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INNOVATIVE GREENHOUSE SUPPORT SYSTEM IN THE MEDITERRANEAN REGION: EFFICIENT FERTIGATION AND PEST MANAGEMENT THROUGH IOT BASED CLIMATE CONTROL — IGUESSMED

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Deliverable D1.8
Ethical and Legal Manual

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Dissemination Level

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Abstract

The purpose of this document is to provide ethical guidelines, which have to be followed by each partner of the project. This manual shall ensure that matters of data safety, privacy, legality, authorization, protection, ethics and general conduct regarding personal information and research results are considered and implemented properly in the research process in compliance with national and EU legislation.

Researchers have overall responsibility for ensuring that research activities are carried out in accordance with these guidelines, and for ensuring that clients and other parties to the research agree to comply with its requirements.

Table of Contents

1 Introduction

The iGUESS-MED project aims to develop a Decision Support System (DSS) able to effectively manage fertigation and prevent plant diseases and pests in tomato crops grown in soil and soilless in commercial greenhouses of the Mediterranean region. This innovative greenhouse DSS will be developed to (i) help greenhouse farmers to improve the management of fertigation in areas with low (saline) quality waters (ii) to reduce the use of chemicals by a sustainable and integrated pest and disease control and (iii) to improve the climatic efficiency in the existent greenhouse by low-cost climate actions. The DSS will allow obtaining healthier and higher quality productions and higher yields, while will reduce the use of water and the losses of nutrients and chemicals to the environment. iGUESS-MED will be able to manage efficient fertigation, to forecast diseases and pests, and to improve the climatic efficiency in tomato greenhouses, using only climate data acquisition and basic information on cropping system. The DSS will provide feedbacks and alerts about crop needs and real time recommendations to the farmers through friendly portable real time data visualization tools as PC, tablets or smartphones. To achieve this objective, new models for calculating crop evapotranspiration will be performed by integrating sensor data from plant, soil and climate, and forecasting models for assessing disease and pest risks will be developed by using the Integrated Pest Management.

The project consortium (research centers, SMEs and end-users of EU and non-EU countries belonging to the Mediterranean basin) will collaborate from the beginning to make the DSS marketable involving, end-users and stakeholders to validate the system in own greenhouses, reducing gaps between research, application developers and farmers. The application of DSS will benefit the workers and the consumers, providing better working conditions, crop healthiness and reduction of environmental impact.

1.1 Summary of the deliverable

This Ethical and Legal Manual will define the project strategy to address any issue that could be raised during the project lifecycle and it may be used as a reference book for Consortium management bodies, when monitoring and assessing the proper ethical and legal procedures during the project.

The outputs of iGUESS-MED project will require the interaction with farmers (commercial greenhouses farming) and people belonging to agricultural sector, and more general, with human participants.

The Ethics and Legal procedures laid down in the Manual will focus on ethical procedures for the consortium to follow to ensure that adequate ethical standards are met and that data protection measures are taken.

All partners will be requested to carefully review these procedures and confirm that they will follow them throughout the project.

1.2 Document structure

The deliverable is structured in the following chapters:

- Chapter 1 includes the description of iGUESS-MED project and the introduction of the deliverable;
- Chapter 2 describes the legal basis for ethics in Horizon2020 and PRIMA programme;
- Chapter 3 describes an overview on Ethical Issues in iGUESS-MED project;
- Chapter 4 describes data processing and protection issue in iGUESS-MED project.

The deliverable provides in Annex section the templates for ethical issues to be used by the project partners.

2 Legal basis for ethics in Horizon 2020 and PRIMA programme

iGUESS-MED Project complies with the ethical standards and guidelines under Horizon 2020 and relevant national, EU and international legislation. Major applied ethical principles and regulations are highlighted in the regulations listed below.

In iGUESS-MED, data protection (specifically addressed in Deliverable D1.9) and research integrity have a key role.

As the basic regulation of all Horizon 2020-related topics, the Horizon 2020 Rules of Participation

mentions ethical issues in several Articles[1]:

Article 13 – Proposal (3)

"A proposal which contravenes ethical principles or any applicable legislation, or which does not fulfil the conditions set out in Decision No 2013/743/EU, in the work programme, in the work plan or in the call for proposals may be excluded from the evaluation, selection and award procedures at any time."

Article 14 – Ethics:

The Commission shall systematically carry out ethics reviews for proposals raising ethical issues. That review shall verify the respect of ethical principles and legislation and, in the case of research carried out outside the Union, that the same research would have been allowed in a Member State.

The Commission shall make the process of the ethics review as transparent as possible and ensure that it is carried out in a timely manner avoiding, where possible, the resubmission of documents.

Article 18 – Grant agreement (6)

The grant agreement shall, where appropriate, contain provisions ensuring the respect of ethical principles, including the establishment of an independent ethics board and the right of the Commission to carry out an ethics audit by independent experts.

Article 23 – Implementation of Action (9)

Participants shall comply with national legislation, regulations and ethical rules in the countries where the action will be carried out. Where appropriate, participants shall seek the approval of the relevant national or local ethics committees prior to the start of the action.

[1] REGULATION (EU) No 1290/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2013 laying down the rules for participation and dissemination in "Horizon 2020 the Framework Programme for Research and Innovation (2014-2020)" and repealing Regulation (EC) No 1906/2006.

2.1 iGUESS-MED Grant Agreement

The Grant Agreement number No: 1916 between the Partnership for Research and Innovation in the Mediterranean Area ('the PRIMA Foundation') and the iGUESS-MED Consortium rules on ethical issues are the followings:

Article 33 — Gender equality

33.1 Obligation to aim for gender equality

The beneficiaries must take all measures to promote equal opportunities between men and women in the implementation of the action. They must aim, to the extent possible, for a gender balance at all levels of personnel assigned to the action, including at supervisory and managerial level.

33.2 Consequences of non-compliance

If a beneficiary breaches its obligations under this Article, the PRIMA Foundation may apply any of the measures described in Chapter 6.

Article 34 — Ethics and research Integrity

34.1 Obligation to comply with ethical and research integrity principles

The beneficiaries must carry out the action in compliance with:

(a) ethical principles (including the highest standards of research integrity) and

(b) applicable international, EU and national law.

Funding will not be granted for activities carried out outside the EU if they are prohibited in all Member States or for activities which destroy human embryos (for example, for obtaining stem cells).

The beneficiaries must ensure that the activities under the action have an exclusive focus on civil applications.

The beneficiaries must ensure that the activities under the action do not:

(a) aim at human cloning for reproductive purposes;

(b) intend to modify the genetic heritage of human beings which could make such changes heritable (with the exception of research relating to cancer treatment of the gonads, which may be financed), or

(c) intend to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer.

The beneficiaries must respect the highest standards of research integrity as set out, for instance, in the European Code of Conduct for Research Integrity[2].

This implies notably compliance with the following essential principles:

- *honesty;*

[2] The European Code of Conduct for Research Integrity of ALLEA (All European Academies) and ESF (European Science Foundation) of March 2011.

- *reliability;*
- *objectivity;*
- *impartiality;*
- *open communication;*
- *duty of care;*
- *fairness and responsibility for future science generations.*

This means that beneficiaries must ensure that persons carrying out research may:

1. present their research goals and intentions in an honest and transparent manner;
2. design their research carefully and conduct it in a reliable fashion, taking its impact on society into account;
3. use techniques and methodologies (including for data collection and management) that are appropriate for the field concerned;
4. exercise due care for the subjects of research — be they human beings, animals, the environment or cultural objects;
5. ensure objectivity, accuracy and impartiality when disseminating the results;
6. allow, in addition to the open access obligations under Article 29.3 as much as possible and taking into account the legitimate interest of the beneficiaries, access to research data, in order to enable research to be reproduced;
7. make the necessary references to their work and that of other researchers;
8. refrain from practicing any form of plagiarism, data falsification or fabrication;
9. avoid double funding, conflicts of interest and misrepresentation of credentials or other research misconduct.

2.1.1 Activities raising ethical issues

Activities raising ethical issues must comply with the “ethics requirements”, as evidenced in this deliverable.

Before the beginning of an activity raising an ethical issue, each beneficiary must have obtained:

(a) any ethics committee opinion required under national law and

(b) any notification or authorisation for activities raising ethical issues required under national and/ or European law needed for implementing the action tasks in question.

The documents must be kept on file and be submitted upon request by the coordinator to the PRIMA Foundation (see Article 52 GA). If they are not in English, they must be submitted together with an English summary, which shows that the action tasks in question are covered and includes the conclusions of the committee or authority concerned (if available).

2.1.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43 GA) and the Agreement or participation of the beneficiary may be terminated (see Article 50 GA).

Such breaches may also lead to any of the other measures described in Chapter 6 of iGUESS-MED Grant Agreement.

3 Ethical issue management in iGUESS-MED

3.1 General remarks

The outputs of iGUESS-MED innovation action project will require the interaction with farmers (commercial greenhouses) and generally people belonging to agricultural sector, and then human participants, it will carefully consider ethical issues, which may arise from:

- Research involving adult volunteers;
- Data protection, privacy, integrity, ownership, secondary use, third-party use and transparency in relation to Open data.

iGUESS-MED project may collect data such as:

1. Data about the crops provided by farmers facilitating personal identification,
2. Data provided by the farmer devices that require a potential personal identification (e.g. IP address and geo-localisation);
3. Small survey and personal data collection to the participants of the living labs.

Data collection will regard at least the following iGUESS-MED work packages:

- **WP3:** Validation and Demo of DSS where farmers and agricultural stakeholders will be involved;
- **WP4:** Environmental and socio-economic impact assessment that will boost intense different categories of stakeholders involvement in the envisaged living labs and community of practices (SMEs, technology developers and suppliers, practitioners, NGOs, education and extension organisations, civil society, policy makers and local administrations, and local communities);
- **WP5:** Dissemination, exploitation, communication, and outreach (DECO) plan that will boost intense different categories of stakeholders involvement in the dissemination events.

Data belonging to these categories may have a direct impact on personal data protection and a medium level of ethical or privacy risks. Regardless of the category, it is important to note that all the operations will be performed in full compliance with the ethics principles. Collection, transmission and processing of user' personal information will be treated in compliance with European privacy legislation. iGUESS-MED ethical issues and data privacy will be thoroughly cross-checked for compliance with the above-mentioned policies and regulations.

3.2 Compliance with ethics principles and relevant international, European and national legislation

The international legal framework to which iGUESS-MED Consortium will have to comply with is the recently implemented the REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation - GDPR).

The European Data Protection Regulation is applicable as of May 25th 2018 in all Member States and aim to harmonize data privacy laws across Europe. The regulation contains provisions and requirements pertaining to the processing of personally identifiable information of individuals (formally called data subjects) inside the European Union, and applies to all enterprises, regardless of location, that are doing business with the European Economic Area.

It was adopted on 14 April 2016, and became enforceable beginning 25 May 2018; because the GDPR is a regulation, not a directive, it does not require national governments to pass any enabling legislation and is directly binding and applicable.

At an early stage of the Project, Data Protection Officers of each organization of iGUESS-MED Consortium will be asked to sign a Declaration of compliance with the abovementioned European legislation (Annex 1).

Moreover, the iGUESS-MED Project research activities will be conducted according to the relevant EU legislation on privacy and data collection and to the Article 34 Ethics and research integrity and Article 39 Processing of Personal Data of the iGUESS-MED Grant Agreement.

3.3 Recruiting of stakeholders

iGUESS-MED partners will engage with a wide-range of stakeholders throughout the project's activities (interviews, living labs, community of practices, workshops, open field days, and training courses). The results of these interactions with people who are not members of the consortium will be used to provide data for the project and disseminate project results. Therefore, it is important for the iGUESS-MED partners to ensure that all forms of engagement will be conducted in an ethical way.

The Consortium will engage with a large number of human participants who are involved in farming and agricultural sector or experts in these areas.

Human participants in iGUESS-MED will be adults involved in the agricultural and farming sector, ICT, engineering, as well as a broad range of stakeholders and experts engaged in the design and implementation of policies that focus on modernization and technological improvement of greenhouse farming sector. Consequently, participants in iGUESS-MED will be farmers, agricultural entrepreneurs, advisors, ICT and engineering businesses, stakeholders from NGOs, researchers as well as policy makers or staff members from administrative and financial agencies (both public and private). Most of them will have a high level of expertise in their areas and share interest in the themes addressed by iGUESS-MED.

3.3.1 Informed consent procedures

iGUESS-MED research activities provide for voluntary participation and all participants will be requested to provide their informed consent in advance.

Informed consent is mandatory so participants in interviews or other activities will be asked to sign an “informed consent form” in advance. This form describes what the collected information will be used for and how the participant can review this information – and, if necessary, ask for correction or deletion.

Participants shall be informed in detail by an information sheet about the objectives and methods of the research and that they participate on a voluntary basis. Measures to protect the privacy of participants in data collection will be described to participants.

In case of an interview with multiple participants (e.g. a workshop or a discussion forum), all participants are required to sign an Informed Consent Form.

In the case of the Online Survey, the consent will be given electronically.

Annex 2 and Annex 3 provides templates for the information sheet, privacy notice and the informed consent forms.

For the provided template forms the following procedure must be ensured:

1. Translate in the local language of the event both information sheet and privacy statement and information consent forms (if your stakeholders do not speak English).
2. Fill in the missing information highlighted in yellow
3. Ask the signature
4. Convert the document into a PDF
5. Save the pdf in your repository

4 Data processing and protection issue in iGUESS-MED project

4.1 Compliance with ethics principles and relevant European and national legislation

The personal data that, during the project, may be collected will be treated according to the national and EU legislation on privacy and data collection (Directive 95/46/EC).

The Regulation on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation - GDPR) - (Regulation (EU) 2016/679) is applied since the 25th May 2018.

After the entry into force of the General Data Protection Regulation, the definition of 'personal data' includes "any information relating to an identified or identifiable natural person ('data subject'); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person" (see Article 4(1) GDPR).

Whereas necessary, the adequate authorizations - Transfers of personal data to third countries or international organizations – of the GDPR, will be prepared and submitted to the Italian Data Protection Authority (Garante per la protezione dei dati personali), the Italian Institution charged with the task of receiving the said authorizations. A copy of them may be provided also to the European Commission.

Before any data collection event, participants will be informed about:

1. aim and scope of the event;
2. how their data will be collected, stored and protected and either destroyed or reused at the end of the research; and
3. they will be requested to provide their informed consent in advance.

Data will be used for scientific and innovative application purposes, and will be analyzed and presented anonymously, finally filed and protected on the CREA cloud (https://creagov.sharepoint.com/sites/iGUESSMED).

At the end of the research project, the documents will be stored for five years. All data will be stored for five years, counting from the end of the project. These data can be made available to other scientific practitioners at request. CREA is a body authorized to manage sensitive data.

4.2 Security of data processing

It is essential to prevent unauthorized access and also to control issues such as ability to edit material.

In order to guarantee this priority, it will be useful to respect the followings actions:

- iGUESS-MED partners shall never allow personal data that they collect in the project to be used for any other purpose;
- Protection of confidentiality has to be guaranteed, no access other than as statistical aggregates could be allowed. Exceptions will not take place without the explicit consent of the participant;
- Researchers shall guarantee that adequate security measures are employed in order to prevent unauthorized access, manipulation to or disclosure of the personal data;
- Particular attention shall be taken to maintain the data protection rights of individuals when personal data are transferred from the country in which they are collected to another country;
- No automatic data collection or data collection without project-related intent can be used as a strategy to ensure security of data processing;
- Data collection activities in the project should be limited on the research scope/objectives.

According to the Ethics and Professional Conduit Code of CREA (Decree of the Extraordinary Commissioner n.37 12 March 2020), integrity in research means the set of ethical principles and values, ethical duties and professional standards on which responsible and correct conduct is based by those who carry out, finance or evaluate scientific research as well as by the institutions that promote and carry it out.

The application of principles and values and the respect of professional ethics and standards are a guarantee of the quality of the research itself and contribute to increasing the reputation and public image of science, with important repercussions on its development and on society.

According to the Guidelines the following principles are fundamental to the integrity of research:

- Honesty
- Reliability
- Respect
- Responsibility

4.3 iGUESS-MED website and cloud data processing and protection

iGUESS-MED website provides a last section in which it has been specifically designed to describe the privacy policy to inform the website visitors on what info is collected by iGUESS-MED website and how this information is managed, in order to create a transparent environment in which people are more confident, thus eliminating stress and concerns about potential abuse of personal data.

During iGUESS-MED project life, the public deliverables will be published on iGUESS-MED website (https://www.iguessmed.com/results)

Confidential documentation, if relevant to iGUESS-MED partners, will be made available via CREA cloud server (https://creagov.sharepoint.com/sites/iGUESSMED) only to those who need access to the documents.

CREA Cloud has been built and based on the cloud self-hosted file share and collaboration platform.

Every partner will identify one or two people inside its organization who will have a unique username and password to access and manage confidential documents through the cloud system.

Users are encouraged to change their pre-assigned passwords and use high strength standards password in order to access documents. Passwords that do not meet these requirements or are otherwise found vulnerable by automatic password strength checkers may be rejected. The cloud system will give suggestions about the right password to choose during the process.

Once changed, passwords cannot be known by CREA technical staff. If lost, a password could be recovered and changed through an automated process available from the cloud platform.

Connections between partners clients and the cloud web server are encrypted with SSL standard security technology.

The cloud is structured into a parent folder called iGUESS-MED made of subfolders and other specific subfolders for datasets.

4.3.1 Privacy policy

iGUESS-MED website collects some Personal Data from its Users. Among the types of Personal Data that this website collects, by itself or through third parties, there are: Usage Data, Cookies and email address.

Complete details on each type of Personal Data collected are provided in a dedicated page of the website: https://www.iguessmed.com/privacy-policy/.

Owner and Data Controller for iGUESS-MED Project is Alejandra Navarro Garcia (CREA).

5 Conclusions

The ethical standards and guidelines of PRIMA and Horizon 2020 will be rigorously applied, regardless of the country in which the research is carried out.

All participant institutions are required to comply with the EU directive 95/46/EC on data protection and with any updates on standards or requirements it might receive during the lifetime of the project.

6 Annexes

Annex 1 – Declarations of Compliance

Example of **Templates for Declarations of Compliance** are provided below.

Name of the partner:_____

1. **Data protection within project** (to be completed and signed by all partners)

I _____ hereby state that all personal data collection and processing will be carried out according to EU and national legislation; and that this declaration of compliance and/or authorisation will be kept on file and submitted to the European Commission upon request.

Signed _____ (data protection officer)

Date _____

2. **No national requirements** (to be completed and signed by partners from countries without national requirements)

I _____ hereby state that no declarations of compliance or authorisation for collecting and processing personal data are required under the national laws of _____.

I furthermore declare that this declaration of compliance and/or authorisation will be kept on file and submitted to the European Commission upon request.

Signed _____ (data protection officer)

Date _____

3. **National requirements** (to be completed and signed by partners from countries with national requirements)

I _____ hereby state that all required declarations of compliance or authorisation for collecting and processing personal data, as required under the national laws of _____, have been completed.

I furthermore declare that this declaration of compliance and/or authorisation will be kept on file and submitted to the European Commission upon request.

Signed _____ (data protection officer)

Date _____

Annex 2 - Information Sheet

iGUESSmed is a PRIMA (Partnership for Research and Innovation in the Mediterranean Area) project, relates to the Call: Section 1 – Farming Systems 2019 and belongs to the IA – Topic 1.2.2: "Sustainability and competitiveness of Mediterranean greenhouse and intensive horticulture"

iGUESSmed supports the transition toward innovative, sustainable and competitive Mediterranean horticultural greenhouses by developing, validating and transferring a pioneering Decision Support System (DSS) for the MED greenhouses, which is able to:

- REDUCE NUTRIENT LEAKAGE into sub-surface and groundwaters by optimizing the fertigation management (both irrigation and fertilization) under low quality water conditions;
- REDUCE THE USAGE OF CHEMICALS thanks to a sustainable and integrated pests and diseases control;
- INCREASE THE PRODUCTIVITY thanks to an improved and cost-effective efficiency of climatic control procedures, introducing specific low-cost solutions to apply to pre-existent greenhouse structures

The project will be carried out on tomato as reference crop, in soil and soilless culture in low-tech greenhouses typical of the Mediterranean region, by applying participatory and integrated interdisciplinary toolkit of novel and emerging technologies such as sensor technology, IoT, advanced agronomic management, simulation models and self-calibrating mathematical algorithms.

The project started in APRIL 2020 and has an extension of 4 years.

The iGUESSmed consortium is comprised by 4 of the most important countries in Med-area as regards the greenhouse tomato cultivation, 2 European (Italy and Spain) and 2 non-EU (Turkey and Tunisia). There are 7 entities from the 2 European countries and 2 entities from 2 non-EU countries, from which 1 very small company, 1 SME, 1 big company, 1 non-profit foundation, and 5 RTDs.

Annex 3 – Privacy notice and Informed Consent Forms

Privacy notice

The [Name of the Organisation] will use your personal data for the purposes of the research undertaken in the iGuessmed project. Our legal basis for processing your data is that it is necessary for the performance of a task carried out in the public interest in relation to research funded by the PRIMA, supported under Horizon 2020.
We are the Data Controller over your personal data. We will not share your personal data beyond the project team, unless required by law and shall only retain it according to good scientific practice for as long as is necessary to fulfil the research undertaken on the project, to deliver project outcomes, and to fulfil the requirements of the funder. For further information, please contact our Data Protection Officer on [add email address of data protection officer][3].

[Insert data collector name]
Contact details:
[Name of organisation]
[Address]
Email:
Telephone:

Informed Consent Forms

Name and organisation of data collector: _____

Name of the participant: _____

1) Consent statement the participant have been informed that:

- Data is being collected as part of the PRIMA Project IGuessMED.
- Data collected, audio recording, video-shooting and photos may be taken and used for research, dissemination, and communication purposes.
- Data will be analysed by members of the IGuessMED project, and in some cases may be analysed by project members other than the interviewer.
- Participation is voluntary.
- Consent can be withdrawn at any time without reason.
- Participants can access personal data at any time without reason.
- Data will be anonymised if possible. In cases in which the data cannot be anonymised, any publications will be shown to identifiable participants for further consent for publication.
- Data will be safely stored in certified repositories for long term preservation and curation.

Signed _____ (participant)
Date _____

[3] If there is no privacy notice on the partner's website, and if a partner does not have a Data Protection Officer, substitute the sentence with the following: "For further information please contact [add email address of person responsible for data protection]."

2) Recording of consent Project partners will keep evidence of consent by recording.

Name of the person who gained consent: _____

Data and time that consent was given: _____