendees (SFT industry, farmers) provided feedback to research results regarding specific SFT?

New ideas for research are the following: for Variable Rate Irrigation (VRI) a holistic approach is needed to analyse and evolve a solution to the irrigation problem, which ensures every step, from water drilling to application. Establishment of the right methodology and the standards according to which Variable Rate Fertilization with biological-based fertilizers can be performed and the optimum amount of bio-fertilizers will be applied to the field.

For performing aerial pesticides, herbicides, and fungicides spraying, with the use of drones, research should be done so that the drone will be balanced with the extra weight of the container it carries, and the potential wind forces. Use of autonomous robotic weed control systems with laser.



### RIW2 Project Ideas

### Project Idea in Variable Rate Irrigation (VRI)

| Category of project | Smart Farming Technology | Crop system |
|---------------------|--------------------------|-------------|
|                     |                          | Arable      |
| Innovation          | A holistic approach to   | Orchards    |
|                     | Variable Rate Irrigation | Vegetables  |
|                     | (VRI)                    | Vineyards   |
|                     |                          | Grasslands  |

### Promoter/s name/s

Savvas Paxatiroglou (Farmer)

MATRIX- Hara Koutalou, AGENSO- Zisis Tsiropulos (Industry)

University of Thessaly- Christos Karamoutis (Research)

### Short description of project

Irrigation in Greece is conducted based on farmers' experience. Currently, the irrigation systems in use apply water at uniform rates to entire fields. This results in applying more water than needed in many areas in the field and thus to inefficient utilization of water resource.

Site-specific management of water: tailor applications to match field variability to increase water use efficiency and crop production.

Optimize irrigation scheduling: VRI allows growers to apply varying rates (different duration and frequency) of irrigation water based on individual management zones within the field.

A holistic approach to analyse and evolve a solution to the irrigation problem, which ensures every step, from water drilling to application. A technology which proposes when, for how long and how much water should be applied on a specific field and crop variety. Shows to the grower direct indicators and alerts.

### **Expected benefits**

This project holds great promise on how to optimize water usage (reducing overwatering, underwatering, and run-off) and fertilizers applied to the field, through the customization of water application based on topographic data, soil maps and other information

It also helps to meet a crop's specific moisture needs, improving crop quality and yield. Reduce energy costs for fuel and electricity. Meet environmental regulations by controlling the irrigation process.

### Multi-actor collaboration needed

*Farmers* 

Agricultural cooperatives

Research and advisory services

Industry



### Project Idea in Variable Rate Fertilization (VRF)

| C    | Category of project | Smart Farming Technology    | Crop system |
|------|---------------------|-----------------------------|-------------|
|      |                     | Variable Rate Fertilization |             |
|      | Innovation          | with biological-based       | Tree        |
|      |                     | fertilizers                 | Vineyards   |
|      |                     | •                           |             |
| Drom | oter/s name/s       |                             |             |

### Promoter/s name/s

### (Please add info)

### Short description of project

Farmers in Greece are still mostly applying fertilizers empirically. Currently, soil management practices are primarily dependent on inorganic chemical-based fertilizers. These have a great environmental impact. There is a growing demand that soil fertilization relies on biological-based fertilizers to improve nutrient supply.

The goal of this project is to establish the right methodology and the standards according to which the optimum amount of bio-fertilizers will be applied at specific locations, different "management zones", for specific crops.

### **Expected benefits**

Precision fertilization of biological-based fertilizers with GPS can reduce energy requirements. Farmers can avoid overlapping or missing application areas. This method is also expected to reduce significantly the use of chemical fertilizers and pesticides and the nutrient availability in the soil can be fixed without an extended environmental impact. Finally, biological-based fertilizers are cost-effective when compared to chemical fertilizers.

### Multi-actor collaboration needed

Farmer Research Industry Advisory



### Project Idea in Precision Crop Protection

| Category of project | Smart Farming Technology | Crop system |
|---------------------|--------------------------|-------------|
|                     |                          | Arable      |
| Innovation          | Spraying Drone           | Tree        |
|                     |                          | Vegetables  |
|                     |                          | Vineyards   |
| Dramatar/s nama/s   |                          |             |

### Promoter/s name/s

Athanasios Gertsis (Research-Perrotis College/American Farm School)

### Short description of project

Farmers do not plan carefully their pest management practices, as they do not fully understand the impact of pesticides on human health and the environment. Additionally, sometimes in the mountainous areas of Greece, it gets challenging to use a tractor for pesticide control.

The main objective of this project is to be able to proceed to aerial pesticides, herbicides, and fungicides spraying, with the use of drones. The software created for the drone will allow to precisely map the route, regardless of the shape of the field, the existence of an incline and the type of crop. The drone is able to carry a container filled with up to 10 litters of liquid pesticide. This means it will perform ultra low volume (ULV) spraying (mL). The fact that the drone has extra weight added on it, its force has to be greater to be able to fly. The drone has to be balanced with this extra weight, and the potential wind forces should be encountered.

Trials should be performed in areas with difficult terrain that are not easily accessible with tractors, to evaluate the Spraying Drone's efficiency.

### **Expected benefits**

Spraying with drones provides real time observational technology. It can produce information related to crop protection and alerts about potential issues.

It is more effective than traditional spraying. The dosage of pesticide is reduced, so it minimizes the environmental pollution of pesticide and therefore promotes the production of healthier crops. The cost of water and pesticides is also reduced while the yields are improving. Finally, the technology allows the operator to stay away from chemical pollution.

### Multi-actor collaboration needed

Farmer

Research- Agricultural University of Athens, EL.GO "DIMITRA" Institute of Forest Research

Machinery

Industry- AGENSO

Advisory



### Project Idea in Precision Disease Epidemiology

| Category of project        | Smart Farming Technology    | Crop system |
|----------------------------|-----------------------------|-------------|
|                            |                             | Arable      |
| Innovation                 | Modelling and prediction in | Tree        |
|                            | infectious disease          | Vegetables  |
|                            | epidemiology                | Vineyards   |
|                            |                             |             |
| Promoter/s name/s          |                             |             |
| Georgios Galousis (Industr | y- Bayer)                   |             |

### Short description of project

The number of emerging infectious diseases on crops is increasing. It is important to gain a better understanding of them, as they cause loss of yield.

A predictive epidemiological model should be developed for the understanding of invasion processes that is essential to prevent and manage further spread. The models for infectious epidemics should simulate spatial and temporal patterns of disease spread on a specific time basis for application at wider agricultural areas. Data from the field, such as weather information (temperature, rainfall) should be incorporated when modelling.

The model should be able to record via satellite imaging, for example, the ways an infectious disease is spread on the field and then calculate and suggest the spraying amounts that need to be applied. Monitor how fungal spores affect fruits and vegetables and capture them with electronic traps.

### **Expected benefits**

The epidemiological model is an effective management tool to identify areas at high risk to disease spread. This way the production cost is reduced while the quality of the products is improved.

### Multi-actor collaboration needed

Farmer

Research- Agricultural University of Athens, EL.GO "DIMITRA" Institute of Forest Research Machinery

Industry- Bayer, TractorGPS

Advisory



### Project Idea in Remote Sensing for irrigation

| Category of project | Smart Farming Technology    | Crop system |
|---------------------|-----------------------------|-------------|
|                     |                             | Arable      |
| Innovation          | Satellite Remote Sensing in | Vegetables  |
|                     | Irrigation                  | Grasslands  |
| _ , , ,             |                             |             |

### Promoter/s name/s

Athanasios Markinos (Advisory: President of the Local Land Improvement Organizations) Theofanis Gemptos (Research: University of Thessaly)

### Short description of project

Fresh water, used for irrigation, withdraws within Greece. Appropriate planning and water resources management is needed but there is still insufficient knowledge of actual irrigation applications of different agricultural crops. One more challenge in Greece that needs to be addressed is the existence of many small and mid-sized scale farmers.

The main objectives of this project are to estimate the needs for irrigation water, check which farmers irrigate the most as well as control their irrigation practices through remote sensing. The control of irrigation practices will be done by the Local Land Improvement Organizations (LLIO). Irrigation scheduling and water usage reduction/ better water management are to be achieved through this project.

### **Expected benefits**

With this project an analytical mapping of the irrigated areas will be done which will result in better irrigation scheduling and the improvement of water use productivity. The diversification of crops will enhance crop monitoring.

Finally, an increased production will be achieved along with reduced production cost.

### Multi-actor collaboration needed

Research- Agricultural University of Athens to enact the irrigation rules

Advisory services - the Local Land Improvement Organizations

Industry to provide the satellite data needed.

Farmers



### Project Idea in Remote Sensing for VRA in orchards

| Category of project | Smart Farming Technology | Crop system |
|---------------------|--------------------------|-------------|
|                     |                          |             |
| Innovation          | Remote sensing and VRA   | Tree        |
|                     | with the use of GPS in   | Vineyards   |
|                     | orchards                 |             |
| Promoter/s name/s   |                          |             |

### rromoter/s name/s

Theofanis Gemptos (Research: University of Thessaly)

TractorGPS- Aris Zamidis (Industry)

### Short description of project

One of the challenges orchardists face is to actually scout entire orchards and manage them (e.g. tree data logger). In case farmers pick up any small infection points by fungal disease, they have to use fungicides. This can lead to multiple fungicide sprayings throughout the year. Similarly they act with irrigation. Over or under irrigation might occur.

The use of imaging cameras mounted on unmanned drone aircrafts can provide real-time information to growers. The information is related to crop health and water usage.

These aerial photos show orchardists how their trees look like. It serves as a way to identify problematic areas within fields and an initiation to take action, dictate irrigation, crop protection or fertilizing steps.

Data can be collected for targeted individual trees or a portion of the orchard. The estimation of the tree row canopy is possible so that the appropriate amount of crop protection products can be applied.

A GPS is needed for prescription maps and for performing variable rate spraying and fertilization.

### **Expected benefits**

Orchardists can make adjustments to the orchard maintenance plan according to the overview of the orchard. This innovation can provide the grower with visual information, which can ensure the optimum tree health and increased production.

### Multi-actor collaboration needed

Farmer Research *Industry* 

**Advisory** 



### **RIW2 Evaluation**

Information summing up the results from the Evaluation Form voluntarily filled in by attendees.

An Evaluation Form in English is proposed but partners are free to tailor it to their needs and to use a local language form.

| Interest      | Average score   | 4.6                              |  |  |  |  |
|---------------|---|----------------------------------|--|--|--|--|
|               | More interesting presentations  AGILE – Variable Rate Fertilization |                                  |  |  |  |  |
|               | All   |                                  |  |  |  |  |
|               | Average score   | 4.4                              |  |  |  |  |
| Organization  | Improvement areas   |                                  |  |  |  |  |
|               | improvement areas   | Improve Projection means,        |  |  |  |  |
|               | C   | pace for parallel working groups |  |  |  |  |
|               | 3   | pace for parallel working groups |  |  |  |  |
|               |   | 4.2                              |  |  |  |  |
|               | Average score   | 4.3                              |  |  |  |  |
|               |   |                                  |  |  |  |  |
| Methodology   | Improvement areas   |                                  |  |  |  |  |
|               | Enrich the agenda,  |                                  |  |  |  |  |
|               | emphasis to discussion not to presentations,                        |                                  |  |  |  |  |
|               | r   | nore time, more farmers needed   |  |  |  |  |
|               |   |                                  |  |  |  |  |
|               | Average score   | 4.5                              |  |  |  |  |
|               | Ğ   |                                  |  |  |  |  |
|               | Top Smart Farming Technologies                                      |                                  |  |  |  |  |
| Smart Farming | Top smart ranning recimologies                                      | Variable Rate Fertilization,     |  |  |  |  |
| Technologies  |   | Precision Irrigation,            |  |  |  |  |
| reciliologies |   |                                  |  |  |  |  |
|               |   | Precision crop protection        |  |  |  |  |
|               |   | Remote Sensing- Guidance         |  |  |  |  |
|               | Average rate of intended use of Smart AKIS                          |                                  |  |  |  |  |
|               | database  | 65%                              |  |  |  |  |
|               |   |                                  |  |  |  |  |
|               | Average score   | 4.1                              |  |  |  |  |
|               |   |                                  |  |  |  |  |
| Project Ideas | Top Project Ideas   | AGILE – Variable Rate            |  |  |  |  |
|               |   | Fertilization                    |  |  |  |  |
|               | Average rate in (% over all RIW attendees) of                       | . C. SIILEGUOT                   |  |  |  |  |
|               | attendees planning to take part on projects                         | 65%                              |  |  |  |  |
| Onon          | attendees planning to take part on projects                         | 05/0                             |  |  |  |  |
| Open          |   |                                  |  |  |  |  |
| suggestions   |   |                                  |  |  |  |  |



### 5.1.3. RIW3

### SMART AKIS 3<sup>rd</sup> REGIONAL INNOVATION WORKSHOP Greece Athens, 20<sup>th</sup> of February

### **RIW3 Programme**



## Agenda – 3<sup>rd</sup> Regional Innovation Workshop in Greece "Smart technologies in agriculture - funding opportunities"

Multiple Purposes Room, Agricultural University of Athens lera Odos 75, Athens, 118 55, Greece 20th of February, 2018

### Contact persons

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09:30 - 10:00 - Welcome and coffee

10:00 - 10:15 - Short presentation of Smart-AKIS

Dr. Spyros Fountas, Coordinator - Agricultural University of Athens (www.aua.gr)

10:15 - 10:30 - Smart Farming Platform

Dr. Thanos Balafoutis, IBO/CERTH (www.ibo.certh.gr)

10:30 - 12:00 - Presentation of funding opportunities

"Funding Opportunities through GSRT in agrofood sector"
 Dr. Thomas Bartzanas, Coordinator of the Greek Innovation Agrofood platform, IBO-CERTH (www.ibo.certh.gr)

"Rural Development Program"

Dr. Maria Tsara - Ministry of Rural Development & Food (www.ead.gr)

"Funding schemes of Athens Exchange Group"

Dr. Nikos Porfyris - Vice Chairman ATHEXGroup (www.helex.gr)

"NBG Business Seeds: enhancing innovative entrepreneurship in Greece"
 George Kametas – Business Banking & NBG Business Seeds Head, NBG Group (www.nbg.gr)

"Supporting Sustainable Agricultural Development"
 Xenophon Kappas – Director of Captain Vasilis & Carmen Konstantakapoulos Foundation (www.cvf.gr)

"HAMAC business ideas"

Yiannis Giannarakis - General Director of HAMAC (www.hamac.gr)

12:00 - 12:15 Coffee break

12:15 - 13:00 - Pitch of collaboration ideas

"Satellite Remote Sensing in Irrigation"

Prof. Theofanis Gemtos - University of Thessaly (www.agr.uth.gr)

"A holistic approach to Variable Rate Irrigation (VRI)"

Dr. Zisis Tsiropoulos - AGENSO (www.agenso.gr)

"Variable Rate Fertilization with biological-based fertilizers"

Dr. Panagiotis Ilias - Neuropublic (www.neuropublic.gr)

"Spraying Drone"

Giorgos Bourodimos - ELGO DIMITRA (www.elgo.gr)

 "Modelling and prediction for infectious disease epidemiology" Giorgos Galousis — Bayer (www.bayer.gr)

. "Remote sensing and VRA with the use of GPS in orchards"

Aris Zamidis - TractorGPS (www.tractorgps.gr)

12:45 – 13:30 - Networking/matchmaking: Open session for project coordinators/interested partners to discuss matching of project ideas with funding bodies.

13:30 - 14:00 - Wrap up & next steps: main conclusions and next steps until TIW2 in Serbia.

14:00 - 15:00 - Light lunch



### **RIW3 Power Point presentations**

### "Short presentation of Smart-AKIS"

Dr. Spyros Fountas, Coordinator – Agricultural University of Athens (www.aua.gr)







### ΓΝΩΣΗ:

- Φάνηκε ότι πθανές συμμαχίες με γεωργικούς συμβούλους θα ενισχύσουν την καλύτερη διείσδυση και υιοθέτηση της έξυπνης γεωργίας ως υπηρεσία που θα μπορούσε να καλύψει τις ανάγκες των αγροτών.
- Πα να επιτευχθεί περαιπέρω υιοθέτηση των χ μπορεί να απαιπηθεί καινοτομία από την άποψη της μείωσης του κόστους, το μέγεθος του εξοπλισμού, την συμβατότητα και την ευχρηστία.
- Υπάρχουν πολλές ενδείξεις ότι οι ΤΕΓ αυξάνουν το κέρδος και μειώνουν τον χρόνο εργασίας.
- Οι εμπορικές ΤΕΓ υιοθετούνται σε μεγαλύτερες εκμεταλλεύσεις, ενώ οι ερευνητικές ΤΕΓ χρησιμοποιούνται λόγω πειραματισμού σε μικρές εκμεταλλεύσεις.



# PEYNA 1: ΑΝΑΓΚΕΣ & ΕΝΔΙΑΦΕΡΟΝΤΑ ΓΕΟΡΓΩΝ ΠΑ ΊΗΝ ΕΞΥΠΝΗ ΓΕΟΡΠΑ 1. Σημαντικές προκλήσεις για τους γεωργούς που θα μπορούσαν να λυθούν με τη χρήση ΙΕΤ 2. Αντίληψη των γεωργών σχεπικά με τη δυνατότητα των ΤΕΓ να λύσουν τις προκλήσεις αυτές 3. Πηγές πληροφοριών για ΙΕΓ από τους γεωργούς

- <mark>Μέθοδος:</mark> 271 γεωργοί απάντησαν σε ερωτηματολόγιο 129 ερωτήσεων. Το 48% αυτών θεωρούνται χρήστες IET.

|           | Γαλλία | Γερμανία | Ελλάδα | Σερβία | Ισπανία | Ολλανδία | Ηνωμένο<br>Βασίλειο | Σύνολο |
|-----------|--------|----------|--------|--------|---------|----------|---------------------|--------|
| Αροτραίες | 21     | 25       | 10     | 16     | 8       | 26       | 16                  | 122    |
| Οπωρώνες  | 0      | 0        | 27     | 10     | 0       | 9        | 0                   | 46     |
| Λαχανικά  | 16     | 2        | 4      | 0      | 4       | 9        | 4                   | 39     |
| Αμπέλια   | 10     | 1        | 27     | 10     | 16      | 0        | 0                   | 64     |
| Σύνολο    | 47     | 28       | 68     | 36     | 28      | 44       | 20                  | 271    |



### (m) permet Arkins EPEYNA:

- Αντίληψη: μεγάλες αμφιβολίες για την ικανότητα των ΤΕΓ να λύσουν τα προβλήματα αυτά.
  - Πηνές πληροφορίας μεναλύτερης αξίας: ανεξάρτητοι ιδιώτες σύμβουλοι, άλλοι γεωργοί, και πάροχοι εμπορικών ΤΕΤ. Το 67% των γεωργών που ερωτήθηκαν, είχαν πρόσφατα αναζητήσει πληροφορίες για ΤΕΤ.

- Οι πο γρήσιμες ΤΕ:
  1) ρομπότ για μονότονες διαδικασίες μέσα στον αγρό (π.χ. βοτάνισμα, στάλισμα, συγκομιδή)
  2) διάγνωση σε άμεσο χρόνο μέσω drones, δορυφορικών εικόνων, ή αισθητήρων έξυπνων τηλεφώνων
  3) ενσωμάτωση συνδιασιεμένων ΤΕΙ
  4) δεδομένα για πληροφόρηση και λήψη αποφάσεων
- - Περιοχές βελτίωσης των ΤΕΙ: πληροφορίες (π.χ. μετατροπή των δεδομένων σε χρήσιμες πληροφορίες, μείωση πολυπλοκότητας στην παρουσίαση δεδομένων), κόστος και μέγεθος.



### ΚΑΙΝΟΤΟΜΙΑ: ΠΕΡΙΦΕΡΕΙΑΚΑ & ΔΙΑΣΥΝΟΡΙΑΚΑ

- Διοργάνωση Σημερίδων καινοτομίας με συμμετέχοντες φορείς από όλο το φάσμα του γεωργικού τομέα στην Ελλάδα, Γαλλία, Γερμανία, Ολλανδία, Σερβία και Ηνωμένο Βασίλειο. Το γενικό πλαίσιο διεξαγωγής έχει ορισθεί και οι περισσότερες ημερομηνίες έχουν ορισθεί.

- όχου: Επιμέρωση των εταιριών ΤΕ΄ για την τιραγματική κατάσταση από φορείς του γεωργικού κλάδου. Μεταφορά των στρατηγικών εμπορευματοποίησης από την αγορά στους ερευνητές. Δημιουργία κανοτόμων χρήσεων των ΤΕ΄. Ενθάρρυση ανάπτυξης τέων ΤΕ

### Αναμενόμενα αποτελέσματα: ΝΕΑ ΕΡΕΥΝΗΤΙΚΑ ΕΡΓΑ





### Αναμενόμενα αποτελέσματα:

| Περιγραφή  | Στόχος ανά<br>πόλο | Στόχος Έργου |
|--|--------------------|--------------|
| # συμμετεχόντων φορέων στις περιφερειακές ημερίδες         | 100                | 700          |
| # ΤΕΓ που θα παρουσιαστούν στις περιφερειακές ημερίδες     |                    | 50-70        |
| # ΤΕΓ υιοθετημένες από τους χρήστες                        | 5-20               | 50-70        |
| # ιδεών προερχόμενες από τους χρήστες                      | 20                 | 140          |
| # συνεργασιών για δημιουργία νέων έργων προς χρηματοδότηση | 5                  | 35           |
| # διασυνοριακών συνεργασιών                                | -                  | 10           |

### ΔΙΑΣΥΝΟΡΙΑΚΗ ΔΙΑΔΙΚΑΣΙΑ ΚΑΙΝΟΤΟΜΙΑΣ

- νγανωση ∠ οιασυνορίακων ημεριδων καινοτομίας: <u>Ημερίδα 1 στην Ισπανία. Νοέμβριος 2017</u>: αξιολόγηση ωριμότητας ΤΕΓ, αποτελέσματα από τις περιφερειακές ημερίδες και τάσεις για νέα ερευνητικό έρνα
- εργα

  <u>Ημερίδα 2 στη Σερβία, Μάρτιος 2018</u>: αξιολόγηση αποτελεσμάτων των περιφερειακών ημερίδων και υποστήριξη δημιουργίας διασυνοριακών συνεργασιών σε νέα έργα.





- IΣΤΌΤΟΠΟΣ: <u>www.smart-akis.com</u>
- FACEBOOK: @SmartFarmingNetwork





TWITTER: @smart akis



### "Smart Farming Platform"

Dr. Thanos Balafoutis – IBO/CERTH (www.ibo.certh.gr)

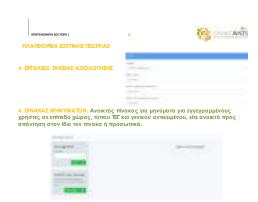


### **Smart AKIS** Πλατφόρμα Έξυπνης Γεωργίας















### "Funding Opportunities through GSRT in agrofood sector"

Dr. Thomas Bartzanas, Coordinator of the Greek Innovation Agrofood platform, IBO-CERTH

(www.ibo.certh.gr)















### Το όραμα

Το όραμά για τον αγροδιατροφικό τομέα με χρονικό ορόσημο το 2023 συνίσταται στη διαμόρφωση ενός σύγχρονου παραγωγικού κλάδου με έμφαση στην παραγωγή αγροτικών προϊόντων και τροφίμων, ικανού να συμβάλει στην οικονομική ευημερία και την ποιότητα ζωής των πολιτών, μέσω της παραγωγής διεθνώς ανταγωνιστικών, ποιοτικών και ασφαλών τροφίμων ελληνικής προέλευσης, με υψηλή προστιθέμενη και διατροφική αξία



Προτεραιότητες ανά περιοχή παρέμβασης

### Προτεραιότητες ανά περιοχή παρέμβασης

### Σύνδεση με τον Οδικό Χάρτη Ερευνητικών Υποδομών

Βιοποικιλότητα (χερσαίων και θαλάσσιων οικοσυστημάτων)

Φυτοπροστασία

- Την διετήρηση και αξιοποίηση του πλούτου της Ελληνικής βιοποιωλότητας και την ανακλυψή φυσικών τρρίοντων φαρμακευτικού, διατροφικού, καλλυντικού και προχημικού ενδιαφέρουτος με στόχε την ανάπτυξη προϊόντων υψηλής προστιθέμενης είδας. Την φυσιουχεία και φυσιοπροστασία μέσω της πρόλημής ειβάλης κε πιβλαβών οργανισμών εκραντίσης των φυτών και των αναδυύμενων οργανισμών (ΗΟ) μεκροοργανισμών, έντομα, ξίξανια, ποι συχετίζονται με γεωργικά και δασιασία οικοιουστήματα.
  Την βιδιούμη ειμετιδάλευση θαλάσοιων βιολογικών πόρων στην Α. Μεσόγειο και την πλήρη αξιοποίηση του θαλάσοιου πλούτου με πολλαπλά σφέλη τόσο για τον τομέα των υδαστοκλελιγρειών και την προστοκαί του θαλάσοιου αποθελάσοιου το πρεβάλλοντος αλλά και για τον τομέα των υδαστοκλελιγρειών και την προστοκαί του θαλάσοιου το πρεβάλλοντος αλλά και για τον τομέα των υδαστοκλελιγρειών και την προστοκαί του θαλάσοιου παριβάλλοντος αλλά και για τον τομέα των υδαστοκλελιγρειών και την προστοκαί του θαλάσοιου και καλλυντικών



### Συμβουλευτική ομάδα Αγροδιατροφής







Δράσεις που υλοποιούνται / προσεχείς δράσεις



Δράσεις που υλοποιούνται / προσεχείς δράσεις



Δράσεις που υλοποιούνται / προσεχείς δράσεις



Στρατηγικές Δράσεις Ερευνητικών Φορέων



Ερευνητικές Υποδομές Εθνικής Εμβέλειας

Ειδικές Δράσεις σε τομείς υψηλής προτεραιότητας

Δημόσια Δαπάνη : 24 εκατ. €







Υλοποίηση εμβληματικού χαρακτήρα έργων

- Μέσω συνεργασιών ερευνητικών φορέων και επιχειρήσεων
   Ενέργειες προβολής/διάχυσης των αποτελεσμάτων
   Δικτύωση σε εθνικό και διεθνές επίπεδο

- Καινοτομία για Μικρομεσαίες Επιχειρήσεις

# Κέντρα Ικανότητας (Competence Centers)



Τα Κέντρα αυτά συνίστανται σε δίκτυα εργαστηριακών υποδομών ερευνητικών φορέων και επιχειρήσεων τα οποία θα παρέχου εξεπλεκτυμένες υπηρεσίες Ερευνας, Τεχνολογικής Ανάπτυξης και Καινοτομίας (ΕΤΑΚ) υψθηλής προστιθέμωνης αξίας, σε επιχειρήσεις του ιδικινικού τομέα, υπηρεσίες του Δημοσίου, ΔΕΚΟ, Τοπική Αυτοδιοίκηση κ.α.

εποκτούν πρόσβαση σε ερευνητικές υποδομές και υπηρεσίες τις όποιες οι ίδιες δεν α αναπτύξουν ή/και να συντηρήσουν όπως πρόσβαση σε ερευνητικό εξοπλισμό, ηριακείς αναλύσεις και δοκιμές, αξιολόγηση τεχνολογιών, εκπαίδευση σε νέες πιμονικό προσωπικό υψηλής εξειδίκευσης, κ.α.

Δημόσια Δαπάνη: 50 εκ €



Καινοτομικές συνεργατικές συστάδες επιχειρήσεων στους τομείς της RIS3 (clusters καινοτομίας)

- 🛘 Δημιουργία και υποστήριξη καινοτομικών συστάδων επιχειρήσεων και ερευνητικών φορέων
- Ανάπτυξη και αξιοποίηση καινοτόμων προϊόν και υπηρεσιών υψηλής προστιθέμενης αξίας
- Ενίσχυση Φορέα Αρωγού για συγκρότηση της συστάδας Ανάπτυξη συνεργιών Ενίσχυση επιχειρήσεων για δράσεις έρευνας, καινοτομίας μέσου υψηλού TRL



Δημόσια Δαπάνη: 24 εκ €

# Seal of Excellence - για ΜΜΕ



🛘 Χρηματοδότηση προτάσεων Η Αρηματοσοτήση προτασεών που έλαβαν το «Seal of Excellence» στη δράση του Ορίζοντα 2020 SME Instrument

(αλλά δεν χρηματοδοτήθηκαν λόγω περιορισμένου προϋπολογισμού)

Δημόσια Δαπάνη: 50 εκ. €

# Χρήσιμες συνδέσεις / Πληροφορίες

www.gsrt.gr www.eyde-etak.gr www.espa.gr www.antagonistikotita.gr/epanek/ erevna.minedu.gov.gr/



# smart **AKÍS**

Ερευνητής, ΕΚΕΤΑ/ΙΒΟ

Συντονιστής Πλατφόρμας Αγροδιατροφής, ΓΓΕΤ

Tel: 6947-907412

Skype: thomas.bartzanas













# "Rural Development Program"

# Dr. Maria Tsara – Ministry of Rural Development & Food (www.ead.gr)



### ΥΠΟΜΕΤΡΟ 16.1-16.2 "ΙΔΡΥΣΗ ΚΑΙ ΛΕΙΤΟΥΡΓΙΑ ΕΠΙΧΕΙΡΗΣΙΑΚΩΝ ΟΜΑΔΩΝ ΤΗΣ ΕΣΚ ΓΙΑ ΤΗΝ ΠΑΡΑΓΩΓΙΚΟΤΗΤΑ ΚΑΙ ΒΙΩΣΙΜΟΤΗΤΑ ΤΗΣ ΓΕΩΡΓΙΑΣ"

 Με το υπ' αριθμ. 2353/27-09-2016 έγγραφο της ΕΥΔ ΠΑΑ έχει κατανεμηθεί το 40% του προϋπολογισμού (43 εκ. 6) του Υπομέτρου για προϊόντα περιφερειακής εμβέλειας ή συνεγισμές με φορές εντός πρ. ίδιας Περιφέρειας

### ΥΠΟΜΕΤΡΟ 16.1-16.5 "ΣΥΝΕΡΓΑΣΙΑ ΓΙΑ ΠΕΡΙΒΑΛΛΟΝΤΙΚΑ ΕΡΓΑ, ΠΕΡΙΒΑΛΛΟΝΤΙΚΕΣ ΠΡΑΚΤΙΚΕΣ ΚΑΙ ΔΡΑΣΕΙΣ ΓΙΑ ΚΛΙΜΑΤΙΚΗ ΑΛΛΑΓΗ"

 Το Υπομέτρο με προϋπολογισμό 17 εκ. ε εφαρμόζεται και υλοποιείται 100% από την ΕΥΕ ΠΑΑ – Μονάδα Συνεργασίας και Καινοτομίας

### ΔΙΚΑΙΟΥΧΟΙ

- Σχήματα συνεργασίας φορέων (Ε.Ο.) που διαθέτουν σύμφωνο συνεργασίας και τουτερικό κανοικομό Αυτουργίας όπου θα προσδούρζεται ο επικφαλής εταίρεος (Συντοινιστής Φορέας του έργου, αναλαμβένε τη ρύθμαση των διαδικασιών υλοποίησης του έργου και την επικοινωνία μεταξύ της ΔΑ και των μελών της
- Οι Ε.Ο. απαρτίζονται από τουλάχιστον δύο μέλη, από τα οποία τουλάχιστον το ένα δραστηριοποιείται στους
- Λοιπά μέλη: ερευνητικοί φορείς, επιχειρήσεις / επιχειρήσεις που δραστηριοποιούνται στον τομέα τι τροφίμων (εντός του παραρτήματος Ι της Συνθήκης) σύμβουλοι επιχειρήσεων, ΜΚΟ
- Διαμεσολαβητής Καινοτομίας (Innovation Broker)



ΔΟΜΗ ΥΠΟΜΕΤΡΩΝ 16.1-16.2, 16.1-16.5

Δράση 1: Ίδρυση Ε.Ο. της ΕΣΚ για την παραγωγικότητα και τη βιωσιμότητα της γεωργίας

Δράση 2: Υλοποίηση επιχειρησιακού σχεδίου

ΔΟΜΗ ΥΠΟΜΕΤΡΩΝ 16.1-16.2, 16.1-16.5

### Δράση 1: Ίδρυση Ε.Ο. της ΕΣΚ για την παραγωγικότητα και της βιωσιμότητα της γεωργίας

- Παραγωγός / κτηνοτρόφος έχει την ιδέα ή γνωρίζει το πρόβλημα / ανάγκη
- Ερευνητικός φορέας ή επιχείρηση έχει τη λύση στο πρόβλημα ή γνωρίζει πώς να αξιοποιήσει τι ιδέα (ως αποτέλεσμα βασικής έρευνας)
- 3. Συστήνουν τη <mark>δυνητική</mark> Ε.Ο.
- καταρτικουν εχεοίο αρασης στο οποίο περγγραφονται το αντικειμένο και οι στοχοί του εργού, καινοτόμες τεχνολογίες, διαδικασίες, καινοτόμα προϊόντα που θα προκύψουν
   ΚΑΙΝΟΤΟΜΟ, ΠΙΛΟΤΙΚΟ, ΑΝΤΑΓΩΝΙΕΤΙΚΟΤΗΤΑ ΚΑΙ ΒΙΩΣΙΜΟΤΗΤΑ ΤΗΣ ΓΕΩΡΓΙΑΣ Η ΠΡΟΣΤΑΣΙΑΤΟΥ ΠΕΡΙΒΑΛΛΟΝΤΟΣ
- Ενέργειες για την εξεύρεση και άλλων εταίρων / μελών

 $\Delta OMH \, Y \Pi OMET P \, \Omega N \, \, 16.2-16.2, \, 16.2-16.5$   $\Delta p d on \, \gamma = 15 p u on \, E.O. \, της \, EZK \, για \, την \, παραγωγικότητα \, και \, της \, βωσιμότητα \, της \, γεωργίας <math display="block">\gamma \epsilon \omega p \gamma \delta \alpha = 15 p u on \, \gamma \delta \alpha + 10 p u on \, \gamma \delta \alpha$ 





# ΔΟΜΗ ΥΠΟΜΕΤΡΩΝ 16.1-16.2, 16.1-16.5

### Δράση 2: Υλοποίηση επιχειρησιακού σχεδίου των Ε.Ο.

- 1150 6----
- 2. Καταρτίζει επιχειρησιακό σχέδιο για την υλοποίηση του έργου με τα εξής χαρακτηριστικά
- Περιγραφή του προτεινόμενου έργου, του πλάνου εργασίας διαιρεμένου σε ενότητες ερ
- Περιγραφή των μελών που απαρτίζουν την Ε.Ο. με αναφορά στις γνώσεις, τα προσόν: τον ρόλο που θα αναλάβει το κάθε μέλος στην πιλοτική εφαρμογή του έργου
- · Περιγραφή των αναμενόμενων αποτελεσμάτων από την πιλοτική εφαρμογή του έργου
- Περιγραφή των δραστηριοτήτων προβολής και διάδοσης των αποτελεσμάτων με μία τουλάχιστον δράση διάδοσης μέσω του ΕΑΔ και του δικτύου ΕΣΚ
- Tunorraya monunada roc manana nuyée embaluane ara mbalana ron Mérana.



# ΟΙΚΟΝΟΜΙΚΗ ΣΤΗΡΙΞΗ

Αφορά στο 200% των επιλέξεμων δαπανών, εκτός από την περίπτωση των δαπανών της Δρώσης 2 που σχετίζονται με παραγωγική επινόύσση του Μέτρου 4 (Υπομέτρα 4,1 και 4,2) όπου προσαυξάνεται κατά 20 ποσοσπαίες μονάδες, υπό τον όρο ότι η ανώτατη στήρεξη δεν υπερβαίνει το φύθ







# ΠΑΡΑΔΕΙΓΜΑΤΑ ΣΥΝΕΡΓΑΣΙΩΝ ΕΠΙΧΕΙΡΗΣΙΑΚΩΝ ΟΜΑΔΩΝ



# ΠΑΡΑΔΕΙΓΜΑΤΑ ΣΥΝΕΡΓΑΣΙΩΝ ΕΠΙΧΕΙΡΗΣΙΑΚΩΝ ΟΜΑΔΩΝ



# ΠΑΡΑΔΕΙΓΜΑΤΑ ΣΥΝΕΡΓΑΣΙΩΝ ΕΠΙΧΕΙΡΗΣΙΑΚΩΝ ΟΜΑΔΩΝ







# "Funding schemes of Athens Exchange Group"

Dr. Nikos Porfyris – Vice Chairman ATHEXGroup (www.helex.gr)



Πρόγραμμα – 3η Ημερίδα Καινοτομίας στην Ελλάδα «Έξυπνες Τεχνολογίες στη Γεωργία – Δυνατότητες Χρηματοδότησης

# Εργαλεία χρηματοδότησης

που προσφέρει το Χρηματιστήριο Αθηνών



Τρίτη 20 Φεβρουαρίου 2018

# Ο Όμιλος του Χρηματιστηρίου Αθηνών



### Από πού χρηματοδοτούνται ιστορικά οι εταιρίες στην ΕΕ



# Η ελληνική αγορά άντλησης κεφαλαίων

- $\checkmark$  Τόσο η Ευρώπη όσο και η Ελλάδα, βρίσκονται σε φάση **τραπεζικής απομόχλευσης**. Αυτό **περιορίζει** τον Τραπεζικό Δανεισμό.
- Τα ημεδαπά ιδιωτικά κεφάλαια (private equity) και τα venture capital funds, που είναι από τους ελάχιστους που μπορούν να επενδύουν σε μη εισηγμένες εταιρίες, έχουν εξαιρετικά περιορισμένους πόρους.
- Οι **business angels** είναι ακόμα σε **νηπιακό στάδιο** από πλευράς μεγέθους/ωριμότητας Δεν υπάρχουν ξεκάθαρα exit strategies
- Οι ιδιώτες επενδυτές έχουν περιοριστεί λόγω μείωσης εισοδημάτων και αποταμιεύσεων.
- Ο ασφαλιστικός 2ος και 3ος πυλώνας είναι ακόμα σε ιδιαίτερα πρώιμο στάδιο. Οι Θεσμικοί επενδυτές στην Ελλάδα επενδύουν κυρίως σε εισηγμένες εταιρίες και οι πόροι τους (μερίδια) έχουν μειωθεί δραστικά λόγω της κρίσης.
- Οι Ξ**ένοι Θεσμικοί επενδυτές** διαθέτουν σημαντική ρευστότητα και διάθεση να επενδύσουν στην Ελλάδα, κυρίως σε **μεγάλες εισηγμένες** εταφίες.

# Το Χρηματιστήριο Αθηνών αποτελεί ένα σημαντικό πυλώνα χρηματοδότησης των ΜμΕ

- ΜμΕ από όλες τις κατηγορίες είναι εισηγμένες στο Χ.Α., τόσο στην **Οργανωμένη Αγορά** (43%) όσο και στην **Εναλλακτική Αγορά** (92%) Με τις **μεσαίες Μμ**Ε να έχουν το υψηλότερο ποσοστό

|              | Οργανωμένη Αγορά<br>(Main Market) |     | Εναλλακτική Αγορά<br>(Alternative Market) |     | SME Sub-Totals |      |
|--------------|-----------------------------------|-----|---|-----|----------------|------|
| Micro        | 5                                 | 3%  | 1   | 8%  | 6              | 6%   |
| Small        | 17                                | 9%  | 3   | 25% | 20             | 21%  |
| Medium-sized | 63                                | 32% | 7   | 58% | 70             | 73%  |
| SMEs         | <b>85</b>                         | 43% | (11)                                      | 92% | 96             | 100% |
| Large        | 112                               | 57% | 1   | 8%  |                |      |
| ΣΥΝΟΛΟ       | 197                               |     | 12  |     |                |      |

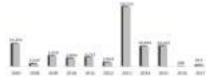
... Η χρήση των αγορών του Χρηματιστηρίου Αθηνών είναι ιδιαίτερα σημαντική διέξοδος χρηματοδότησής των ελληνικών ΜμΕ και διεθνοποίησής τους
... καθώς τόσο η Ευρώπη όσο και η Ελλάδα βρίσκονται σε φάση τραπεζικής απομόχλευσης για λόγους μείωσης συστημικού κνώδυνου. Με βαση στουχεία της ΕΚΤ η Ευρώπη έχει λόγο 3.5 Ενεργητικό τραπεζών/ΑΕΠ έναντι 1 για ΗΠΑ και 2 για Καναδά και Αυστραλία.

# Το Χρηματιστήριο Αθηνών έχει αναδειχθεί σε βασικό μηχανισμό άντλησης κεφαλαίων από το εξωτερικό

Πρωτογενώς, με ιδιαίτερα υψηλή συμμετοχή ξένων επενδυτών

Οι ξένοι επενδυτές : ✓ Έχουν επενδύσει άνω των 52 δις € από το 2012 - από τα μεγαλύτερα στην Ευρώπη

Ποωτονενώς Αντληθέντα Κεφάλαια στο Χ.Α. (σε εκ. €)





# Το Χρηματιστήριο Αθηνών έχει αναδειχθεί σε βασικό μηχανισμό άντλησης κεφαλαίων από το εξωτερικό

...αλλά και <mark>δευτερογενώς, με ιδιαίτερα σημαντικό ποσοστό ξένων επενδυτών</mark> κατά τα τελευταία 8 έτη σταθερά πάνω από 50%
σήμερα, 62,3% της κεφαλαιοποίησης των ελληνικών μετοχών Links 

# Το ΧΑ προσφορά λύσεις χρηματοδότησης

«ώριμα» στάδια



# Οι Αγορές του Χρηματιστηρίου Αθηνών

- Οι χρηματιστηριακές αγορές στο χώρο της Ευρωπαϊκής Ένωσης διακρίνονται σε

  Σε «Οργανωμένες Αγορές» και

  Σε «Πολυμερείς Μηχανισμούς Διαπραγμάτευσης»

- Η Οργανωμένη Αγορά του Χρηματιστηρίου Αθηνών εποπτεύεται από την Επιτροπή Κεφαλαιαγοράς Απευθύνεται κομίος σε Μήμ Ειφ προοπτικές περαπέρω ανάπτυξη Ταρέχει τη δυνατότητα διασυνορισκής άντλησης κεφαλαίων και (σηματιστηριακούς δείκτες.

# Με ποιο τρόπο το Χρηματιστήριο Αθηνών στηρίζει την επιχειρηματικότητα

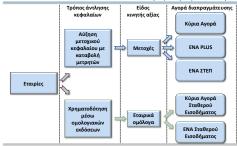
Οι αγορές του Χρηματιστηρίου Αθηνών παρέχουν τη δυνατότητα άντλησης κεφαλαίων

- Σε **ευρύ** φάσμα εταιριών, ανάλογα με τα μεγέθη τους και το στάδιο επιχειρηματικής τους ανάπτιξης.
- νάπτυξης
  Τομικε εταιρίες μεγάλου / μεσαίου μεγέθους
  Αναπτυσούμενες εταιρίες
  Εταιρίες σε αρχικό στάδιο επιχειρηματικής δραστηριότητας
  Το δραστηριότητας
- Με **επιλογή** του χρηματοδοτικού **εργαλείου**

- Με **επιλογή** του **τρόπου άντλησης** κεφαλαίων
- Δημόσια Προσφορά (προσφορά το ευρό επενόπικό κοινό)
   Ιδιωτική Τοποθέτηση (προσφορά μόνο σε επαγγελματίες επενδυτές ή και σε λιγότερα από 150 φυσικά η νομικά πρόσωπα τα οποία δεν είναι επαγγελματίες επενδυτές)
   Συνδυασμό αυτών
- Με **συγκεκριμένη** διαδικασία, δικαιολογητικά & χρονοδιάγραμμα

# Λύσεις & Χρηματοοικονομικά Εργαλεία

Με βάση τις ανάγκες κάθε Εταιρίας



# Τι χαρακτηριστικά πρέπει να διαθέτει η υποψήφια Εκδότρια Εταιρία

- Σαφή επιχειρηματική ταυτότητα και αντικείμενο εργασιών
- **Συγκεκριμένο** επενδυτικό πλάνο
- Αποτελεσματική Ομάδα Διοίκησης Καλή Εταιρική Διακυβέρνηση
- Δυνατότητες υγιούς ανάπτυξης και επέκτασης Εσωτερική **Οργάνωση**
- Ουσιαστική βούληση για την υιοθέτηση κανόνων διαφάνειας
- Παροχή ικανού free float ώστε να υπάρχει επαρκής ρευστότητα
- Διάθεση ανυεργασίας με τους επαγγελματίες συνεργάτες που θα την κατευθύνουν στη διαδικασία εισαγωγής

ιαγωγή στο Χρηματιστήριο αποτελεί για κάθε ετ Στρατηγική Επιλογή & Σημαντικό Ορόσημο για την επιχειρηματική της πορεία



### Τα οφέλη από την εισαγωγή στο ΧΑ είναι πολλαπλά... . εφόσον θελήσει να τα εκμεταλλευτεί και η εταιρία

- Εναλλακτική μέθοδος χρηματοδότησης η οποία μπορεί να λειτουργήσει συνδυαστικά με άλλες πηγές χρηματοδότησης.
- Exit strategy για αρχικούς επενδυτές
- $\succ$  Πρόσβαση των επενδυτών στη **δευτερογενή** αγορά κεφαλαίου.
- Προώθηση της αναγνωρισιμότητας και της φήμης, η οποία διευκολύνει:
- ✓ στην επίτευξη επιχειρηματικών συμπράξεων, συμφωνιών και στρατηγικών συνεργασιών,
   ✓ στην εσωτερική οργανωτική πειθαρχία,
   ✓ στις αχέσεις με τους προμηθευτές και τους πελάτες,

- ✓ στην προσέλκυση αξιόλογων στελεχών.
- Βελτίωση της εταιρικής διακυβέρνησης, μέσω της υιοθέτησης σύγχρονων διοικητικών δομών και αρχών διαφάνειας.
- Ρευστότητα και διαμόρφωση αποτίμησης.
- Ρευότυση εξωστρόφειας μέσω συμμετοχής σε χρηματιστηριακούς δείκτες (δείκτες FTSE/XA), roadshows (Λονδίνο / Ν. Υόρκη) και επαφής με χρηματιστηριακούς αναλυτές και επαγγελματίες επενδυτές.

# Συγκριτικός πίνακας

κριτηρίων εισαγωγής μετοχών (1/2)

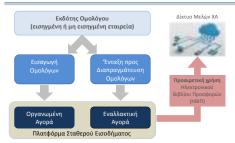
| Κριτήριο  |  | КҮРІА АГОРА   | ENA PLUS  | ΕΝΑ ΣΤΕΠ  |  |
|---|--|---|---|---|--|
| Νομική μορφή εταιρείας                                      |  | Α.Ε. κ.ν.2190/1920<br>(ή αντίστοιχη μορφή<br>της αλλοδαπής) | Α.Ε. κ.ν.2190/1920<br>(ή αντίστοιχη μορφή<br>της αλλοδαπής) | Α.Ε. κ.ν.2190/1920<br>(ή αντίστοιχη μορφή<br>της αλλοδαπής) |  |
| Ιστορικό<br>Δραστηριότητας<br>/ Δημοσιευμένες               | Νεοϊδρυθείσες εταιρείες<br>(χωρίς εταιρικές χρήσεις ή<br>με <2 χρήσεις)<br>Εταιρείες με 2 εταιρικές<br>χρήσεις | Επιτρέπεται η εισαγωγή<br>κατόπιν έγκρισης από<br>ΕΚ        |   | Επιτρέπεται η ένταξη  |  |
| Οικονομικές<br>Καταστάσεις                                  | Francisc us 34 stanovér  | Επιτρέπεται η εισαγωγή                                      | Επιτρέπεται η ένταξη  |   |  |
| Ελάχιστο ύψος Ιδίων Κεφαλαίων                               |  | 3.000.000 €<br>(κατά την υποβολή της<br>αίτησης εισαγωγής)  | 1.000.000 €<br>(μετά την άντληση των<br>νέων κεφαλαίων)     | Δεν υφίσταται<br>περιορισμός                                |  |
| Υιοθέτηση & συμμόρφωση με κώδικα<br>εταιρικής διακυβέρνησης |  | Υποχρεωτική   | Επιθυμητή   | Επιθυμητή   |  |

# Συγκριτικός πίνακας

# κριτηρίων εισαγωγής μετοχών (2/2)

| Κριτήριο  |                      | КҮРІА АГОРА   | ENA PLUS   | ΕΝΑ ΣΤΕΠ                     |  |
|---|----------------------|---|--|------------------------------|--|
| Κερδοφορία  |                      | ΚΠΦ 3ετίας 2 εκ. € ή<br>ΕΒΙΤΟΑ 3ετίας 3 εκ. €<br>κερδοφορία για<br>τελευταίες 2 χρήσεις | Δεν υφίσταται<br>περιορισμός                     | Δεν υφίσταται<br>περιορισμός |  |
| Δυνατότητα ένταξης εταιρειών<br>με ζημιογόνες χρήσεις |                      |   | Εφόσον<br>συσσωρευμένες<br>ζημιές < 50% των Ι.Κ. | Επιτρέπεται η ένταξη         |  |
| Λογισ   | Λογιστικά Πρότυπα    |   | ΔΛΠ / ΔΠΧΑ                                       | ΔΛΠ / ΔΠΧΑ                   |  |
| Διασπορά μετοχών                                      | ελάχιστο %           | 25%<br>(15% για μεγάλες<br>εκδόσεις)  | 10%<br>(15% σε 6 μήνες)                          | . τουλάχιστον 50<br>πρόσωπα  |  |
|   | αριθμός προσώπων <5% | τουλάχιστον 300<br>(εξαίρεση σε<br>περίπτωση ιδιωτικής<br>τοποθέτησης)                  | τουλάχιστον 50<br>πρόσωπα                        |                              |  |

# Η Πλατφόρμα Εταιρικών Ομολόγων



# Το Ηλεκτρονικό Βιβλίο Προσφορών (ΗΒΙΠ)

- Για την έκδοση των ομολογιών και τη διάθεση τους στο επενδυτικό κοινό, οι εκδότριες εταιρείες μπορούν να κάνουν χρήση της ηλεκτρονικής εφαρμογής ΗΒΙΠ (Ηλεκτρονικό Βιβλίο Προσφορών) που έχει αναπτύξει και προσφέρει το Χρηματιστήριο Αθηνών.
- Το ΗΒΙΠ είναι μια ασφαλής ηλεκτρονική εφαρμογή συγκέντρωσης δηλώσεων συμμετοχής των ενδιαφερόμενων επενδυτών για αγορά των κινητών αξιών που διαθέτει μια εκδότρια εταιρεία και αυτόματης κατανομής των κινητών αξιών αυτών στις μερίδες των επενδυτών.
- Το Ηλεκτρονικό Βιβλίο Προσφορών λειτουργεί μέσω των τερματικών των Μελών του Χρηματιστηρίου Αθηνών (Τράπεζες & ΑΕΠΕΥ). Στο ΗΒΙΠ έχουν πρόσβαση όλα τα Μέλη του Χρηματιστηρίου και διαμέσου αυτών οι πελάτες τους.

Τα νέα ομόλογα του Χρηματιστηρίου Αθηνών





# Τα νέα ομόλογα του Χρηματιστηρίου Αθηνών





# Εισηγμένα Επενδυτικά Κεφάλαια στο Χρηματιστήριο Αθηνών

| Ειδος Fund                          | Περιγραφη   |  |  |
|-------------------------------------|---|--|--|
| Ανώνυμες Εταιρείες Επενδύσεων σε    | Funds που επενδύουν <b>αποκλειστικά σε ακίνητη περιουσία</b> , καθώς και δικαιώματα, μετοχές <i>έ</i> |  |  |
| Ακίνητη Περιουσία (ΑΕΕΑΠ)           | μερίδια σε ακίνητη περιουσία. Εισάγονται υποχρεωτικά στην Κύρια Αγορά.                                |  |  |
| Εισηγμένες σήμερα                   | Λειτουργούν σε πλεονεκτικό φορολογικό καθεστώς.   |  |  |
| Εισηγμένες                          | Έγιναν τροποποιήσεις στη Νομοθεσία προκειμένου να γίνουν ακόμα πιο ανταγωνιστικά σ                    |  |  |
|                                     | σχέση με τα αντίστοιχα της Ε.Ε.   |  |  |
| Ανώνυμες Εταιρείες Επενδύσεων       | Funds για επένδυση κυρίως σε εισηγμένες εταιρείες, αλλά και σε μη εισηγμένες.                         |  |  |
| Χαρτοφυλακίου (ΑΕΕΧ)                | Εισάγονται υποχρεωτικά στην Κύρια Αγορά.  |  |  |
| Εισηγμένες σήμερα                   | Λειτουργούν σε πλεονεκτικό φορολογικό καθεστώς.   |  |  |
| Εισηγμένος                          | Έγιναν τροποποιήσεις στη Νομοθεσία προκειμένου να αυξηθεί η δυνατότητά τους νι                        |  |  |
|                                     | επενδύουν σε μη εισηγμένες εταιρίες.  |  |  |
| Εταιρείες Κεφαλαίου Επιχειρηματικών | Funds για επένδυση κυρίως σε μη εισηγμένες εταιρείες , αλλά και σε εισηγμένες.                        |  |  |
| Συμμετοχών (ΕΚΕΣ)                   | Υποχρεωτική εισαγωγή στο ΧΑ με δικαίωμα επιλογής Αγοράς (Κύρια ή ΕΝΑ)                                 |  |  |
| Only                                | Λειτουργούν σε πλεονεκτικό φορολογικό καθεστώς.   |  |  |
| Αναμένεται να εισαχθούν             | Έγιναν τροποποιήσεις στη Νομοθεσία προκειμένου να εισάγονται στο Χ.Α., να επενδύου                    |  |  |
| Avuper-                             | και σε εισηγμένες εταιρείες και να αποκτήσουν ευρύ φάσμα επενδυτικών εργαλείων                        |  |  |
| Αμοιβαία Κεφάλαια Επιχειρηματικών   | Ομάδες περιουσίας, χωρίς νομική προσωπικότητα, υπό την διαχείριση επαγγελματιώ                        |  |  |
| Συμμετοχών (ΑΚΕΣ)                   | διαχειριστών Α/Κ για επένδυση κυρίως σε μη εισηγμένες εταιρίες, αλλά και σε εισηγμένε                 |  |  |
|                                     | Επιτρέπεται να εισαχθούν στο ΧΑ (Κύρια ή ΕΝΑ).  |  |  |
|                                     | Είναι φορολογικά διαφανή και οι επενδυτές φορολογούνται για τα εισοδήματά του                         |  |  |
| Αναμένεται να εισαχθούν             | σύμφωνα με την εκάστοτε φορολογική κλίμακα.   |  |  |
| Αναμένεται                          | Έγιναν τροποποιήσεις στη Νομοθεσία προκειμένου να μπορούν να εισαχθούν στο Χ.Α.                       |  |  |
|                                     |   |  |  |

# Ευχαριστώ πολύ!

Νίκος Πορφύρης Αναπληρωτής Επιτελικός Διευθυντής Λειτουργιών

E- Mail : N.Porfyris@athexgroup.gr

www.athexgroup.gr



# "Supporting Sustainable Agricultural Development"

Xenophon Kappas — Director of Captain Vasilis & Carmen Konstantakopoulos
Foundation
(www.cvf.gr)































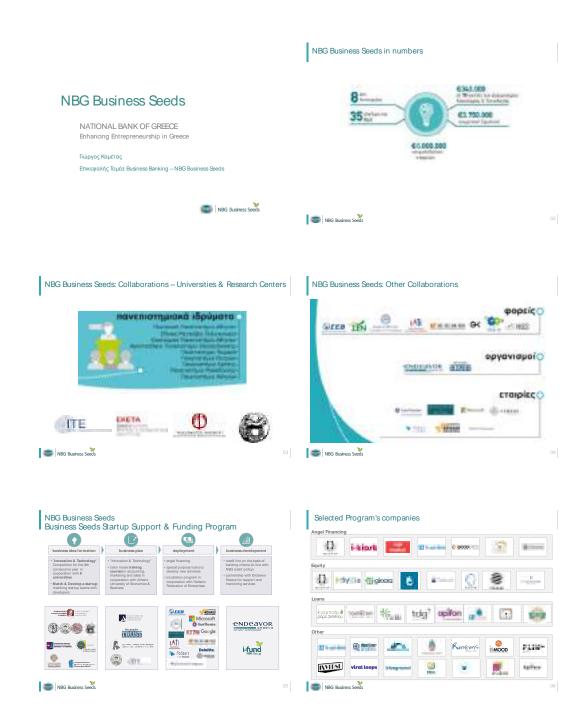






# "NBG Business Seeds: enhancing innovative entrepreneurship in Greece"

George Kametas – Business Banking & NBG Business Seeds Head, NBG Group (www.nbg.gr)









# Match & Develop a startup





NBG Business Seeds

NBG Business Seeds

act4Greece is the leading crowdfunding effort in Greece producing remarkable engagement and results



over €1.8mn has been collected through ~5.600 donations for 16 actions

NBG Business Seeds

# Crowdfunding for debt and equity



- new and innovative entrepreneurship

  support for innovative entrepreneurship through crowdfunding

  NBC mediation in the crowdfunding process

  development of additional pioneering tools

### Law 4416/2016

- Submission of proposal through the relevant online platform
- €500,000 per company/year
- Participation by individual crowdfunding investors with up to €5,000 (up to 10% of their income over the past 3 years, up to €30,000 p.a. per online platform)

### company eligibility features

- significant presence in Greece with export-oriented activities
- track record of innovation and investments in R&D
- steadily growing income flow

09 NBG Business Seeds

# NBG i-bank | Fintech Crowdhachathons



http://befinnovative.com/



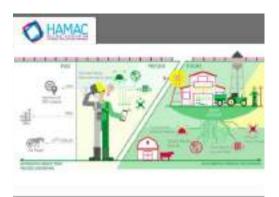
NBG Business Seeds



# "HAMAC business ideas" Yiannis Giannarakis – General Director of HAMAC (<u>www.hamac.gr</u>)

































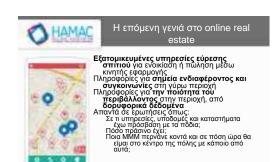


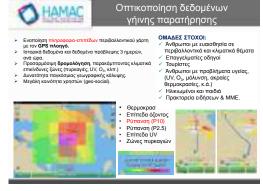




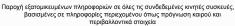






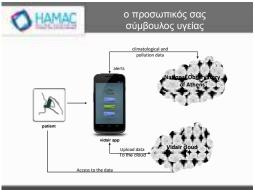




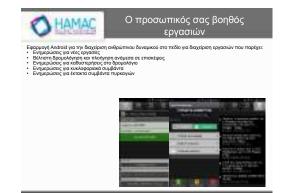


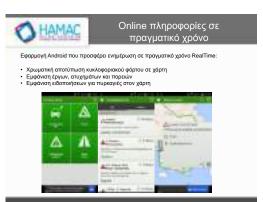






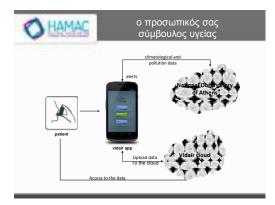
















# "Satellite Remote Sensing in Irrigation"

Prof. Theofanis Gemtos - University of Thessaly (www.agr.uth.gr)







Σύστημα καλλιέργειας

Καθ. Θ. Γέμτος – Πανεπιστήμιο Θεσσαλίας (Έρευνα, Α. Μαρκινός – Τοπικοί Οργανισμοί Εγγείων Βελτιώ

Δορυφορική τηλεπισκόπηση για άρδευση

# Επάρκεια αρδευτικού νερού

- Το μεγαλύτερο μέρος της χώρας αντιμετωπίζει πρόβλημα επάρκειας νερού.
- Το πρόβλημα είναι μικρό στη Δυτική Ελλάδα, μεγαλύτερο στην Ανατολική και ιδιαίτερα έντονο στις νησιωτικές περιοχές
- Η άρδευση συνδέεται άμεσα με τη κατανάλωση ενέργειας ιδιαίτερα σε περιοχές που αρδεύονται από υπόγειους υδροφορείς.
- Σε πολλές περιοχές της χώρας αυξάνει το βάθος άντλησης συνεχώς ενώ γεωτρήσεις στερεύουν ή θαλασσινό νερό εισρέει στους υδροφορείς.
- Το πρόβλημα αναμένεται να αυξηθεί καθώς με τη κλιματική αλλαγή πιθανώς να έχουμε μείωση των βροχοπτώσεων, αύξηση των ακραίων φαινομένων και των ημερών καύσωνα.
- Επομένως μέθοδοι βέλτιστης διαχείρισης είναι απαραίτητοι



Carriada

# Ιδέα, Κατάσταση σήμερα, Λύση

Εξοικονόμηση αρδευτικού νερού μέσω εκτίμησης των πραγματικών αναγκών για άρδευση και βελτίωσης των πρακτικών άρδευσης των γεωργών μέσω δορυφορικής

- Κατάσταση Σήμερα

  > Περιασότερο από 80% του νερού που καταναλίσεται στην Ελλάδα χρησυμοποιείται για άρδευση

  > Σε πολλές περιοχές υπάρχει Ελλειψη νερού ενώ σε περιοχές που αρδεύονται με υπόγεια ύδατα
  με γεωτήρισες αρχίζουν να τελειώνουν τα αποθέματα, έχουμε είσοδο θαλασοινού νερού και
  συνεχώς θαθύτερες ανκλήσεις.

  > Η Αλλεική γέρηνα τομέυσης εγρού είναι εμφανής

  > Οι πρακτικές που ακολουθούνται στην άρδευση δασίζονται σε παλιές τεχνολογίες και σε
  συνολική άρδευση των αγροτειρικών με κοινή δόσι άρδευσης

  > Η άρδευση δεν θασίζεται στις πραγματικές ανάγκες των καλλιεργειών, αλλά σε εμπειρικές
  ποσεπικές

- ακτικες Οι γεωργικές εκμεταλλεύσεις είναι μικρές έως μεσαίες σε έκταση Απαιτείται η μείωση του νερού που χρησιμοποιείται για άρδευση στην Ελλάδα

- Προφανώς η χρήση μεθόδων άρδευσης υψηλής απόδοσης πχ στάγδην μπορεί να, μειώσει τη κατανάλωση νερού
- της σταγοήν μπορετ και, μετωσει τη καιταναωσή γεντάρχουν Χρήση μεθόδων διαφοροποιημένης άρδευσης –Υπάρχουν μέθοδοι για συγκεκριμένες εκμεταλλεύσεις είτε με βάση τη σύσταση εδάφους με χρήση της φαινομενικής ηλεκτρικής αγωγιμότητας είτε με αναλύσεις εδάφους είτε με βάση ενδείξεις αισθητήρων
- Έλλειψη ολιστικής μεθόδου για κάλυψη μεγάλων περιοχών που σήμερα ποτίζουν με βάση πρόγραμμα και όχι τις ανάγκες καλλιέργειας ή τύπου εδάφους
- Αυτή θα μπορούσε να επιτευχθεί με τηλεπισκοπηση που θα επέτρεπε προγραμματισμό άρδευσης πχ σε περιοχές ΤΟΕΒ
- επετρεπε πιρυγραμματισμό αφοευσης, πις σε πεμισχες ΤΟΕΒ Η τηλεπισκόπηση θα μπορούσε να χρησιμοποιήσει διαφόρων τύπων κάμερες (θερμικές κλπ) που να εντοπίζουν περοιχές με ανάγκη εφαρμογής αρδευτικού νερού. Μη επαρκής γνώση των πραγματικών αναγκών άρδευσης σε διαφορετικές καλλιέργειες





# Μεθοδολογία Υλοποίησης, Επιπτώσεις

- Μεθοδολογία Υλοποίησης
  > Επιλογή των καλλιεργειών ενδιαφέροντος σε ένα ΤΟΕΒ (πχ Ταυρωπού με 120.000 αρδευόμενα

- Επιουή των κανικείγεων ενοιωφεροντο, σε ενα το Εση τι αυρωπού με 12.000 αμοι συσμενά εμέμματα Καθορισμός των αναγκών άρδευσης με αλγορίθμους/ επαλήθευση στη περιοχή Συσχέτιση δεδομένων δορυφορικών λήψεων (π.χ. Sentinel) με δεδομένα εγκατεστημένων σθητήρων σε επιλεγμένους αγγούς Αλήμο δεδομένων από εναέρια μέσα με χρήση τη θερμοκαμερών για καθορισμό σειράς άρδευσης Αλημουργία πλατφόρμας υπολογισμού δόσης και χρονισμού άρδευσης θάσει των δορυφορικών \*δημένων.

δεδομένων Οι αλγόριθμοί θα παραχθούν από τα AEI, ο έλεγχος των αρδευτικών πρακτικών θα γίνεται από τον επιλεγμένο TOEB σε συγκεκριμένους αγρούς, ενώ τα δορυφορικά δεδομένα θα δίνονται από επιλεγμένες εταιρίες του κλάδου.

# Αναμενόμενα οφέλη

- ταμενόμενα οφέλη Καλύτερος προγραμματισμός άρδευσης Μείωση της χρήσης νερού Αναλυτική χραγογράφηση των αρδευόμενων περιοχών Βελτίωση της παρακολούθησης της καλλιέργειας Ανξημένη παραγωγή Μειωμένο κάστος παραγωγής



# "A holistic approach to Variable Rate Irrigation (VRI)"

Dr. Zisis Tsiropoulos – AGENSO (www.agenso.gr)





### **AGENSO**

- ✓ Spin-out του Γεωπονικού Πανεπιστημίου Αθηνών
  - ✓ Ημερομηνία Ίδρυσης: 18/5/2016
- ✓ Συμμετοχή σε 10 Ευρωπαϊκά και 4 Ελληνικά ερευνητικά προγράμματα.
- ✓ Προσφορά υπηρεσιών σε 5 πανεπιστήμια και ερευνητικά ιδρύματα του εξωτερικού
- √ 4 λύσεις Τεχνολογιών Ευφυούς Γεωργίας
- Προηγμένος εξοπλισμός (μη επανδρωμένα οχήματα, μετεωρολογικοί σταθμοί, διάφοροι τύποι αισθητήρων, συστήματα GNSS κτλ)







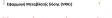
Ιδέα, Κατάσταση σήμερα, Λύση

Ιδέα
Μα ολιστική προσέγγιση, από τη γεώτρηση νερού έως την εφαρμογή

Κατάσταση Σήμερα
> Η προευση βασίζεται στην εμπειρία των αγροτών
> Το νερό εφαρμόζεται με ομούμορφη δόση σε ολόκληρο τον αγρό
> Αυτό έχει ως αποτέλεσμα την εφαρμογή μεγαλύτερων ποσοτήτων νερού από ό, τι χρειάζεται σε πολλές περιοχός του αγρού και κατά συνέπαις, ητι να «παριαλ φίσποίηση των υδάτινων πόρω».
> Ιδιαίτερα σε καλλιέργειες υψηλών αναγκών σε νερό, η υπάρχουσα προσέγγιση δεν είναι ικανοποιητική

Κατάσταση







# Ιδέα, Κατάσταση σήμερα, Λύση

Ιδέα Μια ολιστική προσέγγιση, από τη γεώτρηση νερού έως την εφαρμογή

- Διαχείριση νερού σε επίπεδο αγρού
   Βελτιστοποίηση του προγραμματισμού άρδευσης βάσει τύπου καλλιέργειας
   Εφαρμογή μεταβλητής δόσης νερού άρδευσης (χρονισμός και δόση)

# Μεθοδολογία Υλοποίησης, Επιπτώσεις



- ΜΕΘΟδολογία Υλοποίησης

  Επιλιών το Μεθοδολογία Υλοποίησης

  Επιλιών των απλικερικών ενδιαφέροντος βασει υψηλής κατανάλωσης νερού (π.χ. βαμβάκι, αραβάσιτος, καρπούς, κτλ.)

  Καθορισμός των αναγκών άρδευσης βασει καλλιέργειας και εδαφολυματικών συνθητών

  Σιξεδιαφιρός ελεγτικών, επιλιή η εξαστριμάτων, ούνδαση αυστήματος ελέγχου δόσης και χρονισμού 
  Δημιουργία πλατφόριας υπολογισμού δόσης και χρονισμού άρδευσης βάσει μετεωρολογικού 
  σταθμού και αισσήτερων (π.χ. υφοιαίας εδάφους, συλικής υγρασίας, διαμέτρου κοριούς, κτλ.)

  Εγκατάσταση συστήματος σε πιλοτικούς αγρούς για δοκιμή και σύγκριση με τις παραδοσιακές 
  τεχνικές





# Μεθοδολογία Υλοποίησης, Επιπτώσεις

# Αναμενόμενα οφέλη

Αναμενομενα οφελη

> Βελιτιστοποίησης της χρήσης του νερού (μείωση της υπεράρδευσης, υποάρδευσης και απορροής) και των λιπασμάτων που εφαρμόζονται στον αγρό, μέσω της προσαρμογής της εφαρμογής νερού βάσει τοπογραφικών δεδομένων, χαρτών εδάφους και άλλων πληροφοριών

> Συμβολή στη θελτίωση της ποιώτητας και απόδοσης της καλλιέργειας > Μείωση του κόστους ενέργειας άντλησης νερού > Μείωση του περιβαλλοντικού αντίκτυπου





# "Variable Rate Fertilization with biological-based fertilizers" Dr. Panagiotis Ilias - Neuropublic (www.neuropublic.gr)









Παναγιώτης Ηλίας p\_ilias@neuropublic.gr



# "Spraying Drone" Giorgos Bourodimos - ELGO DIMITRA

(www.elgo.gr)







# Σύστημα Καλλιέργειας

- ΑροτραίεςΔενδρώδειςΛαχανικάΑμπέλια

Όνομα Προωθητή Ιδέας > Δρ. Α. Γκέρτοης - Perrotis College / Αμερικάνικη Γεωργική Σχολή (Έρευνα) > Γ. Μπουροδήμος - ΕΛ.Γ.Ο. "ΔΗΜΗΤΡΑ" / Ινστιτούτο Εδαφούδατικών Πόρων / Τμήμα Γεωργικής Μηχανικής

- Διακλαδική Συνεργασία

  > Έρευνα Perrotis College, Γεωπονικό Πανεπιστήμιο Αθηνών, ΕΛ.Γ.Ο. "ΔΗΜΗΤΡΑ" / Τμήμα Γεωργικής Μηχανικής

   Κατασκευακτάς Γεωργικών Μηχανημάτων

   Βιομηχανία ΑΕΕΝ50

   Γεωργοί Συνεταμομοί

   Συμβουλευτική





CO CONTRACTOR

# Ιδέα, Κατάσταση Σήμερα, Λύση

### Το Έργο

Εναέριος ψεκασμός φυτοφαρμάκων, ζιζανιοκτόνων και μυκητοκτόνων, με τη χρήση

### Κατάσταση Σήμερα

- Οι πρακτικές φυτοπροστασίας δεν σχεδιάζονται προσεκτικά και οι ποσότητες ψεκαστικού υγρού που διαφεύγουν εκτός στόχου είναι σημαντικές
- Ορεινές και ημιορεινές περιοχές καλλιεργούνται κυρίως με οπωρώνες με δύσκολη πρόσβαση
- Η χρήση ελκυστήρα και νεφελοψεκαστήρα για φυτοπροστασία στις ορεινές περιοχές της Ελλάδας είναι πρόκληση
- Οι μέθοδοι ψεκασμών με αυλό και μάνικα καλύπτουν το κενό με σημαντική μείωση ακρίβειας ψεκασμού ανά δέντρο, η οποία βασίζεται στην εμπειρία του ψεκαστή

- Η Λύση

   Αντικατάσταση παραδοσιακών τεχνικών με χρήση ψεκαστικών drones για ορεινές, δύσκολα προσδασμες περιοχές

   Πλήρης χαρτογράφηση οπωρώνων για τον εντοπισμό της θέσης και του όγκου του κάθε δέντρου
- Σχεδιασμός πτήσεων βάσει προγραμματισμού για αντικατάσταση μπαταριών και επαναπλήρωση ή αντικατάσταση του δοχείου ψεκαστικού υγρού



CO CONTRACTOR

CAN'S

# Μεθοδολογία Υλοποίησης, Επιπτώσεις

# Μεθοδολογία Υλοποίησης

- Επιλογή τύπων οπωρώνων (π.χ. ελαιώνες)
- Σχεδιασμός φυτοπροστατευτικών ενεργειών σε κάθε καλλιεργητική περίοδο Παρατήρηση σε πραγματικό χρόνο
- Τιαματιρηιση σε ημαγματικό χρυνο
   Δημιουργία λογισμικού που θα επιτρέπει την ακριθή χαρτογράφηση της διαδρομής, θα παράγει πληροφορίες σχετικά με την προστασία των καλλιεργετών και προειδοποιητικά μηνύματα
   Σχεδιασμός και κατασκευή drone που θα φέρει ένα δοχείο ψεκαστικού υγρού 10-15 I
- Τοποθέτηση κάθε ακροφυσίου κάτω από τις έλικες για μεγαλύτερη αποτελεσματικότητα, αφού το ισχυρό ρεύμα αέρα που δημιουργείται από τις έλικες, βοηδά στην καλύτερη διείσδιουη των σταγόνων στην κύμη του φυτού, πετυχαίνοντας καλύτερη κατανομή του ψεκαστικού υγρού



- ψεκωνικου σηγευν » Ψεκασμοί υπερμικρού όγκου (Ultra Low Volume ULV) με χρήση ειδικών ακευασμάτων (που χρησιμοπαιούνται "ως ξρουν" ή αραιώνονται με μικρές ποσότητες συγκεκριμένου φορέα) κα ποσότητα ψεαστικού υρφοί < 5.5 / Εντρέμμα > Δοκιμές και σύγκριση με τις παραδοσιακές τεχνικές

# Μεθοδολογία Υλοποίησης, Επιπτώσεις

# Αναμενόμενα Οφέλη

- τεριετούεται συγετή. Προστασία του χειριατή από τη επίδραση των χημικών ακευασμάτων (ψεκασμός εξ αποστάσεως) Ασφάλια και ευκολία κατά την εφαρμογή του ψεκασμού, καθώς παρέχεται στους γεωργούς των ορεινών περιοχών της χώρας, η δυνατάτητα να ξεπεράσουν τις δυσκολίες και τους κινδύνους που κρύδουν στη διαδιασιαία αυτή τα επικλυή από δυσπρόσιτα εδάφη
- Υψηλότερη απόδοση (έως 400 στρέμματα/ημέρα) και εξοικονόμηση χρόνου
   Μεγαλύτερη αποτελεσματικότητα από τον παραδοσιακό ψεκασμό

- πιεγευστερή αποτεκευριατιστήτα απο να παρασούματα φυτοφορμάκων
   Εξοικονόμηση και οράολογικάτερη χρήση των φυτοπροστατευτικών προϊόντων (έως 30% μείωση στη χρήση φυτοφαρμάκων, λόγω καλύτερης διείσδυσης και κατανομής του ψεκαστικού υγρού στη κύρη στων φυτών\*)

- Πιθανά Προβλήματα
- ΙΒΙΩΝΙ Ι ΙΡΟΣΡΑΙΙΑΝ.
  Νομικό Πλαίσιο

   ΝΟΜΟΣ Υπ' Αριθμ. 4036, ΦΕΚ 8/Α/27.01.2012, "Διάθεση γεωργικών φαρμάκων στην αγορά, ορθολογική χρήση αυτών και συναφείς διατάξεις, Άρθρο 23 Αεροψεκασμοί"

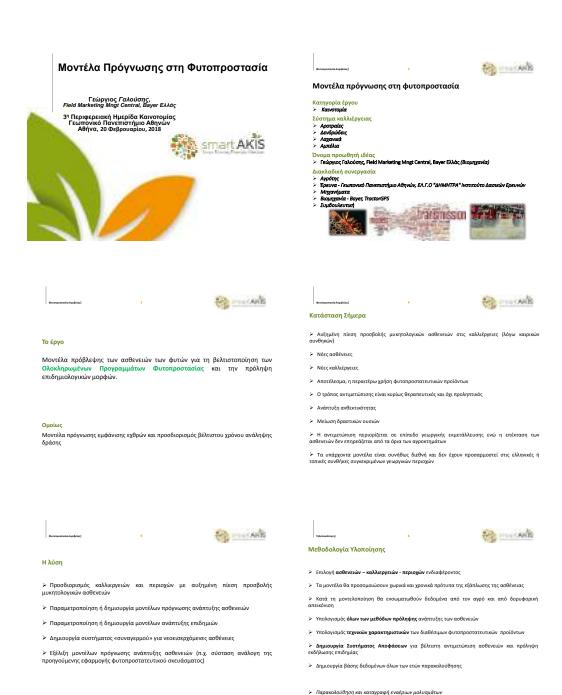
   ΑΠΟΦΑΣΗ Αριθμ. Δ/ΥΠΑ/21860/1422, ΦΕΚ 3152/8/30.09.2016, "Κανονισμός γενικό πλαίσιο πτήσεων Συστημάτων μη Επανδρωμένων Αεροσκαφών ΣμηΕΑ (Ummanned Aircroft Systems 11ΑΕ)"
- ΑΠΟΦΑΣΗ Αριθμ. ΥΠΑ/Δ2/Δ/30005/12541. ΦΕΚ 4527/Β/30.12.2016. "Κανονισμό





# "Modelling and prediction for infectious disease epidemiology"

Giorgos Galousis – Bayer (www.bayer.gr)









# "Remote sensing and VRA with the use of GPS in orchards" Aris Zamidis – TractorGPS (www.tractorgps.gr)





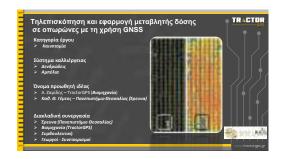


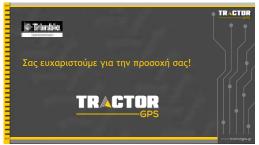














# **RIW3 Attendance Sheets**

Due to confidentiality reasons, the list is not provided

# **RIW3 Pictures**





Figure 7 and 2 Registration desk



**Figure 3 Presentation of Smart-AKIS** 







Figure 4 and 5 The audience/ participants





**Figure 6 Working Groups** 



Figure 7 Light lunch provided



# **RIW3 Findings**

# Identification of needs regarding SFTs

Are the users' needs identified in D2.2 confirmed by the RIW findings for your Hub? Can other needs regarding SFTs be identified from the discussions in the RIW? These can be technological needs, but also others, such as need for training, need for improved advisory, etc. Can these needs be addressed by setting up collaborations (for example, by a collaboration project) or are there to be addressed at the political level (for example, by setting up a subsidy for SFTs)? Do attendees have ideas regarding the use of SFT to your Hub?

The results of D2.2. were once again confirmed in RIW3 in Athens. The major issue raised in all 3 RIWs was that farmers need to be well educated and trained.

Currently, even if an agronomist or a technology provider give the farmers suggestions on what to do, when to do it and what technological equipment they should use, it is not guaranteed farmers will follow these suggestions. The question arose was "how are they going to follow the instruction given by a system, an application or machine?" Universities, research centers, advisory and extension services should take the responsibility to provide farmers with the necessary knowledge so that they will consider proceeding to the adoption of new technologies more easily and knowing how to utilize them in an optimum way for optimum results. Finally, it is crucial to prove them through pilot use cases that the systems or equipment suggested actually works.

The cost of the equipment used in Precision Agriculture is often higher that what the farmers can afford. Government intervention in agriculture is needed in the form of subsidies or reduced loan rates but growers should also be introduced to the idea of sharing some pieces of equipment with each other. This way the initial and operating costs will be reduced.

In RIW3, it was shown that the 6 ideas of collaborative projects were very well accepted by all participants, including the funding entities participating, as they were touching real needs of the regular work life of Greek farmers. After the presentations, 3 working groups were assembled regarding the following topics:

- 1. Variable Rate irrigation
- 2. FMIS
- 3. Variable Rate Spraying

From the discussion it was shown that at this stage in Greece, the best way to provide financial support to Smart Farming development is through the state funds. This could be done through two ways:

- 1. Research Projects through Measure 16 for Operational Group creation and Innovation research projects between OGs members of the Ministry of Agriculture and the General Secretariat of Research & Development initiative «Research-Create-Innovate», where funds are directed to only companies (with farmers), consortium of companies with research entities and farmers in the field of agrifood sector and to consortiums that have already mature research results and there is need for higher and persistent dissemination to create business out of it.
- 2. Infrastructure subsidies from the Ministry of Agriculture through Measure 4, where there is a bonus category of Smart Farming equipment purchase.

It should be noted that private funding sources (banks, stock market) showed their interest in this new field of opportunity, but they pointed out that these initiatives are still in low TRL and not mature enough for funding from their tools. They pointed out that they will follow the development of this



sector and when mature ideas comes to the table of discussion, they are very keen to participate again.

On the other hand, HAMAC companies showed their interest for any new idea that could be translated in a new App, while the IBK foundation started direct discussions for Smart Farming application in the area of their interest (Messinia Peloponnese) with the companies and the Research entities participating in the event.

# Identification of barriers and incentives for adoption of SFTs

Are the barriers identified in D2.3 confirmed by the RIW findings for your Hub (i.e. farm size, cropping system, farmers' age and education/training, etc)? Can other barriers for SFT adoption be identified that are specific to your Hub?

As mentioned above, farmers in Greece lack education and training. The application of irrigation, fertilization and spraying is still done, in many cases, according to each farmer's personal experience. They also lack access to the necessary equipment and organized extension services, mainly by the government and universities. Farmers and agriculture related entrepreneurs' still hesitate to progress by adopting new technologies. They resist change, avoid taking risks, changing practices and trying new methods. It is challenging to "persuade" farmers to follow different practices, than the ones they are used to. Lack of formal education attainment, is expected to be negatively related to the adoption of SFT.

Funding of new high-tech equipment to support Smart Farming techniques is very rare the last 8 years, due to the economic crisis. The crisis reduced significantly the availability of funds, while farmers resigned from any kind of investments due to the instability they experience. Therefore, while other countries in EU have a slow but continuous progress in this field, Greece is still in its infancy. Another matter that is crucial for Greek agriculture is the difficulty of small farmers (the majority of Greek farmers) to cooperate that reduces their power to transit from traditional practices to Smart Farming. The case of Pigasos farmers' union (table grapes) and Nileas cooperative (olive oil) that participated in RIW3 are excellent examples of the positive results of cooperation in the agricultural sector.

# Interest on adoption and transfer of presented SFTs

Do attendees show a special interest towards specific SFTs? Are these SFTs in the market yet or are they being developed (TRL<9)? Have attendees provided feedback to SFT industry in the RIW for improving the SFTs or adjusting them to the specific regional conditions so as to bring them into practice?

During this workshop, attendees showed an increased interest and highlighted the need for "Advisory on SFTs", through platforms and other FMIS systems. They pointed out that all SFTs should be shown in real conditions in pilot farms, as Greek farmers are difficult to accept new things in their farm without proof of concept.

The technologies discussed the most were the following:

# VRT: Precision Irrigation, Spraying Drone

As in other countries, all participants mentioned VRT technologies as the solution for reduced input costs and increased quality of product without increased environmental impact. However, all participants agreed that these technologies have to be adjusted in Greek agriculture as there is high variability in pedoclimatic conditions, even in farms that are very close to each other.

# Satellite remote sensing



This idea of dealing with large surface terrestrial issues through satellite imagery was really popular, but at the same time there was a high disbelief that such systems can provide credible results for the farmers and the advisors.

# Modelling and prediction for infectious disease epidemiology

This case was discussed thoroughly as the disease expansion and especially mycological diseases are of high interest for Greek agriculture, because it increases year by year and chemical crop protection is increasing constantly. In addition, it was said that using models coming from other countries is a big problem, as the prediction is not accurate and in many cases it is not enough to prevent the spreading of the disease with destructive results. The models need to be adjusted in regional conditions and optimised at least for 3 years before going in use.

# Potential new uses for existing SFTs (to feed EIP-Agri template "Needs for research")

Have new uses been identified for the SFTs presented (i.e. SFT presented for arable crops that can be adapted for vineyard).

Multicopter Drones have been mainly used for crop imagery. The idea of using them for crop protection purposes, performing aerial pesticides, herbicides, and fungicides spraying seems very interesting for orchards of semi- and mountainous areas in Greece. The majority of olive and citrus groves in the country are in such areas where conventional pesticide equipment cannot reach. AGROMA owner, a pesticide equipment company, shared with the rest of the participants that in Albania where he has a lot of customers, the citrus orchards are only reached by hose and lance providing a very low quality result with huge amounts of pesticide spill. Such customers, see spraying drones as an excellent solution.

# Potential inputs for research (to feed EIP-Agri template "Needs for research")

Are there specific needs that can be addressed through research (it can be basic research on i.e. development of a new remote sensing index, but also applied research on, i.e. application of a specific SFT to a new environment)? Have attendees (SFT industry, farmers) provided feedback to research results regarding specific SFT?

- 1. Establishment of the right methodology and the standards according to which Variable Rate Irrigation, Fertilization and Spraying can be performed and the optimum amount inputs will be applied to the field. Develop the hardware and software that evolves a solution to the irrigation problem, which ensures every step, from water drilling to application.
- 2. For performing aerial pesticides, herbicides, and fungicides spraying, using spraying drones, research should be done so that the drone will be balanced with the extra weight of the container it carries, and the potential wind forces.
- 3. Using satellite sensors that at the moment are used for other purposes (e.g. radar) for agricultural purposes could be a support on the field to promote the use of other SFTs.



# **RIW3 Project Ideas**

| Category of project | Smart Farming Technology     | Crop system |
|---------------------|------------------------------|-------------|
| Innovation          | A holistic approach to       | Arable      |
|                     | Variable Rate Irrigation     | Tree        |
|                     | (VRI) using Satellite Remote | Vegetables  |
|                     | Sensing and Sensors          | Vineyards   |
|                     |                              | Grasslands  |

# Promoter/s name/s

Savvas Paxatiroglou (Farmer)

Theofanis Gemtos, Christos Karamoutis (Research- Professors University of Thessaly)

# Partner/s of the proposal and role

Theodore Kokiousis (Farmer- PIGASOS AGRICULTURE, Agricultural Cooperative of Grapes)
Athanasios Markinos (Advisory: President of the Local Land Improvement Organizations (LLIO))

Hara Koutalou (Industry- MATRIX) – Sensors and VRI

Zisis Tsiropoulos, Panagiotis Stamatelopoulos (Industry- AGENSO) – Software for VRI Panagiotis Ilias (Industry- NEUROPUBLIC) – Informative Platform

# Title of project

A holistic approach to Variable Rate Irrigation (VRI) using Satellite Remote Sensing and Sensors

# **Expected benefits**

This project holds great promise on enhancing water efficiency. Innovative irrigation practices can optimize water usage (reducing overwatering, underwatering, and run-off) through the customization of water application based on topographic data, soil maps and other information gathered on the field from sensors. Analytical mapping of the irrigated areas could be performed, which will result in better irrigation scheduling and the improvement of water use efficiency. More water-efficient management, by controlling the irrigation process, could combine wider environmental benefits, with economic advantage for farmers, since it promotes an increase in production and reduces the production and energy cost for fuel and electricity. Finally, VRI also helps to meet a crop's specific moisture needs, improving crop quality and yield. The diversification of crops will enhance crop monitoring.

# Goal and objectives

Create a complete irrigation system. A holistic approach to analyse and evolve a solution to the irrigation problem, which ensures every step, from water drilling to application.

- Design/decide the system, the hardware needed and develop the software.
- Incorporate some piloting applications that growers will "watch" how the system works and its final improved results.
- The necessary knowledge should be provided by extension services, helping farmers to adapt and implement viable solutions, thus gaining more benefits from irrigation technology.
- Advisory services in combination with research centers, universities and the Greek government should play
  an important role on farmers' training and education on how to translate these messages and suggestions
  given from the system, to ensure the ideal decision will be made. The decision making processes is a part of
  the irrigation system but each grower should have the knowledge to interfere only in the case it is
  absolutely needed
- Teach the growers the need of sharing some expensive but important for better results equipment.
- The farmer should be able to use a completed irrigation system, using a smart-phone, getting the right notifications and suggestions the right time on when and how much to irrigate the field.



# Follow a protocol

# Planned work packages or main activities

- 1. Selection of the crop system of interest in a LLIO (e.g. Tauropos has 120,000 irrigated acres) based on high water consumption (e.g. cotton, maize, watermelon, etc.)
- 2. Determination of irrigation needs and soil and climatic conditions with algorithms and on the field verification
- 3. Design the controllers, select components, create a dose and timing control system
- 4. Correlate satellite data (e.g. Sentinel) with installed in selected fields sensor data
- 5. Receiving data from airborne media by using for example drone cameras to determine the irrigation order to be followed
- 6. Create a platform for calculating the irrigation dosage and timing based on satellite, meteorological data and sensors (e.g. soil moisture, leaf moisture, trunk diameter, etc.)
- 7. Installation of a system in pilot fields for testing and comparison with traditional techniques

The algorithms needed will be generated by research institutes and industry, irrigation practices will be controlled by the selected LLIO in specific areas/fields, while satellite data will be given by selected companies in the sector.

# Estimated budget

200K – 1M euro

# Planned source of funding

Measure 16. Primarily an OG can be assembled with all the proposal partners and then prepare a proposal. This way, the produced system can be replicated in other LLIOs.

# Maturity level

This innovative idea is still in the experimental/piloting stage, but there is increase knowledge in the irrigation sector and the relative monitoring devices. It can benefit from the different actors' feedback on how to be planned properly to become a successful innovation.

# Cross-border potentiality

This can become a multinational Project involving actors from Southern and Eastern European countries (Spain, Greece, Serbia), that face the same issues when it comes to irrigation and water management.



| Category of project | Smart Farming Technology    | Crop system |
|---------------------|-----------------------------|-------------|
|                     | Integrated System for table | Tree        |
| Innovation          | grape vineyard crop         | Vineyards   |
|                     | protection                  |             |

# Promoter/s name/s

Markos Legas, (President- PIGASOS AGRICULTURE, Agricultural Cooperative of Grapes)

Aris Zamidis, (Industry- CEO, Tractor GPS)

*Nikos Petkos*, (Industry- CEO, *AGROMA*)

George Bourodimos, (Research & Advisory-Researcher, ELGO-DIMITRA)

Dionysis Kalyvas, (Research-Professor, AUA)

Thanos Balafoutis, (Research-Researcher, iBO-CERTH)

# Partner/s of the proposal and role

Pigasos Cooperative: This cooperative will be the end-user and the demo farm of the project.

Tractor GPS: This company will work on the GNSS and satellite imagery.

AGROMA: This company will provide spraying technology.

ELGO-DIMITRA: This research entity has the facilities for spraying machinery inspection.

AUA: This research group can work thoroughly in satellite imagery.

iBO-CERTH: This Institute can provide technological solutions for precision spraying.

# Title of project

Integrated System for table grape vineyard crop protection

# **Expected benefits**

Table grapes market in the EU is growing and Greece can play a significant role as a key player in this production. If an IPM system is applied and the quality of the final product remains in high standards or even increases (pesticide residues are reduced), then the EU market demand will increase taking prices up. Therefore, the main benefit will be for the numerous producers to maintain and increase their market share.

Another benefit will be the reduction of costs for table grapes production due to the reduction of plant protection product (PPP) application, which at the moment counts for over 20-30% of the total production cost.

The above mentioned PPP use reduction will directly provide also environmental benefits, as a significant part of the PPPs applied in vineyards are spread in neighboring areas due to spray drift effect.

# Goal and objectives

The project will focus on the optimization of crop protection strategies in table grape vineyards in Peloponnese. The situation in this specific crop is unique, since the grapes need to be clean, with no collored spots, or else it is not marketable. This means that at least 12-20 spraying application have to be applied every year. This increases cost and environmental hazards. Therefore, the objective of the project is to regulate plant protection product use to keep the quality and quantity of the final product in high levels and at the same time reduce economic and environmental costs.

# Planned work packages or main activities

The project will provide a full IPM system with:

- 1. Disease modelling adjusted in the specific region
- 2. Selection of plant protection product (PPP) for each disease

# **Smart AKIS Report**



- 3. Development of an App where all partners of the cooperative will have to sign in before they apply any kind of PPP
- 4. All tractors have to be equipped with real-time connected GNSS devices for monitoring centrally from the cooperative headquarters
- 5. Optimization of sprayers to reduce spray drift and application of multiple sensors (flow, pressure, etc.) to provide all information in the system
- 6. Full record keeping for each field to provide traceability in a QR format
- 7. Optimization of the whole system using the stored data of each year (learning process)

# Estimated budget

600.000 - 800.000 euro

# Planned source of funding

Measure 16, Ministry of Agriculture

# Maturity level

In a scale 0-10, the maturity is 5-7. The consortium is really interested in the project, the idea is very good for Greek agriculture (since high-value crops are very important for its uptake) and the partners can cover all sides of the project.

# Cross-border potentiality

As all south EU countries have table grapes vineyards, there is a significant cross-border potentiality, especially with Spain and France.



| Category of project | Smart Farming Technology | Crop system |
|---------------------|--------------------------|-------------|
| Innovation          | [FMIS]                   | Arable      |
| Technology transfer | Integrated Agriculture   | Tree        |
| Market uptake       | Advisory Services        | Vegetables  |
|                     |                          | Vineyards   |
|                     |                          | Grasslands  |

# Promoter/s name/s

Georgios Galousis (Industry- Bayer)

Fotis Chatzipapadopoulos (Industry- NEUROPUBLIC)

Klearxos Daskalakis, (Industry- Tractor GPS)

Georgios Kokkinos (Farmer- Nileas Association of olive oil producers)

Michael Tsagkaropoulos (Industry- KONDELLIS SA)

# Partner/s of the proposal and role

Nileas Association of olive oil producers, Agricultural Cooperative of Grapes (Farmers and Farmers' Associations)

Agricultural University of Athens (Research)

EL.GO "DIMITRA" (Extension Services and Advisory)

Bayer (Industry)

TractorGPS, KONDELLIS SA (Industry)

# Title of project

# Farmers sharing: from community spirit to a corporate Platform

# **Expected benefits**

The Platform, as a nationwide knowledge reference on farming, can serve as a catalyst for institutions and individuals in agriculture and rural development to share knowledge, learn from others, and improve decision making. The different stakeholders can ultimately assist to improve and empower rural communities and build sustainable agriculture by improving policies and processes around farming.

Thought the Platform, on top of the direct contact with advisory services in selected points, farmers will have the opportunity to:

- Ask questions and connect with experts, practitioners and producers
- Share experiences in the field
- Learn how to implement technologies and practices

This will lead to a reduced cost for advisory services.

Additionally, the concept of equipment sharing will eliminate a significant barrier to entry for young, next-generation farmers. Since it has become increasingly difficult to purchase agricultural equipment, sharing it provides access to it for a fraction of the initial purchasing cost.

#### Goal and objectives

The ultimate goal of this proposed project is to enhance farmers' knowledge by strengthening agricultural extension and advisory services within Greece.

The main objective is to create a platform, where one can find practical information about agricultural technologies and practices, interact with people with similar interests and discuss sustainable solutions in online forums.

This Platform will promote information exchange and sharing and facilitate dialogue to achieve professionalization, standardization and quality assurance for a more sustainable agriculture and rural development. It will benefit from the active collaboration of its contributors including the



Government, farmers' organizations, research centres and academia, other information and communication specialists, policy makers, business people, development practitioners, students and others.

The Platform will gather digitized quality information on agriculture from all over Greece; including national laws and regulations, public policies, best practices, relevant data and statistics, researches, articles and publications.

Knowledge exchange is about starting constructive dialogue. This will be one of the main activities in the platform through the Chatting Group Discussions (online forums). The objective is to provide forums for practitioners, researchers, advisory service providers, farmers and other stakeholders in Greece to discuss different topics related to farmer innovation and to share different innovative practices, technologies and processes. Topics will be demand-driven, and lead by partner institutions specializing in specific agriculture areas. These forum will also offer the opportunity to ask and answer questions and explore areas of common interest that potentially serve as the basis for establishing partnerships.

# Planned work packages or main activities

- 1. Facilitation and enhancement of effective and continuous knowledge generation and exchange. Farmers education through creative business training workshops, interacting with innovative farmers who have already tried methods and equipment that works well on the field, and establishing the "citizen observatory concept" for farming, lessons learned, as well as online access to programmes, legislation, updated statistics, publications, and initiatives fosters knowledge and information dissemination
- **2.** Advisory services: Professionalization of rural advisory services. Establishing cooperation with scientists and agronomists
- **3.**Field locations: establish separate stations by region for data acquisition from representative fields, considered as a "common field", using sensors
- 4. Advocacy and support for an enabling policy environment and appropriate investment in agriculture
- 5. Innovation metrics
- 6. Funding coming from the industry
- 7. Creation of an open and integrated management platform
- 8. Innovative agricultural equipment and machinery sharing for small and medium landholding farmers. Land and expertise can also be shared.

### Estimated budget

800K -1M euro

# Planned source of funding

Measure 16 for Operational Group creation and Innovation research projects between OGs members of the Ministry of Agriculture and the General Secretariat of Research & Development initiative «Research-Create-Innovate»

### Maturity level

This project idea is still at a relatively good maturity level and all of the actors that will be involved have thought of it very thoroughly. This is a very much-needed project with great potential not only in Greece but all over Europe.

# Cross-border potentiality

There is a significant cross-border potentiality all over the EU, as enhancing effective and continuous knowledge as well as improving advisory services in the agricultural sector is of high importance throughout Europe.



# **RIW3 Evaluation**

Information summing up the results from the Evaluation Form voluntarily filled in by participants.

|                    | T  |                      |  |
|--------------------|--|----------------------|--|
|                    | Average score  | 4.7                  |  |
| Interest           | More interesting presentations   |                      |  |
|                    | Modelling and prediction for infectious disease epidemeology,<br>Irrigation, Spraying Done, Advisory on SFTs |                      |  |
| Organization       | Average score  | 4.7                  |  |
| -                  | Improvement areas  More time on WG and presentations, introduce voting                                       |                      |  |
| Methodology        | Average score  | 4.6                  |  |
|                    | Improvement areas  More time with working groups, more farmers   |                      |  |
|                    | Average score  | 4.5                  |  |
| Project Ideas      | Top Project Ideas  Spraying Drone, Satellite remote sensing, Precision Irrigation,                           |                      |  |
|                    | Modelling and prediction for infectious disease epidemiology   |                      |  |
|                    | Average rate of participants planning to take part on projects   | 90%                  |  |
|                    | Average score  | 4.7                  |  |
| Sources of funding | Top sources of funding   | HAMAC<br>GSRT<br>CVF |  |
|                    | Average rate of participants planning to use sources of funding  | 85%                  |  |
| Open               | Create Demo Farms so that farmers can witness the benefits gained from SFT                                   |                      |  |
| suggestions        |  |                      |  |



# 5.2. Research needs in Smart Farming

# Needs for research from practice (EIP-Agri format) [1]

#### Title

A holistic approach to Variable Rate Irrigation (VRI)

# This is the problem (summary in your language)

Η άρδευση στην Ελλάδα διεξάγεται ακόμα και σήμερα βάσει της εμπειρίας των αγροτών. Προς το παρόν, τα χρησιμοποιούμενα συστήματα άρδευσης εφαρμόζουν νερό σε ομοιόμορφα ποσά σε όλο το χωράφι. Αυτό έχει ως αποτέλεσμα την εφαρμογή περισσότερου νερού από ότι απαιτείται σε πολλά σημεία του χωραφιού και κατά συνέπεια σε ανεπαρκή χρήση των υδάτινων πόρων.

Χωρική διαχείριση του ύδατος: προσαρμοσμένη εφαρμογή νερού που αντιστοιχεί στη μεταβλητότητα του χωραφιού ώστε να αυξηθεί η αποδοτικότητα της χρήσης του νερού και η παραγωγή.

Βελτιστοποίηση του προγραμματισμού άρδευσης: Η μεταβλητής δόσης άρδευση (VRI) επιτρέπει στους παραγωγούς να εφαρμόζουν με διαφορετικό ρυθμό (διαφορετική διάρκεια και συχνότητα) to νερό άρδευσης βάση των ζωνών διαχείρισης εντός του αγρού.

Μια ολιστική προσέγγιση για την ανάλυση και την εξεύρεση λύσης στο πρόβλημα της άρδευσης, που εξασφαλίζει κάθε βήμα, από τη γεώτρηση νερού έως την εφαρμογή. Μια τεχνολογία που προτείνει πότε, για πόσο χρόνο και πόσο νερό πρέπει να εφαρμοστεί σε ένα συγκεκριμένο χωράφι και μια ποικιλία. Δείχνει στον παραγωγό άμεσα δείκτες και ειδοποιήσεις.

Please briefly explain in your national language the problems you are experiencing in practice and which type of research (or knowledge) you need to solve them.

# This is the problem (summary in English)

Irrigation in Greece is conducted based on farmers' experience. Currently, the irrigation systems in use apply water at uniform rates to entire fields. This results in applying more water than needed in many areas in the field and thus to inefficient utilization of water resource.

Site-specific management of water: tailor applications to match field variability to increase water use efficiency and crop production.

Optimize irrigation scheduling: VRI allows growers to apply varying rates (different duration and frequency) of irrigation water based on individual management zones within the field.

A holistic approach to analyse and evolve a solution to the irrigation problem, which ensures every step, from water drilling to application. A technology which proposes when, for how long and how much water should be applied on a specific field and crop variety. Shows to the grower direct indicators and alerts.

Please briefly explain in English the problem that you are experiencing in practice and which type of research (or knowledge) you need to solve it.

#### **Geographical scope**

Southern, Eastern Europe and the Balkans (Greece, Serbia, Spain)

Please specify the geographical area/s where the need has been identified.

# Keywords

Irrigation, Variable Rate

#### **Agricultural sectors**

Crop production: arable, tree, vegetables, vineyards, grasslands *Choose the sectors your issue is relevant for (max.5 selections).* 

# Additional information



Please provide here any other relevant information concerning your initiative.

#### **Attachments**



# Needs for research from practice (EIP-Agri format) [2]

#### Title

Variable Rate Fertilization with biological-based fertilizers

# This is the problem (summary in your language)

Οι αγρότες στην Ελλάδα εξακολουθούν να εφαρμόζουν τα λιπάσματα εμπειρικά. Επί του παρόντος, οι πρακτικές διαχείρισης του εδάφους εξαρτώνται κυρίως σε ανόργανα χημικά λιπάσματα τα οποία έχουν μεγάλη περιβαλλοντική επίπτωση. Υπάρχει αυξανόμενη ζήτηση η λίπανση του εδάφους για τη βελτίωση των θρεπτικών ουσιών να βασίζεται σε βιολογικά λιπάσματα.

Ο στόχος αυτού του έργου είναι να θεσπιστεί η σωστή μεθοδολογία και τα πρότυπα σύμφωνα με τα οποία η βέλτιστη ποσότητα βιο-λιπασμάτων θα εφαρμοστεί σε συγκεκριμένες τοποθεσίες, διαφορετικές «ζώνες διαχείρισης», για συγκεκριμένες καλλιέργειες.

Please briefly explain in your national language the problems you are experiencing in practice and which type of research (or knowledge) you need to solve them.

# This is the problem (summary in English)

Farmers in Greece are still mostly applying fertilizers empirically. Currently, soil management practices are primarily dependent on inorganic chemical-based fertilizers that have a great environmental impact. There is a growing demand that soil fertilization relies on biological-based fertilizers to improve nutrient supply.

The goal of this project is to establish the right methodology and the standards according to which the optimum amount of bio-fertilizers will be applied at specific locations, different "management zones", for specific crops.

Please briefly explain in English the problem that you are experiencing in practice and which type of research (or knowledge) you need to solve it.

#### Geographical scope

Entire Europe

Please specify the geographical area/s where the need has been identified.

#### **Keywords**

# Variable rate, biological-based fertilizers

# Agricultural sectors

Crop production (intensive subsistence and shifting cultivation): tree, vegetables, vineyards Choose the sectors your issue is relevant for (max.5 selections).

#### Additional information



Please provide here any other relevant information concerning your initiative.

# **Attachments**



# Needs for research from practice (EIP-Agri format) [3]

# **Title**

Spraying Drone

# This is the problem (summary in your language)

Οι γεωργοί δεν προγραμματίζουν προσεκτικά τις πρακτικές τους για τη διαχείριση των παρασίτων, καθώς δεν καταλαβαίνουν πλήρως τις επιπτώσεις των φυτοφαρμάκων στην ανθρώπινη υγεία και το περιβάλλον. Επιπλέον, μερικές φορές στις ορεινές περιοχές της Ελλάδας, γίνεται δύσκολη η χρήση ενός ελκυστήρα για φυτοπροστατευτικούς λόγους.

Ο κύριος στόχος αυτού του έργου είναι οι αεροψεκασμοί φυτοφαρμάκων, ζιζανιοκτόνων και μυκητοκτόνων, με τη χρήση drone. Το λογισμικό για το drone θα επιτρέπει την ακριβή χαρτογράφηση της διαδρομής, ανεξάρτητα από το σχήμα του χωραφιού, την ύπαρξη κλίσης και τον τύπο της καλλιέργειας.

Το drone μπορεί να μεταφέρει ένα δοχείο γεμάτο με έως και 10 λίτρα υγρού φυτοφαρμάκου. Αυτό σημαίνει ότι θα εκτελεί ψεκασμό εξαιρετικά χαμηλού όγκου (ULV) (mL). Λόγω του ότι το drone έχει επιπλέον βάρος, η δύναμή του πρέπει να είναι μεγαλύτερη για να μπορεί να πετάξει. Το drone πρέπει να ισορροπεί με αυτό το επιπλέον βάρος και πρέπει να συνυπολογιστούν οι πιθανές δυνάμεις ανέμου.

Δοκιμές θα πρέπει να διεξάχθούν σε περιοχές με δύσκολο έδαφος, όχι εύκολα προσβάσιμες από τους ελκυστήρες, για να αξιολογηθεί η απόδοση του **Spraying Drone**.

Please briefly explain in your national language the problems you are experiencing in practice and which type of research (or knowledge) you need to solve them.

# This is the problem (summary in English)

Farmers do not plan carefully their pest management practices, as they do not fully understand the impact of pesticides on human health and the environment. Additionally, sometimes in the mountainous areas of Greece, it gets challenging to use a tractor for pesticide control.

The main objective of this project is to be able to proceed to aerial pesticides, herbicides, and fungicides spraying, with the use of drones. The software created for the drone will allow to precisely map the route, regardless of the shape of the field, the existence of an incline and the type of crop.

The drone is able to carry a container filled with up to 10 litters of liquid pesticide. This means it will perform ultra low volume (ULV) spraying (mL). The fact that the drone has extra weight added on it, its force has to be greater to be able to fly. The drone has to be balanced with this extra weight, and the potential wind forces should be encountered.

Trials should be performed in areas with difficult terrain that are not easily accessible with tractors, to evaluate the Spraying Drone's efficiency.

Please briefly explain in English the problem that you are experiencing in practice and which type of research (or knowledge) you need to solve it.

# Geographical scope

#### **Entire Europe**

Please specify the geographical area/s where the need has been identified.

#### **Keywords**

Pest management, aerial spraying, pesticides, herbicides, fungicides, drone

# **Agricultural sectors**

Crop production (intensive subsistence and shifting cultivation): arable, tree, vegetables, vineyards *Choose the sectors your issue is relevant for (max.5 selections).* 

#### Additional information



Please provide here any other relevant information concerning your initiative.

#### **Attachments**



# Needs for research from practice (EIP-Agri format) [4]

#### **Title**

Modelling and prediction in infectious disease epidemiology

# This is the problem (summary in your language)

Ο αριθμός των μολυσματικών ασθενειών στις καλλιέργειες αυξάνεται. Είναι σημαντικό να τις κατανοήσουμε καλύτερα, καθώς προκαλούν απώλεια απόδοσης.

Πρέπει να αναπτυχθεί ένα επιδημιολογικό μοντέλο πρόβλεψης για την κατανόηση των διαδικασιών εισβολής των μολυσματικών ασθενειών, απαραίτητο για την πρόληψη και τη διαχείριση της περαιτέρω εξάπλωσης. Τα μοντέλα για λοιμώδεις επιδημίες θα πρέπει να προσομοιάζουν χωρικά και χρονικά πρότυπα της εξάπλωσης της ασθένειας σε συγκεκριμένη χρονική βάση για να εφαρμοστούν σε ευρύτερες γεωργικές περιοχές. Δεδομένα από το χωράφι, όπως πληροφορίες για τις καιρικές συνθήκες (θερμοκρασία, βροχοπτώσεις) θα πρέπει να ενσωματωθούν κατά την δημιουργία μοντέλων.

Το μοντέλο θα πρέπει να είναι σε θέση να καταγράφει μέσω δορυφορικής απεικόνισης, για παράδειγμα, τους τρόπους διάδοσης μιας μολυσματικής ασθένειας στο χωράφι και στη συνέχεια να υπολογίζει και να προτείνει τα ποσά ψεκασμού που πρέπει να εφαρμοστούν. Να παρακολουθεί πώς τα σπόρια των μυκήτων επηρεάζουν τα φρούτα και τα λαχανικά και να τα αιχμαλωτίζει με ηλεκτρονικές παγίδες.

Please briefly explain in your national language the problems you are experiencing in practice and which type of research (or knowledge) you need to solve them.

# This is the problem (summary in English)

The number of emerging infectious diseases on crops is increasing. It is important to gain a better understanding of them, as they cause loss of yield.

A predictive epidemiological model should be developed for the understanding of invasion processes that is essential to prevent and manage further spread. The models for infectious epidemics should simulate spatial and temporal patterns of disease spread on a specific time basis for application at wider agricultural areas. Data from the field, such as weather information (temperature, rainfall) should be incorporated when modeling.

The model should be able to record via satellite imaging, for example, the ways an infectious disease is spread on the field and then calculate and suggest the spraying amounts that need to be applied. Monitor how fungal spores affect fruits and vegetables and capture them with electronic traps.

Please briefly explain in English the problem that you are experiencing in practice and which type of research (or knowledge) you need to solve it.

# Geographical scope

**Entire Europe** 

Please specify the geographical area/s where the need has been identified.

# Keywords

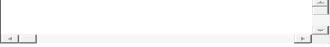
Modeling, prediction, crop infectious disease, epidemiology

#### Agricultural sectors

Crop production: arable, tree, vegetables, vineyards

Choose the sectors your issue is relevant for (max.5 selections).

# Additional information



Please provide here any other relevant information concerning your initiative.

### **Attachments**



# Needs for research from practice (EIP-Agri format) [5]

#### Title

Satellite Remote Sensing in Irrigation

# This is the problem (summary in your language)

Το νερό που χρησιμοποιείται για άρδευση μειώνεται εντός της Ελλάδας. Απαιτείται κατάλληλος προγραμματισμός και διαχείριση των υδάτινων πόρων, αλλά εξακολουθεί να υπάρχει ανεπαρκής γνώση των πραγματικών εφαρμογών άρδευσης των διαφόρων καλλιεργειών. Μια ακόμη πρόκληση στην Ελλάδα που πρέπει να αντιμετωπιστεί είναι η ύπαρξη πολλών μικρών και μεσαίων αγροτών.

Οι κύριοι στόχοι αυτού του έργου είναι η εκτίμηση των αναγκών νερού άρδευσης, έλεγχος για το ποιοι αγρότες αρδεύουν περισσότερο και των αρδευτικών πρακτικών τους μέσω τηλεπισκόπησης. Ο έλεγχος των αρδευτικών πρακτικών θα γίνει από τους Τοπικούς Οργανισμούς Εγγείων Βελτιώσεων (ΤΟΕΒ). Ο προγραμματισμός άρδευσης και η μείωση της χρήσης νερού / καλύτερη διαχείριση του νερού στοχεύονται να επιτευχθούν μέσω αυτού του έργου.

Please briefly explain in your national language the problems you are experiencing in practice and which type of research (or knowledge) you need to solve them.

# This is the problem (summary in English)

Fresh water, used for irrigation, withdraws within Greece. Appropriate planning and water resources management is needed but there is still insufficient knowledge of actual irrigation applications of different agricultural crops. One more challenge in Greece that needs to be addressed is the existence of many small and mid-sized scale farmers.

The main objectives of this project are to estimate the needs for irrigation water, check which farmers irrigate the most as well as control their irrigation practices through remote sensing. The control of irrigation practices will be done by the Local Land Improvement Organizations (LLIO). Irrigation scheduling and water usage reduction/ better water management are to be achieved through this project.

Please briefly explain in English the problem that you are experiencing in practice and which type of research (or knowledge) you need to solve it.

#### Geographical scope

Southern, Eastern Europe and the Balkans (Greece, Serbia, Spain)

Please specify the geographical area/s where the need has been identified.

#### **Keywords**

Irrigation, satellite remote sensing

# **Agricultural sectors**

Crop production: arable, tree, vegetables, vineyards, grasslands *Choose the sectors your issue is relevant for (max.5 selections).* 

### Additional information



Please provide here any other relevant information concerning your initiative.

# **Attachments**



# Needs for research from practice (EIP-Agri format) [6]

#### Title

Remote sensing and VRA with the use of GPS in orchards

# This is the problem (summary in your language)

Μία από τις προκλήσεις που αντιμετωπίζουν οι καλλιεργητές οπωρώνων είναι να ελέγξουν ολόκληρους τους οπωρώνες και να τους διαχειριστούν (π.χ. καταγραφή δεδομένων ανα δέντρο). Σε περίπτωση που οι αγρότες αντιληφθούν μικρά σημεία μόλυνσης από μυκητιασικές ασθένειες, πρέπει να χρησιμοποιήσουν μυκητοκτόνα. Αυτό μπορεί να οδηγήσει σε πολλαπλούς ψεκασμοί μυκητοκτόνων καθ 'όλη τη διάρκεια του έτους. Ομοίως ενεργούν και με την άρδευση. Μεγαλύτερη ποσότητα ή μιρότερη άρδευσης μπορεί να συμβεί.

Η χρήση φωτογραφικών μηχανών απεικόνισης τοποθετημένες πάνω σε μη επανδρωμένα αεροσκάφη μπορεί να παρέχει πληροφορίες σε πραγματικό χρόνο στους καλλιεργητές. Οι πληροφορίες σχετίζονται με την υγεία των καλλιεργειών και τη χρήση νερού.

Αυτές οι αεροφωτογραφίες δείχνουν στον καλλιεργητή πώς μοιάζουν τα δέντρα του. Χρησιμεύει ως ένας τρόπος για τον εντοπισμό προβληματικών περιοχών εντός των χωραφιών και προτροπή για την ανάληψη δράσης, για την άρδευση, για την προστασία των καλλιεργειών ή για τη λίπανση.

Τα δεδομένα μπορούν να συλλεχθούν για στοχευμένα μεμονωμένα δέντρα ή για ένα τμήμα του οπωρώνα. Είναι δυνατή η εκτίμηση του θόλου ανά σειρά δέντρων έτσι ώστε να μπορεί να εφαρμοστεί η κατάλληλη ποσότητα φυτοπροστατευτικών προϊόντων.

Απαιτείται ένα GPS για την δημιοργία χαρτώ και για την εκτέλεση μεταβλητού δόσης ψεκασμού και λίπανσης.

Please briefly explain in your national language the problems you are experiencing in practice and which type of research (or knowledge) you need to solve them.

# This is the problem (summary in English)

One of the challenges orchardists face is to actually scout entire orchards and manage them (e.g. tree data logger). In case farmers pick up any small infection points by fungal disease, they have to use fungicides. This can lead to multiple fungicide sprayings throughout the year. Similarly they act with irrigation. Over or under irrigation might occur.

The use of imaging cameras mounted on unmanned drone aircrafts can provide real-time information to growers. The information is related to crop health and water usage.

These aerial photos show orchardists how their trees look like. It serves as a way to identify problematic areas within fields and an initiation to take action, dictate irrigation, crop protection or fertilizing steps.

Data can be collected for targeted individual trees or a portion of the orchard. The estimation of the tree row canopy is possible so that the appropriate amount of crop protection products can be applied.

A GPS is needed for prescription maps and for performing variable rate spraying and fertilization.

Please briefly explain in English the problem that you are experiencing in practice and which type of research (or knowledge) you need to solve it.

# Geographical scope

**Entire Europe** 

Please specify the geographical area/s where the need has been identified.

#### **Keywords**

Remote sensing, aerial imaging, orchard, vineyard

#### Agricultural sectors

Crop production: tree, vineyards

Choose the sectors your issue is relevant for (max.5 selections).

#### Additional information



Please provide here any other relevant information concerning your initiative.

### **Attachments**



# 5.3. Project ideas Research needs in Smart Farming

# **Create Project ideas [1]**

# Title (native language)

Μια ολιστική προσέγγιση της άρδευσης με μεταβλητή δόση **(VRI)** με τη χρήση δορυφορικής τηλεπισκόπησης και αισθητήρων

# Title (in English)

A holistic approach to Variable Rate Irrigation (VRI) using Satellite Remote Sensing and Sensors

#### Description

Η άρδευση στην Ελλάδα διεξάγεται ακόμα και σήμερα βάσει της εμπειρίας των αγροτών. Προς το παρόν, τα χρησιμοποιούμενα συστήματα άρδευσης εφαρμόζουν νερό σε ομοιόμορφα ποσά σε όλο το χωράφι. Αυτό έχει ως αποτέλεσμα την εφαρμογή περισσότερου νερού από ότι απαιτείται σε πολλά σημεία του χωραφιού και κατά συνέπεια σε ανεπαρκή χρήση των υδάτινων πόρων.

Το έργο αυτό είναι πολλά υπόσχόμενο ως προς την ενίσχυση της αποδοτικότητας του νερού. Οι καινοτόμες πρακτικές άρδευσης μπορούν να βελτιστοποιήσουν τη χρήση του νερού μέσω της διαφοροποίησης της εφαρμογής νερού με βάση τοπογραφικά δεδομένα, χάρτες εδάφους και άλλες πληροφορίες που συλλέγονται στο χωράφι από τους αισθητήρες. Μπορεί να πραγματοποιηθεί αναλυτική χαρτογράφηση των αρδευόμενων περιοχών, γεγονός που θα έχει ως αποτέλεσμα τον καλύτερο προγραμματισμό της άρδευσης και τη βελτίωση της αποδοτικότητας της χρήσης του νερού. Μια πιο αποδοτική διαχείριση του νερού, με τον έλεγχο της διαδικασίας άρδευσης, θα μπορούσε να συνδυάσει ευρύτερα περιβαλλοντικά οφέλη, με οικονομικό πλεονέκτημα για τους αγρότες, καθώς προωθεί την αύξηση της παραγωγής και μειώνει το κόστος παραγωγής και ενέργειας ως προς τα καύσιμα και την ηλεκτρική ενέργεια. Τέλος, η άρδευση μεταβλητής δόσης (VRI) συμβάλλει επίσης στην κάλυψη των ειδικών αναγκών υγρασίας μιας καλλιέργειας, βελτιώνοντας την ποιότητα και την απόδοση των καλλιεργειών. Η διαφοροποίηση των καλλιεργειών θα ενισχύσει την παρακολούθησή τους.

Ο στόχος αυτού του έργου είναι να δημιουργηθεί ένα ολοκληρωμένο σύστημα άρδευσης, μια ολιστική προσέγγιση για την ανάλυση και την εξεύρεση λύσης στο πρόβλημα άρδευσης, η οποία εξασφαλίζει κάθε βήμα, από τη γεώτρηση νερού έως την εφαρμογή του. Οι στόχοι είναι οι εξής:

- Σχεδισμός του συστήματος, τον απαραίτητο υλικό εξοπλισμό και την ανάπτυξη του λογισμικού.
- Ενσωμάτωση μερικές πιλοτικών εφαρμογών που οι καλλιεργητές θα "παρακολουθήσουν" πώς λειτουργεί το σύστημα και τελικά τα βελτιωμένα αποτελέσματά του.
- Οι απαραίτητες γνώσεις θα πρέπει να παρέχονται από υπηρεσίες γεωργικών εφαρμογών, βοηθώντας τους αγρότες να προσαρμόσουν και να εφαρμόσουν βιώσιμες λύσεις, κερδίζοντας έτσι περισσότερα οφέλη από την τεχνολογία άρδευσης.
- Οι συμβουλευτικές υπηρεσίες σε συνδυασμό με τα ερευνητικά κέντρα, τα πανεπιστήμια και την ελληνική κυβέρνηση θα πρέπει να διαδραματίσουν σημαντικό ρόλο στην κατάρτιση και την εκπαίδευση των γεωργών σχετικά με τον τρόπο μετάφρασης των μηνυμάτων και προτάσεων που δίνονται από το σύστημα, ώστε να παρθεί η ιδανική απόφαση. Οι διαδικασίες λήψης αποφάσεων αποτελούν μέρος του συστήματος άρδευσης, αλλά κάθε καλλιεργητής πρέπει να έχει τη γνώση να παρεμβαίνει μόνο στην περίπτωση που είναι απολύτως αναγκαίο
- Να μάθουν οι γεωργοί την ανάγκη να μοιράζονται μερικά ακριβά αλλά σημαντικά τον καλύτερο δυνατό εξοπλισμό.
- Ο γεωργός θα πρέπει να είναι σε θέση να χρησιμοποιήσει ένα ολοκληρωμένο σύστημα άρδευσης, χρησιμοποιώντας ένα έξυπνο τηλέφωνο, να πάρει τις σωστές ειδοποιήσεις και προτάσεις για την κατάλληλη στιγμή για το πότε και πόσο να αρδεύσει το χωράφι.
- Να ακολουθείται ένα πρωτόκολλο

Οι κύριες δραστηριότητες περιγράφονται παρακάτω:

- 1. Επιλογή του συστήματος καλλιέργειας που ενδιαφέρει σε ένα ΤΟΕΒ (π.χ., ο Ταυρωπός έχει 120.000 αρδευόμενες εκτάσεις) με βάση την υψηλή κατανάλωση νερού (π.χ. βαμβάκι, αραβόσιτο, καρπούζι κλπ)
- 2. Προσδιορισμός των αναγκών άρδευσης και των εδαφοκλιματικών συνθηκών με αλγόριθμους και εξακρίβωση στη περιοχή
- 3. Σχεδιασμός των ελεγκτών, επιλογή εξαρτημάτων, δημιουργία ενός συστήματος ελέγχου δόσης και χροωισμού
- **4.** Συσχέτιση δεδομένων δορυφορικών λήψεων (π.χ. Sentinel) με δεδομένα εγκατεστημένων αισθητήρων σε επιλεγμένους αγρούς
- 5. Λήψη δεδομένων από εναέρια μέσα με χρήση πχ θερμοκαμερών για καθορισμό σειράς άρδευσης



- 6. Δημιουργήστε μια πλατφόρμα για τον υπολογισμό της δοσολογίας και του χρονισμού της άρδευσης βάσει δορυφορικών, μετεωρολογικών δεδομένων και αισθητήρων (π.χ. υγρασία εδάφους, υγρασία φύλλων, διάμετρος κορμού κ.λπ.)
- 7. Εγκατάσταση συστήματος σε πιλοτικά πεδία για έλεγχο και σύγκριση με παραδοσιακές τεχνικές

Οι απαιτούμενοι αλγόριθμοι θα δημιουργηθούν από τα ερευνητικά ινστιτούτα και τη βιομηχανία, οι πρακτικές άρδευσης θα ελέγχονται από τον επιλεγμένο ΤΟΕΒ σε συγκεκριμένους τομείς, ενώ τα δορυφορικά δεδομένα θα παρέχονται από επιλεγμένες εταιρείες στον τομέα.

Please provide information in your national language to describe the background of your project (problems to be addressed, objectives, main activities, target groups, innovative elements of this action, expected results).

# **Description (in English)**

Irrigation in Greece is conducted based on farmers' experience. Currently, the irrigation systems in use apply water at uniform rates to entire fields. This results in applying more water than needed in many areas in the field and thus to inefficient utilization of water resource. This project holds great promise on enhancing water efficiency. Innovative irrigation practices can optimize water usage (reducing overwatering, underwatering, and run-off) through the customization of water application based on topographic data, soil maps and other information gathered on the field from sensors. Analytical mapping of the irrigated areas could be performed, which will result in better irrigation scheduling and the improvement of water use efficiency. More water-efficient management, by controlling the irrigation process, could combine wider environmental benefits, with economic advantage for farmers, since it promotes an increase in production and reduces the production and energy cost for fuel and electricity. Finally, VRI also helps to meet a crop's specific moisture needs, improving crop quality and yield. The diversification of crops will enhance crop monitoring.

The goal of this project is to create a complete irrigation system, a holistic approach to analyse and evolve a solution to the irrigation problem, which ensures every step, from water drilling to application. The objectives are the follows:

- Design/decide the system, the hardware needed and develop the software.
- Incorporate some piloting applications that growers will "watch" how the system works and its final improved results.
- The necessary knowledge should be provided by extension services, helping farmers to adapt and implement viable solutions, thus gaining more benefits from irrigation technology.
- Advisory services in combination with research centers, universities and the Greek government should play an important role on farmers' training and education on how to translate these messages and suggestions given from the system, to ensure the ideal decision will be made. The decision making processes is a part of the irrigation system but each grower should have the knowledge to interfere only in the case it is absolutely needed
- Teach the growers the need of sharing some expensive but important for better results equipment.
- The farmer should be able to use a completed irrigation system, using a smart-phone, getting the right notifications and suggestions the right time on when and how much to irrigate the field.
- Follow a protocol

The main activities are described below:

- 1. Selection of the crop system of interest in a LLIO (e.g. Tauropos has 120,000 irrigated acres) based on high water consumption (e.g. cotton, maize, watermelon, etc.)
- 2. Determination of irrigation needs and soil and climatic conditions with algorithms and on the field verification
- 3. Design the controllers, select components, create a dose and timing control system
- 4. Correlate satellite data (e.g. Sentinel) with installed in selected fields sensor data
- 5. Receiving data from airborne media by using for example drone cameras to determine the irrigation order to be followed
- 6. Create a platform for calculating the irrigation dosage and timing based on satellite, meteorological data and sensors (e.g. soil moisture, leaf moisture, trunk diameter, etc.)
- 7. Installation of a system in pilot fields for testing and comparison with traditional techniques

The algorithms needed will be generated by research institutes and industry, irrigation practices will be controlled by the selected LLIO in specific areas/fields, while satellite data will be given by selected companies in the sector.



Please provide information in English to describe the background of your project (problems to be addressed, objectives, main activities, target groups, innovative elements of this action, expected results.

# Project coordinator is searching for...

Provide information on what you are looking for (for example, specific expertise, partner in a specific location).

# Geographical scope

Southern, Eastern Europe and the Balkans (Greece, Serbia, Spain)

Please specify the geographical area(s) where the project will (would) be implemented.

#### **Keywords**

Irrigation, Variable Rate, Satellite Remote Sensing, Sensors

# **Agricultural sectors**

Crop production: arable, tree, vegetables, vineyards, grasslands *Choose the sectors the project is relevant for (max.5 selections).* 

# Proposing person or organization

Savvas Paxatiroglou (Farmer)

Theofanis Gemtos, Christos Karamoutis (Research-Professors, University of Thessaly)

Include the name and address of the person or organization that proposes the project idea.

# Contact E-mail

Please provide the e-mail of a contact person for the project.

# **Expected starting date of the project**

Month Nov → Day 22 → Year 2017 →

### **Expected duration**

3-4 years

Please provide the expected duration of the project in months.

# **Additional information**

The estimated budget of the project is approximately 1M euro and the potential source of funding is Measure 16. Primarily an OG can be assembled with all the proposal partners and then prepare a proposal. This way, the produced system can be replicated in other LLIOs.

Please provide here any other relevant information concerning your initiative.

### **Attachments**

When necessary, auxiliary files can be added using this link.



# **Create Project ideas [2]**

# Title (native language)

Ολοκληρωμένο σύστημα για την φυτοπροστασία αμπελώνων επιτραπέζιων σταφυλιών

# Title (in English)

Integrated System for table grape vineyard crop protection

# Description

Η κατάσταση στους αμπελώνες επιτραπέζιων σταφυλιών στην Πελοπόννησο είναι ιδιαίτερη, αφού τα σταφύλια πρέπει να είναι καθαρά, χωρίς κηλίδες αλλιώς δεν είναι εμπορεύσιμα. Αυτό σημαίνει ότι τουλάχιστον 12-20 ψεκασμοί πρέπει να εφαρμόζονται κάθε χρόνο. Έτσι αυξάνεται το κόστος και οι περιβαλλοντικοί κίνδυνοι.

Η αγορά επιτραπέζιων σταφυλιών στην ΕΕ αυξάνεται και η Ελλάδα μπορεί να διαδραματίσει σημαντικό ρόλο ως βασικός παράγοντας στην παραγωγή αυτή. Εάν εφαρμοστεί μία ολοκληρωμένη διαχείρση ζιζανίων (IPM) και η ποιότητα του τελικού προϊόντος παραμείνει σε υψηλά επίπεδα ή και αυξηθεί (τα υπολείμματα φυτοφαρμάκων είναι μειωμένα), τότε η ζήτηση της ευρωπαικής αγοράς θα αυξηθεί συμπαρασύροντας τις τιμές. Ως εκ τούτου, το κύριο όφελος θα είναι για τους πολυάριθμους παραγωγούς να διατηρήσουν και να αυξήσουν το μερίδιό τους στην αγορά.

Ένα άλλο πλεονέκτημα θα είναι η μείωση του κόστους παραγωγής επιτραπέζιων σταφυλιών λόγω της μείωσης της εφαρμογής φυτοπροστατευτικού προϊόντος (PPP), η οποία επί του παρόντος είναι πάνω από 20-30% του συνολικού κόστους παραγωγής.

Η προαναφερθείσα μείωση της χρήσης PPP θα παρέχει άμεσα και περιβαλλοντικά οφέλη, καθώς ένα σημαντικό μέρος των PPP που εφαρμόζονται στους αμπελώνες κατανέμεται σε γειτονικές περιοχές λόγω της επίδρασης τουν νέφους ψεκασμού.

Το έργο θα επικεντρωθεί στη βελτιστοποίηση των στρατηγικών προστασίας των καλλιεργειών σε επιτραπέζιους αμπελώνες στην Πελοπόννησο. Σκοπός του έργου είναι η ρύθμιση της χρήσης φυτοπροστατευτικών προϊόντων για τη διατήρηση της ποιότητας και της ποσότητας του τελικού προϊόντος σε υψηλά επίπεδα και την ταυτόχρονη μείωση του οικονομικού και περιβαλλοντικού κόστους.

Το έργο θα παρέχει ένα πλήρες σύστημα ΙΡΜ με:

- 1. Μοντελοποίηση ασθενειών προσαρμοσμένη στη συγκεκριμένη περιοχή
- 2. Επιλογή φυτοπροστατευτικού προϊόντος (PPP) για κάθε ασθένεια
- 3. Ανάπτυξη εφαρμογής (app) όπου όλοι οι εταίροι του συνεταιρισμού θα πρέπει να συνδεθούν πριν εφαρμόσουν οποιοδήποτε είδος PPP
- 4. Όλοι οι ελκυστήρες πρέπει να είναι εφοδιασμένοι με συνδεδεμένες σε πραγματικό χρόνο συσκευές GNSS για την παρακολούθηση σε κεντρικό επίπεδο από το συνεταιρισμό
- 5. Βελτιστοποίηση ψεκαστήρων για τη μείωση του νέφους ψεκασμού και την εφαρμογή πολλαπλών αισθητήρων (ροή, πίεση, κλπ.) για την παροχή όλων των πληροφοριών στο σύστημα
- 6. Πλήρης καταγραφή αρχείων για κάθε χωράφι για την παροχή ανιχνευσιμότητας σε μορφή QR
- 7. Βελτιστοποίηση ολόκληρου του συστήματος με χρήση των αποθηκευμένων δεδομένων κάθε έτους **(**διαδικασία εκμάθησης**)**

Please provide information in your national language to describe the background of your project (problems to be addressed, objectives, main activities, target groups, innovative elements of this action, expected results).

# **Description (in English)**

The situation in table grape vineyards in Peloponnese is unique, since the grapes need to be clean, with no collored spots, or else it is not marketable. This means that at least 12-20 spraying application have to be applied every year. This increases cost and environmental hazards.

Table grapes market in the EU is growing and Greece can play a significant role as a key player in this production. If an IPM system is applied and the quality of the final product remains in high standards or even increases (pesticide residues are reduced), then the EU market demand will increase taking prices up. Therefore, the main benefit will be for the numerous producers to maintain and increase their market share.

Another benefit will be the reduction of costs for table grapes production due to the reduction of plant protection product (PPP) application, which at the moment counts for over 20-30% of the total production cost.

The above mentioned PPP use reduction will directly provide also environmental benefits, as a significant part of the PPPs applied in vineyards are spread in neighboring areas due to spray drift effect.



The project will focus on the optimization of crop protection strategies in table grape vineyards in Peloponnese. The goal of the project is to regulate plant protection product use to keep the quality and quantity of the final product in high levels and at the same time reduce economic and environmental costs.

The project will provide a full IPM system with:

- 1. Disease modelling adjusted in the specific region
- 2. Selection of plant protection product (PPP) for each disease
- 3. Development of an App where all partners of the cooperative will have to sign in before they apply any kind of PPP
- 4. All tractors have to be equipped with real-time connected GNSS devices for monitoring centrally from the cooperative headquarters
- 5. Optimization of sprayers to reduce spray drift and application of multiple sensors (flow, pressure, etc.) to provide all information in the system
- 6. Full record keeping for each field to provide traceability in a QR format
- 7. Optimization of the whole system using the stored data of each year (learning process)

Please provide information in English to describe the background of your project (problems to be addressed, objectives, main activities, target groups, innovative elements of this action, expected results.

# Project coordinator is searching for...

# Geographical scope

Southern, Eastern Europe (France, Greece, Serbia, Spain)

Please specify the geographical area(s) where the project will (would) be implemented.

#### **Keywords**

Table grapes, vineyard, crop protection, pesticide

# **Agricultural sectors**

Crop production (intensive subsistence and shifting cultivation): arable, tree, vegetables, vineyards, grasslands

# Proposing person or organization

Markos Legas, (President-PIGASOS AGRICULTURE, Agricultural Cooperative of Grapes)

Aris Zamidis, (Industry- CEO, Tractor GPS)

Nikos Petkos, (Industry- CEO, AGROMA)

George Bourodimos, (Research & Advisory-Researcher, ELGO-DIMITRA)

Dionysis Kalyvas, (Research-Professor, AUA)

Thanos Balafoutis, (Research-Researcher, iBO-CERTH)

# Contact E-mail

Diagra provide the email of a contact person for the project

Please provide the e-mail of a contact person for the project.

# **Expected starting date of the project**

Month Nov - Day 22 - Year 2017 -

#### **Expected duration**

3 years

# **Additional information**

The estimated budget of the project is approximately 600,000-800,000 euro and the potential source of funding is Measure 16, Ministry of Agriculture.

Please provide here any other relevant information concerning your initiative.

#### **Attachments**

When necessary, auxiliary files can be added using this link.



# **Create Project ideas [3]**

Title (native language)

Συμβουλευτικές υπηρεσίες ολοκληρωμένης γεωργίας

Title (in English)

Integrated Agriculture Advisory Services

#### Description

Οι αγρότες στην Ελλάδα δεν έχουν επίσημη εκπαίδευση και κατάρτιση. Η εφαρμογή άρδευσης, λίπανσης και ψεκασμού γίνεται ακόμα, σε πολλές περιπτώσεις, σύμφωνα με την προσωπική εμπειρία κάθε γεωργού. Επίσης, δεν έχουν πρόσβαση στον απαραίτητο εξοπλισμό και οργανωμένες υπηρεσίες γεωργικών εφαρμογών, κυρίως από την κυβέρνηση και τα πανεπιστήμια. Οι αγρότες και οι επιχειρηματίες που σχετίζονται με τη γεωργία "εξακολουθούν να διστάζουν να προχωρήσουν στην υιοθέτηση νέων τεχνολογιών.

Η πλατφόρμα, ως εθνική αναφορά γνώσεων σχετικά με τη γεωργία, μπορεί να χρησιμεύσει ως καταλύτης για τους φορείς και τα άτομα στη γεωργία και την αγροτική ανάπτυξη για να μοιραστούν τη γνώση, να μάθουν από άλλους και να βελτιώσουν τη λήψη αποφάσεων. Οι διάφοροι ενδιαφερόμενοι μπορούν τελικά να βοηθήσουν στη βελτίωση και ενίσχυση των αγροτικών κοινοτήτων και στην οικοδόμηση μιας βιώσιμης γεωργίας μέσω της βελτίωσης των πολιτικών και των διαδικασιών γύρω από τη γεωργία.

Μέσω της πλατφόρμας, εκτός από την άμεση επαφή με συμβουλευτικές υπηρεσίες σε επιλεγμένα σημεία, οι αγρότες θα έχουν την ευκαιρία να:

- Κάνουν ερωτήσεις και επικοινωνήστε με εμπειρογνώμονες, επαγγελματίες και παραγωγούς
- Μοιραστούν εμπειρίες στον τομέα
- Μάθουν πώς να εφαρμόζονται τεχνολογίες και πρακτικές

Αυτό θα οδηγήσει σε μειωμένο κόστος για συμβουλευτικές υπηρεσίες.

Επιπλέον, η έννοια του να μοιράζεται ο εξοπλισμός θα εξαλείψει ένα σημαντικό εμπόδιο για την είσοδο νέων γεωργών. Δεδομένου ότι είναι όλο και πιο δύσκολο να αγοραστεί γεωργικός εξοπλισμός, η από κοινού χρήση του παρέχει πρόσβαση σε αυτόν για ένα μέρος του κόστους αγοράς.

Ο απώτερος στόχος αυτού του προτεινόμενου έργου είναι η ενίσχυση της γνώσης των γεωργών με την ενδυνάμωση των υπηρεσιών γεωργικών εφαρμογών και συμβουλευτικής στην Ελλάδα.

Ο κύριος στόχος είναι η δημιουργία μιας πλατφόρμας, όπου κάποιος θα μπορεί να βρεί πρακτικές πληροφορίες σχετικά με τις γεωργικές τεχνολογίες και πρακτικές, να αλληλεπιδράσει με ανθρώπους με παρόμοια ενδιαφέροντα και να συζητήσει για βιώσιμες λύσεις σε διαδικτυακά φόρουμ.

Αυτή η πλατφόρμα θα προωθήσει την ανταλλαγή πληροφοριών και τη διευκόλυνση του διαλόγου για την επαγγελματικοποίηση, την τυποποίηση και τη διασφάλιση της ποιότητας για μια πιο βιώσιμη γεωργία και ανάπτυξη της υπαίθρου. Θα επωφεληθεί από την ενεργό συνεργασία των συντελεστών της, συμπεριλαμβανομένης της κυβέρνησης, αγροτικών συναιτερισμών, των ερευνητικών κέντρων και του ακαδημαϊκού χώρου, άλλων ειδικών στον τομέα της πληροφόρησης και επικοινωνίας, θεσμικών παραγόντων, των επιχειρηματιών, των επαγγελματιών ανάπτυξης, των φοιτητών και άλλων.

Η πλατφόρμα θα συγκεντρώσει ψηφιοποιημένες ποιοτικές πληροφορίες για τη γεωργία από όλη την Ελλάδα, συμπεριλαμβανομένων των εθνικών νόμων και κανονισμών, των δημόσιων πολιτικών, των βέλτιστων πρακτικών, των σχετικών δεδομένων και στατιστικών, των ερευνών, των άρθρων και των δημοσιεύσεων.

Η ανταλλαγή γνώσεων αφορά την έναρξη εποικοδομητικού διαλόγου. Αυτή θα είναι μία από τις κύριες δραστηριότητες της πλατφόρμας μέσω των συζητήσεων σε ομάδες συνομιλίας (online φόρουμ). Στόχος είναι η παροχή φόρουμ για τους επαγγελματίες, τους ερευνητές, τους παρόχους συμβουλευτικών υπηρεσιών, τους αγρότες και άλλους ενδιαφερόμενους στην Ελλάδα για να συζητήσουν διάφορα θέματα σχετικά με την καινοτομία των γεωργών και να μοιραστούν διαφορετικές καινοτόμες πρακτικές, τεχνολογίες και διαδικασίες. Τα θέματα θα βασίζονται στη ζήτηση και θα συντονίζονατι από ιδρύματα εταίρους που ειδικεύονται σε συγκεκριμένους γεωργικούς τομείς. Το φόρουμ αυτό θα προσφέρει επίσης την ευκαιρία για ερωτήσεις και απαντήσεις και να διερευνηθούν τομείς κοινού ενδιαφέροντος που ενδεχομένως χρησιμεύουν ως βάση για την σύναψη εταιρικών σχέσεων.

Οι κύριες δραστηριότητες περιγράφονται παρακάτω:

- 1. Διευκόλυνση και ενίσχυση της αποτελεσματικής και συνεχούς δημιουργίας και ανταλλαγής γνώσεων. Εκπαίδευση των γεωργών μέσω εργαστηρίων δημιουργικής επιχειρηματικής κατάρτισης που αλληλεπιδρούν με τους καινοτόμους αγρότες που έχουν ήδη δοκιμάσει μεθόδους και εξοπλισμό που λειτουργεί καλά στον τομέα και με την καθιέρωση της «έννοιας του παρατηρητηρίου των πολιτών» για τη γεωργία και των διδαγμάτων, ενημερωμένες στατιστικές, δημοσιεύσεις και πρωτοβουλίες που ενθαρρύνουν τη διάδοση γνώσεων και πληροφοριών
- 2. Συμβουλευτικές υπηρεσίες: Επαγγελματισμός των αγροτικών συμβουλευτικών υπηρεσιών. Δημιουργία συνεργασίας με επιστήμονες και γεωπόνους



- 3. Θέσεις αγρών: δημιουργία ξεχωριστών σταθμών ανά περιοχή για απόκτηση δεδομένων από αντιπροσωπευτικούν αγρούς, θεωρούμενα ως "κοινός αγρός", χρησιμοποιώντας αισθητήρες
- 4. Υποστήριξη ενός πολιτικού πλαισίου και κατάλληλων επενδύσεων στη γεωργία
- 5. Μέτρα καινοτομίας
- 6. Χρηματοδότηση που προέρχεται από τη βιομηχανία
- 7. Δημιουργία μιας ανοικτής και ολοκληρωμένης πλατφόρμας διαχείρισης
- **8.** Καινοτόμος αγροτικός εξοπλισμός και μηχανήματα για μικρούς και μεσαίους γαιοκτήτες. Η γη και η τεχνογνωσία μπορούν επίσης να μοιραστούν.

Please provide information in your national language to describe the background of your project (problems to be addressed, objectives, main activities, target groups, innovative elements of this action, expected results).

# **Description (in English)**

Farmers in Greece lack of formal education attainment and training. The application of irrigation, fertilization and spraying is still done, in many cases, according to each farmer's personal experience. They also lack access to the necessary equipment and organized extension services, mainly by the government and universities. Farmers and agriculture related entrepreneurs' still hesitate to progress by adopting new technologies.

The Platform, as a nationwide knowledge reference on farming, can serve as a catalyst for institutions and individuals in agriculture and rural development to share knowledge, learn from others, and improve decision making. The different stakeholders can ultimately assist to improve and empower rural communities and build sustainable agriculture by improving policies and processes around farming.

Thought the Platform, on top of the direct contact with advisory services in selected points, farmers will have the opportunity to:

- Ask questions and connect with experts, practitioners and producers
- Share experiences in the field
- Learn how to implement technologies and practices

This will lead to a reduced cost for advisory services.

Additionally, the concept of equipment sharing will eliminate a significant barrier to entry for young, next-generation farmers. Since it has become increasingly difficult to purchase agricultural equipment, sharing it provides access to it for a fraction of the initial purchasing cost.

The ultimate goal of this proposed project is to enhance farmers' knowledge by strengthening agricultural extension and advisory services within Greece.

The main objective is to create a platform, where one can find practical information about agricultural technologies and practices, interact with people with similar interests and discuss sustainable solutions in online forums.

This Platform will promote information exchange and sharing and facilitate dialogue to achieve professionalization, standardization and quality assurance for a more sustainable agriculture and rural development. It will benefit from the active collaboration of its contributors including the Government, farmers' organizations, research centres and academia, other information and communication specialists, policy makers, business people, development practitioners, students and others.

The Platform will gather digitized quality information on agriculture from all over Greece; including national laws and regulations, public policies, best practices, relevant data and statistics, researches, articles and publications.

Knowledge exchange is about starting constructive dialogue. This will be one of the main activities in the platform through the Chatting Group Discussions (online forums). The objective is to provide forums for practitioners, researchers, advisory service providers, farmers and other stakeholders in Greece to discuss different topics related to farmer innovation and to share different innovative practices, technologies and processes. Topics will be demand-driven, and lead by partner institutions specializing in specific agriculture areas. These forum will also offer the opportunity to ask and answer questions and explore areas of common interest that potentially serve as the basis for establishing partnerships.

The main activities are described below:

- 1. Facilitation and enhancement of effective and continuous knowledge generation and exchange. Farmers education through creative business training workshops, interacting with innovative farmers who have already tried methods and equipment that works well on the field, and establishing the "citizen observatory concept" for farming, lessons learned, as well as online access to programmes, legislation, updated statistics, publications, and initiatives fosters knowledge and information dissemination
- 2. Advisory services: Professionalization of rural advisory services. Establishing cooperation with scientists and agronomists

#### **Smart AKIS Report**



- 3. Field locations: establish separate stations by region for data acquisition from representative fields, considered as a "common field", using sensors
- 4. Advocacy and support for an enabling policy environment and appropriate investment in agriculture
- 5. Innovation metrics
- 6. Funding coming from the industry
- 7. Creation of an open and integrated management platform
- 8. Innovative agricultural equipment and machinery sharing for small and medium landholding farmers. Land and expertise can also be shared.

Please provide information in English to describe the background of your project (problems to be addressed, objectives, main activities, target groups, innovative elements of this action, expected results.

# Project coordinator is searching for...

Provide information on what you are looking for (for example, specific expertise, partner in a specific location).

# **Geographical scope**

#### **Entire Europe**

Please specify the geographical area(s) where the project will (would) be implemented.

#### **Keywords**

Agricultural knowledge, extension and advisory services, decision-making, information

#### **Agricultural sectors**

Crop production and animal production

Choose the sectors the project is relevant for (max.5 selections).

#### Proposing person or organization

Georgios Galousis (Industry-Bayer)

Fotis Chatzipapadopoulos (Industry- NEUROPUBLIC)

Klearxos Daskalakis, (Industry-Tractor GPS)

Georgios Kokkinos (Farmer- Nileas Association of olive oil producers)

Michael Tsagkaropoulos (Industry- KONDELLIS SA)

Include the name and address of the person or organization that proposes the project idea.

# **Contact E-mail**

Please provide the e-mail of a contact person for the project.

### Expected starting date of the project

Month Nov Day 22 Year 2017

#### **Expected duration**

4 years

Please provide the expected duration of the project in months.

# **Additional information**

The estimated budget of the project is approximately 800,000-1M euro and the potential source of funding is Measure 16, for Operational Group creation and Innovation research projects between OGs members of the Ministry of Agriculture and the General Secretariat of Research & Development initiative «Research-Create-Innovate»

Please provide here any other relevant information concerning your initiative.

#### **Attachments**

When necessary, auxiliary files can be added using this link.



# 5.4. Project ideas from workshops

| Category of project          | Smart Farming Technology   | Crop system |             |            |
|------------------------------|--|-------------|-------------|------------|
| Innovation                   | A holistic approach to Variable<br>Rate Irrigation (VRI) using Satellite<br>Remote Sensing and Sensors |             | Vegetables, | Vineyards, |
| Promoter/s name/s            |  |             |             |            |
| Savvas Paxatiroalou (Farmer) |  |             |             |            |

Theofanis Gemtos, Christos Karamoutis (Research- Proessors University of Thessaly)

# Partner/s of the proposal and role

Theodore Kokiousis (Farmer- PIGASOS AGRICULTURE, Agricultural Cooperative of Grapes)

Athanasios Markinos (Advisory: President of the Local Land Improvement Organizations (LLIO))

Hara Koutalou (Industry- MATRIX) – Sensors and VRI

Zisis Tsiropoulos, Panagiotis Stamatelopoulos (Industry- AGENSO) – Software for VRI

Panagiotis Ilias (Industry- NEUROPUBLIC) – Informative Platform

#### Title of project

A holistic approach to Variable Rate Irrigation (VRI) using Satellite Remote Sensing and Sensors

### **Expected benefits**

This project holds great promise on enhancing water efficiency. Innovative irrigation practices can optimize water usage (reducing overwatering, underwatering, and run-off) through the customization of water application based on topographic data, soil maps and other information gathered on the field from sensors. Analytical mapping of the irrigated areas could be performed, which will result in better irrigation scheduling and the improvement of water use efficiency. More water-efficient management, by controlling the irrigation process, could combine wider environmental benefits, with economic advantage for farmers, since it promotes an increase in production and reduces the production and energy cost for fuel and electricity. Finally, VRI also helps to meet a crop's specific moisture needs, improving crop quality and yield. The diversification of crops will enhance crop monitoring.

#### Goal and objectives

Create a complete irrigation system. A holistic approach to analyse and evolve a solution to the irrigation problem, which ensures every step, from water drilling to application.

- Design/decide the system, the hardware needed and develop the software.
- Incorporate some piloting applications that growers will "watch" how the system works and its final improved results.
- The necessary knowledge should be provided by extension services, helping farmers to adapt and implement viable solutions, thus gaining more benefits from irrigation technology.
- Advisory services in combination with research centers, universities and the Greek government should play an important role on farmers' training and education on how to translate these messages and suggestions given from the system, to ensure the ideal decision will be made. The decision making processes is a part of the irrigation system but each grower should have the knowledge to interfere only in the case it is absolutely needed
- Teach the growers the need of sharing some expensive but important for better results equipment.
- The farmer should be able to use a completed irrigation system, using a smart-phone, getting the right notifications and suggestions the right time on when and how much to irrigate the field.
- Follow a protocol

# Planned work packages or main activities

- 1. Selection of the crop system of interest in a LLIO (e.g. Tauropos has 120,000 irrigated acres) based on high water consumption (e.g. cotton, maize, watermelon, etc.)
- 2.Determination of irrigation needs and soil and climatic conditions with algorithms and on the field verification



- 3. Design the controllers, select components, create a dose and timing control system
- 4. Correlate satellite data (e.g. Sentinel) with installed in selected fields sensor data
- 5. Receiving data from airborne media by using for example drone cameras to determine the irrigation order to be followed
- 6. Create a platform for calculating the irrigation dosage and timing based on satellite, meteorological data and sensors (e.g. soil moisture, leaf moisture, trunk diameter, etc.)
- 7. Installation of a system in pilot fields for testing and comparison with traditional techniques

The needed algorithms will be generated by research institutes and industry, irrigation practices will be controlled by the selected LLIO in specific areas/fields, while satellite data will be given by selected companies in the sector.

### **Estimated budget**

200K - 1M euro

#### Planned source of funding

Measure 16. Primarily an OG can be assembled with all the proposal partners and then prepare a proposal. This way, the produced system can be replicated in other LLIOs.

# **Maturity level**

This innovative idea is still in the experimental/piloting stage, but there is increase knowledge in the irrigation sector and the relative monitoring devices. It can benefit from the different actors' feedback on how to be planned properly to become a successful innovation.

#### **Cross-border potentiality**

This can become a multinational Project involving actors from Southern and Eastern European countries (Spain, Greece, Serbia), that face the same issues when it comes to irrigation and water management.

| Category of project | Smart Farming Technology          | Crop system     |
|---------------------|-----------------------------------|-----------------|
|                     | Integrated System for table grape | Tree, Vineyards |
| Innovation          | vineyard crop protection          |                 |

### Promoter/s name/s

Markos Legas, (President- PIGASOS AGRICULTURE, Agricultural Cooperative of Grapes)

Aris Zamidis, (Industry- CEO, Tractor GPS) Nikos Petkos, (Industry- CEO, AGROMA)

George Bourodimos, (Research & Advisory-Researcher, ELGO-DIMITRA)

Dionysis Kalyvas, (Research-Professor, AUA)

Thanos Balafoutis, (Research-Researcher, iBO-CERTH)

#### Partner/s of the proposal and role

Pigasos Cooperative: This cooperative will be the end-user and the demo farm of the project.

Tractor GPS: This company will work on the GNSS and satellite imagery.

AGROMA: This company will provide spraying technology.

ELGO-DIMITRA: This research entity has the facilities for spraying machinery inspection.

AUA: This research group can work thoroughly in satellite imagery.

iBO-CERTH: This Institute can provide technological solutions for precision spraying.

# Title of project

Integrated System for table grape vineyard crop protection

#### **Expected benefits**

Table grapes market in the EU is growing and Greece can play a significant role as a key player in this production. If an IPM system is applied and the quality of the final product remains in high standards or even increases (pesticide residues are reduced), then the EU market demand will increase taking prices up. Therefore, the main benefit will be for the numerous producers to maintain and increase their market share.



Another benefit will be the reduction of costs for table grapes production due to the reduction of plant protection product (PPP) application, which at the moment counts for over 20-30% of the total production cost.

The above mentioned PPP use reduction will directly provide also environmental benefits, as a significant part of the PPPs applied in vineyards are spread in neighboring areas due to spray drift effect.

#### Goal and objectives

The project will focus on the optimization of crop protection strategies in table grape vineyards in Peloponnese. The situation in this specific crop is unique, since the grapes need to be clean, with no collored spots, or else it is not marketable. This means that at least 12-20 spraying application have to be applied every year. This increases cost and environmental hazards. Therefore, the objective of the project is to regulate plant protection product use to keep the quality and quantity of the final product in high levels and at the same time reduce economic and environmental costs.

#### Planned work packages or main activities

The project will provide a full IPM system with:

- 1. Disease modelling adjusted in the specific region
- 2. Selection of plant protection product (PPP) for each disease
- 3. Development of an App where all partners of the cooperative will have to sign in before they apply any kind of PPP
- 4. All tractors have to be equipped with real-time connected GNSS devices for monitoring centrally from the cooperative headquarters
- 5. Optimization of sprayers to reduce spray drift and application of multiple sensors (flow, pressure, etc.) to provide all information in the system
- 6. Full record keeping for each field to provide traceability in a QR format
- 7. Optimization of the whole system using the stored data of each year (learning process)

#### **Estimated budget**

600.000 - 800.000 euro

#### Planned source of funding

Measure 16, Ministry of Agriculture

#### **Maturity level**

In a scale 0-10, the maturity is 5-7. The consortium is really interested in the project, the idea is very good for Greek agriculture (since high-value crops are very important for its uptake) and the partners can cover all sides of the project.

#### **Cross-border potentiality**

As all south EU countries have table grapes vineyards, there is a significant cross-border potentiality, especially with Spain and France.

| Category of project | Smart Farming Technology        | Crop system                          |
|---------------------|---------------------------------|--------------------------------------|
| Innovation          | [FMIS]                          | Arable, Tree, Vegetables, Vineyards, |
| Technology transfer | Integrated Agriculture Advisory | Grasslands                           |
| Market uptake       | Services                        |                                      |
| Duamataula namala   |                                 |                                      |

#### Promoter/s name/s

Georgios Galousis (Industry- Bayer)

Fotis Chatzipapadopoulos (Industry- NEUROPUBLIC)

Klearxos Daskalakis, (Industry-Tractor GPS)

Georgios Kokkinos (Farmer- Nileas Association of olive oil producers)

Michael Tsagkaropoulos (Industry- KONDELLIS SA)

### Partner/s of the proposal and role

Nileas Association of olive oil producers, Agricultural Cooperative of Grapes (Farmers and Farmers' Associations)



Agricultural University of Athens (Research)
EL.GO "DIMITRA" (Extension Services and Advisory)
Bayer (Industry)
TractorGPS, KONDELLIS SA (Industry)

#### Title of project

Farmers sharing: from community spirit to a corporate Platform

#### **Expected benefits**

The Platform, as a nationwide knowledge reference on farming, can serve as a catalyst for institutions and individuals in agriculture and rural development to share knowledge, learn from others, and improve decision making. The different stakeholders can ultimately assist to improve and empower rural communities and build sustainable agriculture by improving policies and processes around farming.

Thought the Platform, on top of the direct contact with advisory services in selected points, farmers will have the opportunity to:

- Ask questions and connect with experts, practitioners and producers
- Share experiences in the field
- Learn how to implement technologies and practices

This will lead to a reduced cost for advisory services.

Additionally, the concept of equipment sharing will eliminate a significant barrier to entry for young, next-generation farmers. Since it has become increasingly difficult to purchase agricultural equipment, sharing it provides access to it for a fraction of the initial purchasing cost.

#### Goal and objectives

# The ultimate goal of this proposed project is to enhance farmers' knowledge by strengthening agricultural extension and advisory services within Greece.

The main objective is to create a platform, where one can find practical information about agricultural technologies and practices, interact with people with similar interests and discuss sustainable solutions in online forums.

This Platform will promote information exchange and sharing and facilitate dialogue to achieve professionalization, standardization and quality assurance for a more sustainable agriculture and rural development. It will benefit from the active collaboration of its contributors including the Government, farmers' organizations, research centres and academia, other information and communication specialists, policy makers, business people, development practitioners, students and others.

The Platform will gather digitized quality information on agriculture from all over Greece; including national laws and regulations, public policies, best practices, relevant data and statistics, researches, articles and publications.

Knowledge exchange is about starting constructive dialogue. This will be one of the main activities in the platform through the Chatting Group Discussions (online forums). The objective is to provide forums for practitioners, researchers, advisory service providers, farmers and other stakeholders in Greece to discuss different topics related to farmer innovation and to share different innovative practices, technologies and processes. Topics will be demand-driven, and lead by partner institutions specializing in specific agriculture areas. These forum will also offer the opportunity to ask and answer questions and explore areas of common interest that potentially serve as the basis for establishing partnerships.

### Planned work packages or main activities

- 1. Facilitation and enhancement of effective and continuous knowledge generation and exchange. Farmers education through creative business training workshops, interacting with innovative farmers who have already tried methods and equipment that works well on the field, and establishing the "citizen observatory concept" for farming, lessons learned, as well as online access to programmes, legislation, updated statistics, publications, and initiatives fosters knowledge and information dissemination
- 2. Advisory services: Professionalization of rural advisory services. Establishing cooperation with scientists and agronomists
- 3. Field locations: establish separate stations by region for data acquisition from representative fields,



considered as a "common field", using sensors

- 4. Advocacy and support for an enabling policy environment and appropriate investment in agriculture
- 5. Innovation metrics
- 6. Funding coming from the industry
- 7. Creation of an open and integrated management platform
- 8. Innovative agricultural equipment and machinery sharing for small and medium landholding farmers. Land and expertise can also be shared.

# **Estimated budget**

800K -1M euro

### Planned source of funding

Measure 16 for Operational Group creation and Innovation research projects between OGs members of the Ministry of Agriculture and the General Secretariat of Research & Development initiative «Research-Create-Innovate»

#### **Maturity level**

This project idea is still at a relatively good maturity level and all of the actors that will be involved have thought of it very thoroughly. This is a very much-needed project with great potential not only in Greece but all over Europe.

# **Cross-border potentiality**

There is a significant cross-border potentiality all over the EU, as enhancing effective and continuous knowledge as well as improving advisory services in the agricultural sector is of high importance throughout Europe.





THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION'S HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 696294

SMART AKIS PARTNERS:

























