Project Acronym:	**LIFE GAIA Sense**
Grant Agreement number:	**LIFE17 ENV/GR/000220**
Project Title:	**LIFE GAIA Sense: Innovative Smart Farming services supporting Circular Economy in Agriculture**

DELIVERABLE

Training Plan and Material

Type of Document	Deliverable
Contractual date of delivery	30/09/2018
Deliverable Leader	GAIA
Status – version, date	Final version 1.0, 28/09/2018
Action	B.1

Project co-funded by the European Commission within the LIFE 2014-2020 programme		
Dissemination Level		
P	**Public**	
C	**Confidential, only for members of the consortium and the Commission Services**	**X**

Executive Summary

The Training Plan and Material outlines the objectives, needs, strategy and curriculum to be addressed at training users of LIFE GAIA Sense. The plan presents the activities needed to support tile development of the final training materials, also concerning the coordination of training schedules as well as other training - related tasks. Training activities are developed to teach the selected target groups as specified in the training criteria. It must be noticed that farmers, agronomists, experts etc have an individual background of knowledge, experience and skills. Differiented learning aims to tailor teaching to individual needs, interests and aptitude to ensure that all stakeholders will achieve the highest standards possible. Therefore, LIFE GAIA Sense Training Plan and Material adapts the personal needs and interest of all stakeholders.

Role	Name (Organisation)
Deliverable Leader:	I. Galatoulas (GAIA)
Contributors:	I. Fragoulis, I. Papanikolaou (GAIA), N. Marianos (NP)
Reviewers:	K. Mastrogiannis (NP)
Approved by:	K. Mastrogiannis (NP)

Version	Date	Contributor(s)	Description
0.1	10/09/2018	I. Galatoulas, I. Fragoulis, I. Papanikolaou (GAIA),	Draft for review
0.2	19/09/2018	I. Galatoulas, I. Fragoulis, I. Papanikolaou (GAIA), K. Michos, N. Kalatzis, N. Marianos (NP)	Draft for review
1.0	28/09/2018	I. Galatoulas (GAIA)	Final version

Table of Contents

Table of Figures

List of Tables

Definitions, Acronyms and Abbreviations

Acronym/term	Explanation
AUTH	ARISTOTELIO PANEPISTIMIO THESSALONIKIS (Aristotle University Of Thessaloniki – Special Account Of Research Funds)
CAP	Common Agricultural Policy
CE	Circular Economy
CONFAGRI	Confederação Nacional Das Cooperativas Agrícolas E Do Crédito Agrícola De Portugal CCRL
COSTEIRA	Viña Costeira Scg
D	Deliverable
EU	European Union
FSCs	Farmers' Service Centers
GAIA	Gaia Epicheirein Anonymi Etaireia Psifiakon Ypiresion
ICM	Intergraded Crop Management
NP	Neuropublic Ae Pliroforikis & Epikoinonion
SF	Smart Farming

1. Introduction

1.1. Project Summary

The main objective of the LIFE GAIA Sense project is to demonstrate GAIA Sense, an innovative "Smart Farming" (SF) solution that aims at reducing the consumption of natural resources, as a way to protect the environment and support Circular Economy (CE) models.

More specifically, this project will launch 18 demonstrators across Greece, Spain and Portugal covering 9 crops (olives, peaches, cotton, pistachio, potatoes, table tomatoes, industrial tomatoes, almonds, kiwi) in various terrain and microclimatic conditions. They will demonstrate an innovative method, based on high-end technology, which is suitable for being replicated and will be accessible and affordable to Farmers either as individuals or collectively through Agricultural Cooperatives.

Moreover, LIFE GAIA Sense aims to promote resource efficiency practices in SMEs of the agricultural sector and eventually, contribute to the implementation of the Roadmap to a Resource Efficient Europe. This project will demonstrate a method on how the farmer will be able to decide either to use or avoid inputs (irrigation, fertilizers, pesticides etc.) in a most efficient way, without risking the annual production. The focus is on the resource consumption reduction side of CE, and the results will be both qualitatively and quantitatively, considering the resources' efficiency in agricultural sector.

1.2. Document Scope

This LIFE GAIA Sense Training Plan and Material establishes procedures to plan, develop, implement, and maintain the LIFE GAIA Sense Training plan and curriculum.

1.3. Document Structure

This document is comprised of the following chapters:

Chapter 1 presents an Introduction to the project and the document.

Chapter 2 presents the Strategy and Approach

Chapter 3 outlines the Action Plan

Chapter 4 presents the Forms- Means of training

Chapter 5 outlines the Training Resources

Chapter 6 outlines Training Curriculum

Chapter 7 presents the Training Schedule and Locations

2. Strategy and Approach

2.1. Planning Principles – Constraints

Various scenarios were considered to form a basis for the plan and multiple assumptions were made. The applicability of the plan is predicated on the provision of distinguished training programmes according to their targeted groups.

The Training Plan and Material deliverable identifies any limitation that must be taken into consideration regarding the content of this plan. For example, there must be a minimum level of agricultural education or experience, for trainees.

This is a crucial constraint as almost 90% of Greek farmers have not received any agricultural training other than their own practical experience. The peculiarity of the primary sector and the alarming difference with other sectors is concentrated into the lack of basic knowledge of a very large percentage of the employed, the empirical knowledge and the large geographical dispersion of the employees, which shapes the need for a specific design of a training plan regarding smart farming. Thus, the GAIA LIFE Sense Training Plan and Material has foreseen this necessity and created information material which contains some basic information regarding the agricultural sector. This material will be distributed both to information and educational events.

In order to meet the different possible aspects and provide a more tailored approach to training, the proposed GAIA LIFE Sense training plan and material will be delivered by creating programmes from appropriate combinations of training materials and means.

2.2. Strategy and Approach

Smart farming solutions present a complex process of learning through collecting, integrating and interpreting field spatial and temporal information. The process of learning therefore constitutes the most difficult step and the most challenging to teach. Both face2face seminars in class and on the field, self-training material (manuals, videos etc) and online courses will be used. It is preferable to be combined with other events and use e-learning as much as possible to reduce the usage of the resources and carbon footprint.

For the creation of an integrated training plan for the LIFE GAIA Sense project, the following steps and processes were followed as illustrated graphically in Figure 1 below:

Figure 1: Training Approach

The framework is designed to guide learners to achieve an overall set of goals and then associates objectives and activities to achieve those overall goals, and evaluates the activities and results to be sure the goals were achieved.

2.3.   Analysis of the training needs

LIFE GAIA Sense has identified the need for informing the wider audience and specifically farmers on the appropriate consumption of natural recourses and the efficient use of agricultural inputs. As far as the agronomists are concerned is essential in order to be able to provide an advice that is fed by a broad range of data, powered by both scientific knowledge and human experience to be fully informed and both theoretically and in situ trained. More specifically LIFE GAIA Sense has detected the need for providing training to experts as to use a large scale Smart Farming infrastructure for data collection and analysis that will be established by the project.

2.4.   Aims and learning objectives
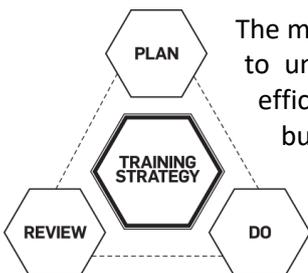
The main objective of the training procedure is to enable the end users and collaborators to understand the value of GAIA Sense solution and how to use its services most efficiently. Moreover, LIFE GAIA Sense training plan and material is focusing on capacity building to make sure the involved stakeholders have all the necessary skills in order to understand the project's outcomes and to use them efficiently.

It is essential to ensure at the start of the training that the participants not only understand the concept and benefits of this training, but are also aware of its limitations and pitfalls. Subsequently, trainers should clarify the objectives of the training and participants should be aware of their expectations related to the training. The trainer should ensure

that participant's expectations match the training's objectives so that participants do not leave feeling disappointed.

2.5. Training strategy and Implementation

LIFE GAIA Sense training strategy is designed attentively in order to meet training needs, e.g., by designing the relevant and most appropriate for each target group courses / modules which includes various methodologies, learning material etc. The implementation of the training strategy has started from [M1] of the LIFE GAIA Sense of the project. LIFE GAIA Sense's training plan and material follows the taxonomy of Bloom in order to maximize the training results:

- knowledge
- comprehension
- application
- analysis
- synthesis
- evaluation
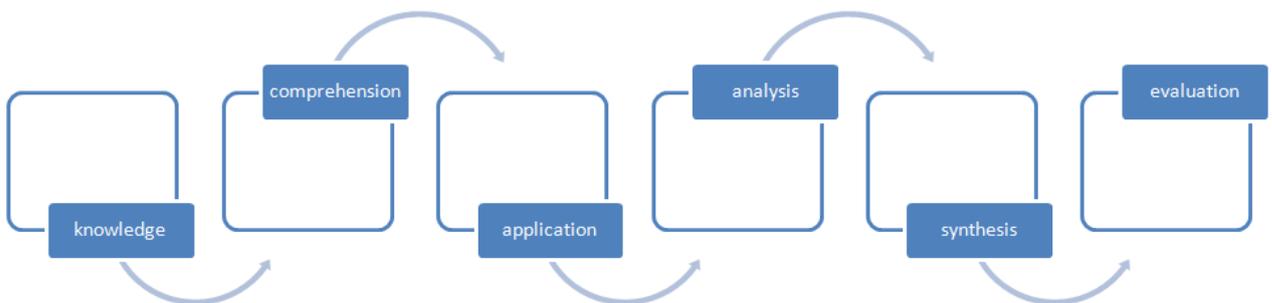
Figure 2: Taxonomy of Bloom

2.6. Evaluation

In order to establish and assess the quality and effectiveness of training, multiple sources of feedback are selected. Specifically, differentiated questionnaires will be given at farmers and agronomists/experts, etc. Lastly, in order to upgrade the procedure feedback from trainers on training problems will be also evaluated. The evaluation engenders judgments about the value of material and methods for given purposes and is an integral part of the training's plan and material taxonomy.

3. Action Plan

The training of the selected groups consists of the following three distinct phases:

- Phase 1 will include face2face seminars with the advisors/agronomists and farmers that will need to be involved in the demonstrators and use a) the tools for documenting the applications in the field (M7) and b) the Smart Farming Application (M19). The events in Phase 1 are multipurpose events, focusing on both training and dissemination
- Phase 2 will include webinars and will be focused on the same target group, aiming to provide updates on potential new features and refresh their memories before the 2nd year of using the Smart Farming advice to the field.
- Phase 3 will include two webinars focused on a wider audience.

Table 1: Action Plan

Phase	Target group	Objective
Phase 1	• advisors/ agronomists • farmers	Familiarize with: • the tools for documenting the applications in the field • the Smart Farming Application
Phase 2	• advisors/ agronomists • farmers	• Update the information & recall the audience memories
Phase 3	• General public	• To increase the efficiency use of resources in agricultural sector • To boost the agricultural production

The three phases of the training events must be completed until:

- the 1st phase - 31/12/2019,
- the 2nd phase - 31/12/2020,
- the 3rd phase - 31/12/2021.

The training is structured in three phases, each phase covers corresponding objectives in the training plan. The training activities of each phase consists of a mix of theoretical and in situ content and training procedure and interactive exercises and are designed to provide insight into specific topics.

3.1. Target Groups

The target groups of LIFE GAIA Sense are the following:

1. Farmers and Agricultural Cooperatives/Farmers Groups: As they are the main targeted stakeholders of LIFE GAIA Sense, they are respectively and the main target group of LIFE GAIA Sense's training plan. The deep and meaningful understanding and knowledge of the basic principles of smart farming and the perception of the advantages of adopting such practices play a key role in LIFE GAIA Sense project, as they are the main users of the GAIA Sense SF solution.

2. Agronomists and agricultural advisors: This target group is expected to contribute both in the process preceding the advice generated by the system and thereafter. Their training must therefore be comprehensive and cover all aspects of intelligent agriculture and implementation. Due to their expert knowledge, they consist another training group.

3. Public sector & policy makers- general public: One of the main objectives of the project is the formulation of proposals for new policies. In order to achieve the main objectives of LIFE GAIA Sense project it is crucial to inform not only the directly but also the indirectly involved people in the agri-food chain about the objectives and the achievements of this project. The training events that will be organized by LIFE GAIA Sense have this group as a target.

4. Forms - Means of training

LIFE GAIA Sense training plan and material aims to create a flexible trajectory for trainees. Thus, various forms of learning and training are combined, for example formal and informal education. One of the key features of organizational component is openness of training – necessary to mention that open training does not mean free training. In this sense webinars and e-learning platform are constantly "open" to trainees. In order to facilitate learning, a blend of training delivery methods and means is adopted. This includes Face-to-face meetings, webinars and an e-learning platform.

4.1. Face-to-face training

Face2face Training

While many things can be done virtually in the digital age, physical interaction remains one of the best ways to learn. Communicating and developing relationships through personal interaction is one of the key reasons face-to-face learning continues to be a preferred methodology. Learners gain from the depth of information and experience that is imparted to them by the trainer. Therefore, despite the increase in the use of technology, face-to-face training remains one of the most reliable methods regarding the training outcome, as it contains several aspects that cannot be replaced, such as discussion and peer-to-peer learning, trainer-participant interaction and engagement, adaptability and ability to have 1-on-1 help. Furthermore, richness of information and memorable experiences are deduced through behavior and body language, including one's mannerisms, gestures, tone, language, and volume of voice. Face-to-face communication allows the entire experience to not only be heard but also seen and felt.

This is especially important in the case of the agricultural sector, for two main reasons. The first is that the trainees, consisting mostly from farmers and agricultural professionals, prefer more traditional approaches. Secondly, a significant part of the training is about the activities that need to take place in the field, something that can be done only (or mainly) at the field.

As it was aforementioned, Phase 1 of the Action Plan will include Face-to-face seminars with the advisors/agronomists and farmers and will take place both in class and on the field.

4.2. Webinars

Webinars are a powerful tool in every training plan, as they are inexpensive and easy to produce and can attract a large number of participants. Moreover, webinars offer the option to access the contents and materials again for some time after the event has ended. Because of this, participants can review the presentation multiple times, helping them revisit the materials for reference and apply the contents as needed. The main advantage is that no one has to travel to get to a webinar or make any special arrangements or preparations.

In LIFE GAIA Sense project webinars is going to use cases for specific training topics will be delivered in regular webinars, providing training in new features and refresh advisors/agronomists and farmers memories. Moreover, webinars that are included in phase 3 aims at attracting adopters and demonstrate the project's results to a wide audience.

4.3. E-Learning Platform

The use of an e-learning platform for training purposes is essential as not only e-learning is less expensive than bringing trainees together in a classroom, but also that e-learning is actually a more effective learning method as learners can advance at their own pace. Also, multimedia learning content which is comprehensive and practical, using video, images, audio and text which all serve as great tools

in learning new skills or information is available through e-learning platform. Trainees can also communicate with their trainers via chat platforms and online forums, creating a more collaborative, interactive, attractive and personal learning environment, eliminating this way the disadvantages of using an e-learning platform such as lack of feedback and motivation, isolation, etc.

An e-learning platform will be used together with videoconferencing tools to minimise the need for travelling for training purposes. This platform will be used for loading, storing, managing and tracking the e-learning training. The activity of informing and training the targeted stakeholders will be supported by the GAIA LEARNING e-learning platform (figure 3) and by the established service provision networks in Greece, Spain and Portugal.
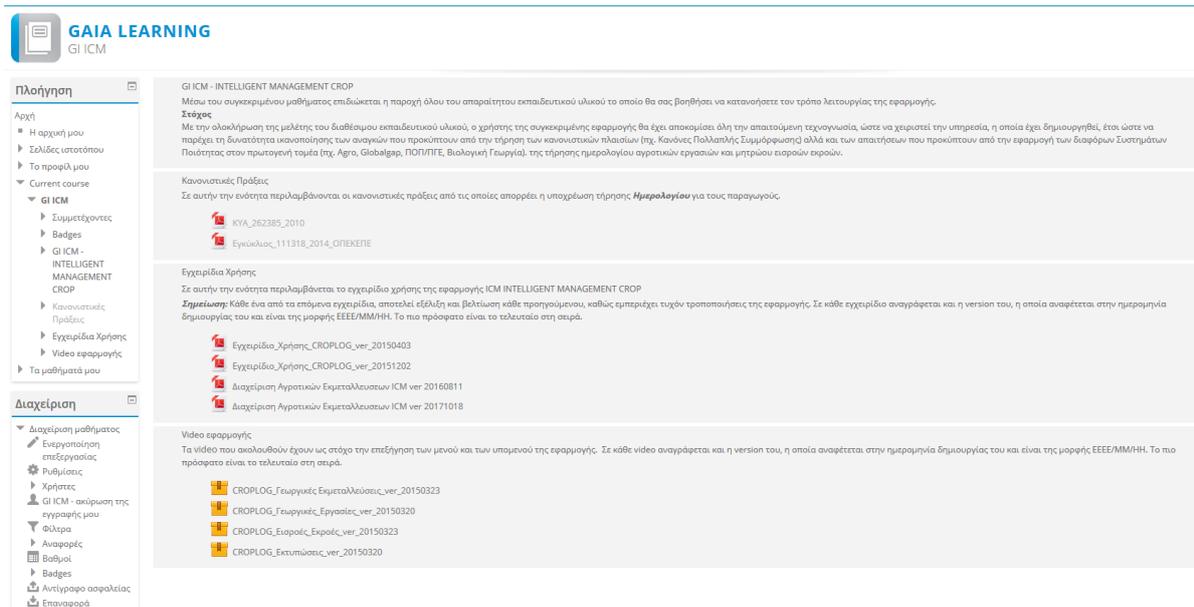
Figure 3: GAIA LEARNING platform

4.4. Training- Capacity Building Events

Capacity building events are valuable and important because of their many long-term impacts, as they allow multidisciplinary focus and holistic orientation. Furthermore, confidence, skills, knowledge are strengthened and they foster a sense of ownership and empowerment, so that trainees gain greater control over their own future development.

LIFE GAIA Sense project training and capacity building events takes place on two dimensions: vertically, through interventions from other levels and horizontally across a particular level with different stakeholders.

Training and capacity building events that will take place both in class and on the field will be combined with other events. In situ training for practical training in collecting, integrating and interpreting field spatial and temporal information will be an experiential process of learning.

The combination of differented forms and means of training aims at incorporating teaching methods that will benefit each type of learner. More specifically, there are different learning styles. Three of the most popular ones are visual, auditory, and kinaesthetic in which trainees take in information. Hence, the learning and training process respects trainees' different learning ways and provides them with different teaching resources.

5. Training Resources

LIFE GAIA Sense training resources include a mix of curriculum materials, presentations with notes, on line courses, etc. This section contains the participant manuals, slides, and handouts necessary to conduct training designed to build the skills of LIFE GAIA Sense. LIFE GAIA Sense training resources aims at enhancing the learning and the preparation of the targeted groups for adopting Smart Farming solutions.

Although it may appear to be simple, conducting a training session requires specific skills and knowledge of how people learn. Thus, greater prominence should be given in the training of the trainers in order to develop their training skills and techniques, thus enabling them to implement LIFE GAIA Sense courses, workshops, etc.

Moreover, it is essential for the training procedure to take place in adequate and appropriate facilities, which include:

- Sufficient space for all attendees to sit comfortably during instruction.
- Sufficient room set-up for participants to interact with one another.
- Enough equipment for all attendees and demonstration equipment for the instructor/facilitator (if applicable).
- Space and facilities for small group exercises or hands-on training using equipment as part of activity-based learning.
- Equipment, technical support, and resources sufficient to support training via technology, such as instructor presentations or web-based training used by trainees to enhance learning (if applicable).

5.1. Materials & Equipment

Training material will be provided during training and capacity building events. The list below contains the basic material and equipment needed for these events. This list can be modified or expanded by the trainer depending on the stakeholder's training group and will be adjusted to match the needs of each specific demonstrator as well:

- Computer & projector. Chalkboards are almost a thing of the past with the advent of projectors in the learning procedure. With the use of projectors, trainers are able to use films, slides, and images to communicate to trainees about a variety of subjects. Computers are useful tools as they teach more effectively in technical sense, they can reach and teach more students and kept students more focus with the subject. The use of computer technology in learning allows the trainer to individualize the learning instructions as well as the technology grants the trainees the autonomy and making them to learn with their own.
- Differentiated PowerPoint presentations. PowerPoint's ability to integrate sound, animation and video in a slide show can capture the attention of media and video-savvy trainees. Text in a PowerPoint is easier to read than notes jotted on a blackboard. Trainers can have greater flexibility in presenting, which can be used repeatedly and modified as needed to different groups. Nevertheless, PowerPoint is not a teaching technique—it is a visual aid that can be used to enhance learning, just like flip charts, overheads, and handouts. PowerPoint will not, in and of itself, improve student learning. It is the way that instructors use PowerPoint that can encourage learning.

- Handouts on the various LIFE GAIA Sense aspects targeting to different trainees. Supplemental and updated handouts will be circulated to stakeholders during the lifetime of the project. The selection of handouts is crucial as they have a tendency to create audience participation, and they also are very easy to maintain and update. Handouts can also enhance remembrance since the audience is using the handouts as reference material Creating handouts are also very inexpensive to make, and can very easily depict lots of information.
- Relevant user manuals of the GAIA INFARM ICM (a web-based application) will be provided to operators and agronomists/advisors. User manuals will provide important information on 'how to use this web based application' to end users- trainees.
- Self-training material such as videos will be produced during the lifetime of LIFE GAIA Sense project, as videos are at least as effective as in-person, instructor-led training. In particular videos is used as a facet of instruction along with other resource material, due to the fact that gives trainees clear concept clarity, as everything can be visualized and explained in detail and they enable trainees to retain and maintain interest for longer periods of time.
- On-line courses will be available at GAIA LEARNING e-learning platform, which will allow flexible and individualized learning. Moreover, with the online courses trainers can optimize the timeliness and focus of the curriculum and trainees can better fit learning time into their schedules.
- USB stick including relevant material.

All the training material is included as annexes of the deliverable.

5.2. Staffing

Trainers should have thorough conception of the subject they are teaching. Moreover, they should have knowledge of practical base/ down to the grass root. In order to assure the success of the training program, GAIA will train the operators and agronomists/advisors into using the appropriate application and entering the data, support them at doing so and also monitor and validate the whole process and the collected data. Training and advice will be continuously provided by NP and GAIA and relevant user manuals of the ICM will be provided. The technology part of training the operators and agronomists/advisors will be conducted by NP, with the help of GAIA, COSTEIRA, and CONFAGRI. Training and advice will be continuously provided by the consortium. The personnel that will be used are education managers specialized in education methods such as lifelong learning specialized in agriculture.

6. Training Curriculum

The curriculum has been developed as a training tool for trainers who will pass on their knowledge to the participants/ stakeholders. It uses participatory techniques based on a variety of theoretical frameworks to ensure that trainers will serve as informed resources for their trainees.

A trainer should be an agronomist him/herself and needs to have specific knowledge about the general principles about smart farming methods and practices as well as the relevant equipment & ICT tools.

As mentioned above, the target audience of the entire program is differentiated and heterogeneous. In addition, their training is required to achieve different outcomes and goals. Therefore, different education and teaching plans have been created for the three groups.

6.1. Training curriculum for agronomists

Table 2: Training Curriculum for agronomists- agricultural advisors

#	Topic	Description	Objectives	Method/Medium
1	Smart Farming: basic concepts	Presentation of the basic concepts of Smart Farming and gaiasense, including the used SF technologies (IoT, Big Data analytics etc). Emphasis of the benefits of using SF practices.	Familiarize agronomists- agricultural advisors with the basic concepts and benefits of smart farming and gaiasense	Face-to-face training Webinars
2	Agronomists, role, tasks and obligations	Detailed presentation of the agronomists' role and assigned tasks and obligations. Training in data collection methods (e.g. soil sampling etc).	To familiarize agronomists- agricultural advisors with their assigned role, tasks and obligations and the respective guidelines	In situ training Face-to-face-training
3	Smart farming web / mobile software	Training in the use of software through which the cultivation practices will be recorded, data and models will be monitored, cultivation instructions will be issued etc. (iCM, agronomy, etc.)	Familiarize agronomists- agricultural advisors with the use of the software that will be used in the context of the project	Face-to-face training Webinars E-learning Platform
4	Taking soil & tissue from samples and water samples from the crops	Experimental network of sampling locations will be designed. The field data will be sampled for three periods: before, during and after growing season in the 'reference' and 'treatment' demonstrator areas.	Determine soil classification, pH, conductivity, mineral (inorganic) constituents, carbonates, organic matter, etc.	In situ training Face-to-face training

5	Establishing insect Traps	Traps for the targeted pests per crop will be deployed in the participating parcels to help with the creation, assessment and improvement of the pest management models. Thus, the proper deployment and installation of the traps is essential.	To familiarize agronomists-agricultural advisors with the basic guidelines regarding the installation of the traps.	In situ training Face-to-face training
6	Combine the information and produce advice on fertilization, irrigation, use of pesticides and spaying.	Through all the aforementioned information an analytic report will be made presenting the current situation regarding the existing processes and management of the selected crops, as applied by the producers	Caters for all these crucial factors and finally produces the right advice and support to the farmer.	In situ training Webinars E-learning Platform Face-to-face training
7	Monitoring and follow up the crop procedures at the field -pilot	Information taking from the gaiasense field is combined with information gathered from other system dimensions and is utilized to accurately calculate for example the plants' need for water, to identify the right time for irrigation, etc and the timely qualitative and quantitative prediction of production.	Measure the impact of SF application on soil, water and air quality	Webinars E-learning Platform

6.2. Training curriculum for Farmers and Agricultural Cooperatives/Farmers Groups

Farmers training plan's goal is to become more conscious about sustainability and realize the quantities of water and agrochemicals consumed during the year and the consequences these have the on the environment and on their annual profits. In order to achieve the spherical information and training for this group, webinars, and the E-learning Platform will be used. Moreover, we target to take advantage of the activities of the producer such as fertilization, plant protection, time and duration of irrigation for in situ education. Thus, the information given by LIFE GAIA Sense will be easily understood and exploited by the producer.

Table 3: Training Curriculum for Farmers and Agricultural Cooperatives/Farmers Groups

#	Topic	Description	Objectives	Method/Medium
1	Smart Farming: basic concepts	Presentation of the basic concepts of Smart Farming and gaiasense, including the used SF technologies (IoT, Big Data analytics etc). Emphasis of the benefits of using SF practices.	Familiarize farmers with the basic concepts and benefits of smart farming and gaiasense	Face-to-face training Webinars
2	Role, tasks and obligations of farmers	Detailed presentation of the farmers' role, tasks and obligations. Training of agricultural practices documentation methods	Familiarize farmers with their role, tasks, obligations and the respective guidelines	In situ training Face-to-face training
3	ICM tool and infrastructure	Presentation of the tool and methods used	Understand how to use GAIA Sense solution more efficiently	E-learning Platform Face-to-face training
4	Application of the produced advice in the field	Applying the advice correctly (fertilizers use, water consumption, energy consumption, greenhouse gas emissions, air pollution and emissions, dangerous substances)	The proper application of the validated advice in the field produce	E-learning Platform Face-to-face training
5	How to report cultivation practices	How to use the GAIA Sense service-daily reporting	To be familiarized with the reporting tool	E-learning Platform Face-to-face training
6	Expected results of SF application concerning environmental impacts	Presentation of the expected environmental results of SF including reduction in a) the use of fertilizers and pesticides, b) water consumption, c) energy consumption, d) greenhouse gas emissions, e) soil pollution, f) reduction of residual Nitrogen and g) water pollution.	To understand the value of GAIA Sense solution. To increase the efficiency use of resources in agricultural sector	Webinar

6.3. Training curriculum for General Public-Policy Makers

The purpose of the training plan of public sector and policy makers is to raise awareness. The training materials that will be used for this specific audience is tailor-made aiming at clearly outlining the long-term environmental benefits of LIFE GAIA Sense project.

Table 4: Training Curriculum for General Public--Policy Makers

#	Topic	Description	Objectives	Method/Medium
1	Smart Farming: basic concepts	Presentation of the basic concepts of Smart Farming, related SF technologies (IoT, Big Data analytics etc) and the overall benefits of using SF practices.	Familiarize policy makers and general public with the basic concepts and benefits of smart farming	Webinar
2	Information on SF application and infrastructure	Presentation of the tool and methods used	To ensure project applicability	Webinar
3	Expected results of SF application concerning environmental impacts	Presentation of the expected environmental results of SF including reduction in a) the use of fertilizers and pesticides, b) water consumption, c) energy consumption, d) greenhouse gas emissions, e) soil pollution, f) reduction of residual Nitrogen and g) water pollution.	To increase the efficiency use of resources in agricultural sector	Webinar
4	Expected results of SF application concerning socio-economic impacts	Presentation of the expected socio-economic related results of SF including a) increased profit by using less inputs, b) increased quality of the products and c) added value on products.	To boost the agricultural production. Boosting investment, employment and economic growth in the EU	Webinar
5	Successful examples of the demonstrators	The benefits of using LIFE GAIA Sense solution on the 18 established demonstrators	To attract investments on larger scales, to replicate and exploit the solution	Webinar

6.4. Guidelines for trainers

It is essential before beginning the training programme, that the trainer learns about the trainees: who they are, their educational background and their expectations. Furthermore, trainers need to discover what the trainees can already do and what they know about and if they are physically able to do the work expected of them. The trainer should know exactly what areas the trainees need training in and he/she will need to make it clear exactly what the trainees will be expected to learn. LIFE GAIA Sense Training Plan and Material has specific learning objectives which state what the trainee is expected to know, or be able to do, after completing the training procedure.

Also, it is important that all the training activities will follow the same agenda, with slight adaptations, where necessary. However, the core elements of the events should stay the same (curriculum, etc). More specifically, the trainers have to:

- Follow the Guidelines provided in this document: Use the Training Curriculum for each training group
- Use the provided PPT presentations and the provided Manuals/Handbooks (but adapt them to the trainees own native language).
- Choose the appropriate training and development methods and processes to effectively implement and execute the above plans.
- To be flexible in using the proposed methods and material, according to training curriculum for each training group.
- Make sure that the main objective of each course will be fully presented.
- Follow the announced agenda for each training.
- Evaluate the effectiveness of each educational process with a view to updating and upgrading it, using the proposed evaluation method.

7. Training schedule and locations

The Phase 1 of the Action Plan will be combined with the informative events that will take place in the first thirteen demonstration areas.

Table 5: Training Locations

	Location	Date	Target Group	Method/Medium
1.	Pieria	15/10/2018	advisors/ agronomists and farmers	Face-to-face training
2.	Orestiada	16/10/2018	advisors/ agronomists and farmers	Face-to-face training
3.	Drama	17/10/2018	advisors/ agronomists and farmers	Face-to-face training
4.	Velvedos	17/10/2018	advisors/ agronomists and farmers	Face-to-face training
5.	Mirambello	24/10/2018	advisors/ agronomists and farmers	Face-to-face training
6.	Lisbon	29-31/10/2018	advisors/ agronomists and farmers	Face-to-face training
7.	Ourense	5-7/11/2018	advisors/ agronomists and farmers	Face-to-face training
8.	Kiato	9/11/2018	advisors/ agronomists and farmers	Face-to-face training
9.	Elassona, Larisa, Stylida*	22-23/11/2018	advisors/ agronomists and farmers	Face-to-face training
10.	Aigina	25/11/2018	advisors/ agronomists and farmers	Face-to-face training

8. References

- Agricultural Cooperative Development- a manual for trainers, Food and Agriculture Organization of the United Nations, Rome, 1998
- Agricultural Education and Skills Improvement Framework (AESIF) 2015 – 2025 (available at http://www.nepad.org/sites/default/files/documents/files/agriculture_education_and_skills _improvement_framework_aesif_-_web.pdf)
- ARC, 2009: Facilitator's Toolkit. http://www.savethechildren.net/arc/using/facilitators.html
- Borich G., Effective teaching Methods,Merrill Publishing Co., Columbus 1988.
- Cano J et al, The Relationship Between Cognitive Performance and Critical Thinking Abilities Among Selected Agricultural Education Student (available at https://s3.amazonaws.com/academia.edu.documents/41589625/32-01-24.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1539616222&Signature=mczB %2BxYFBYj7Z%2BqsFbANv%2BguIpU%3D&response-content-disposition=inline%3B%20filename%3DTHE_RELATIONSHIP_BETWEEN_COGNITIVE_PERFO.p df)
- ESCAP, 2001: Training the Trainer Training Fundamentals. Instructor's reference book. http://www.unescap.org/ttdw/common/TFS/FFMultimodal Tx/TOT.pdf
- IOM, 2006: Counter Trafficking Training Modules. Facilitator's guide.
- Som Naidu , Learning & Teaching with Technology, Kogan Page Limited, 2003
- Taylorann Kalin Clark, Analyzing agricultural education student teachers'critical thinking skills through blogs in an online community of practice, Iowa State University Capstones, Theses and Dissertations, 2015

Appendix I- Power Point presentations

Appendix II- User Manual for ICM

ICM INTELLIGENT MANAGEMENT CROP
Διαχείριση Αγροτικών Εκμεταλλεύσεων

Εγχειρίδιο Χρήσης

Περιεχόμενα

1 Είσοδος στην εφαρμογή Διαχείριση Αγροτικών Εκμεταλλεύσεων (GI-ICM)

Για να συνδεθείτε στην υπηρεσία Διαχείριση Αγροτικών Εκμεταλλεύσεων αρχικά θα πρέπει να συνδεθείτε στο www.c-gaia.gr, με τους κωδικούς, το username και το password (κωδικοί πρόσβασης) που σας έχουν αποδοθεί.

Εφόσον συνδεθείτε, επιλέγετε MyGaia και στη συνέχεια ICM (Εικόνα 1).

MyGaia

Εικόνα 1. Επιλογή ημερολογίου
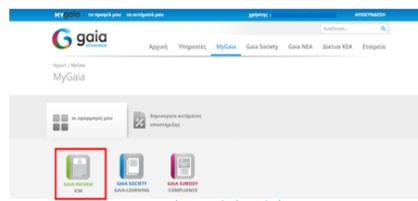
Τα βασικά μενού της εφαρμογής είναι τα εξής (Εικόνα 2):

- Παράμετροι Εφαρμογής
  - Ομαδικές Γεωργικές Εκμεταλλεύσεις
  - Γεωργικές Εκμεταλλεύσεις
  - Μίγματα
  - Τεχνικές Προδιαγραφές Μιγμάτων
  - Οδηγίες Εργασιών
- Εργασίες
  - Πρότυπα Εργασιών
  - Ομάδες Αγροτεμαχίων
  - Εισαγωγή Πλάνου Εργασιών
  - Προβολή Πλάνου Εργασιών

Appendix III- On line courses
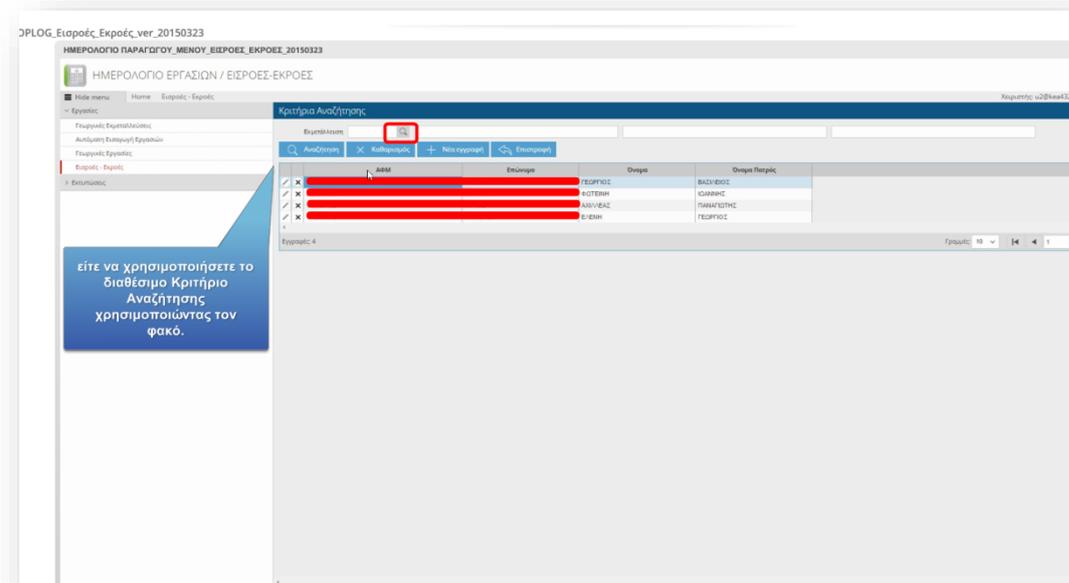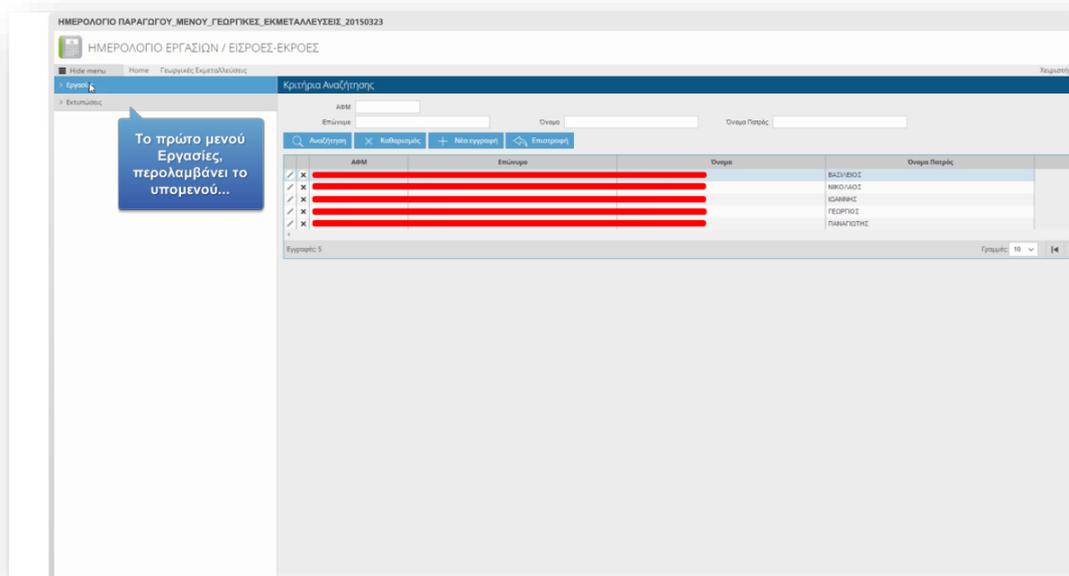
Appendix IV- Questionnaires

LIFE GAIA Sense

LIFE GAIA Sense: Innovative Smart Farming services supporting Circular Economy in Agriculture

COURSE EVALUATION QUESTIONNAIRE FOR TRAINEES

1. Training course details: Please complete the following forms:

1. TITLE of TRAINING COURSE

2. DATE

3. LOCATION

2. Personal Information: Choose the appropriate box.

1. SEX:

☐ Male   ☐ Female

2. EDUCATION:

☐ Basic   ☐ Tech. Ed. In.   ☐ University   ☐ MSc   ☐ PhD

3. AGE:

Please fill your age...

4. PROFESIONAL POSITION:

☐ Farmer   ☐ Agronomist   ☐ Researcher   ☐ Consultant   ☐ Other..............

5. WORKING EXPERIENCE (years):

Please fill your working experience in years:......................

☐

3. Evaluation of trainers: Please tick (✔) the most appropriate score according to your opinion for each of the questions.

To what extent did the trainers have the following characteristics?	Not at all 1	A little 2	Average 3	High 4	Very High 5
Sufficient knowledge	☐	☐	☐	☐	☐
Communication ability	☐	☐	☐	☐	☐
Ability to follow the program	☐	☐	☐	☐	☐
Ability to answer questions	☐	☐	☐	☐	☐

LIFE GAIA Sense

LIFE GAIA Sense: Innovative Smart Farming services supporting Circular Economy in Agriculture

Ability to motivate the trainees	☐	☐	☐	☐	☐
Effective use of examples	☐	☐	☐	☐	☐

4. **Evaluation of training: Please tick (✔) the most appropriate score according to your opinion for each of the questions.**

To what extent do you believe that:	Not at all 1	A little 2	Average 3	High 4	Very High 5
The training responded to the needs of your work?	☐	☐	☐	☐	☐
The training process responded to your goals and expectations?	☐	☐	☐	☐	☐
The training materials responded to your needs?	☐	☐	☐	☐	☐
You considered it necessary to carry out this training?	☐	☐	☐	☐	☐

5. **Please write briefly any suggestions or recommendations for the improvement of the training course:**

----

6. **Please write briefly any other comments you may have:**

LIFE GAIA Sense

LIFE GAIA Sense: Innovative Smart Farming services supporting Circular Economy in Agriculture

COURSE EVALUATION QUASTIONNAIRE
FOR TRAINERS

1. Training course details : Please complete the following forms.

I.	TITLE of TRAINING COURSE	
II.	LOCATION	
III.	DATE	
IV.	DURATION (Hours)	
V.	NUMBER OF TRAINEES	
VI.	NAME & SURNAME OF TRAINER	
VII.	TRAINER'S SPECIALITY	

2. Evaluation of training course and materials: Please tick (✔) the most appropriate score according to your opinion for each of the questions.

To what extent did the training programs:					
	Not at all	A little	Average	High	Very High
	1	2	3	4	5
Provide an appropriate combination of theoretical and practical teaching?	☐	☐	☐	☐	☐
Provide the time required for the development of the modules?	☐	☐	☐	☐	☐
Have the appropriate design / structure of teaching?	☐	☐	☐	☐	☐
Facilitate gaining knowledge through the proposed teaching methods and principles?	☐	☐	☐	☐	☐
Make it possible to achieve the goals and objectives of education?	☐	☐	☐	☐	☐
Offer the appropriate organizational structures (space, educational tools, etc)?	☐	☐	☐	☐	☐

LIFE GAIA Sense

LIFE GAIA Sense: Innovative Smart Farming services supporting Circular Economy in Agriculture

To what extent the training materials:					
Meet the needs of trainees?	☐	☐	☐	☐	☐
Be understandable and easy to use?	☐	☐	☐	☐	☐
Have content completeness?	☐	☐	☐	☐	☐

3. **Information concerning trainees: Please tick (✔) the most appropriate score according to your opinion for each of the questions .**

To what extent:	Not at all 1	A little 2	Average 3	High 4	Very High 5
Were trainees actively involved in the educational process?	☐	☐	☐	☐	☐
Did the training activities meet their level?	☐	☐	☐	☐	☐
Did the trainees follow the proposed timetable?	☐	☐	☐	☐	☐
Did the trainees assimilate the modules taught and acquired the desirable skills and knowledge?	☐	☐	☐	☐	☐

4. **Please write briefly any suggestions or recommendations for the improvements of the training course.**