

Deliverable 5.4

Project Acronym: PRECIMED

Project full Name: Precision Irrigation Management to Improve Water and Nutrient Use Efficiency in the Mediterranean Region

[Intermediate Sustainability Plan (M18)]

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Document history

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Summary

The deliverable [**D5.4 – Intermediate Sustainability Plan (M18)**] is the preliminary analysis of the PRECIMED project activities linked to the sustainability. It describes, notably, the activities aiming to increase awareness of the stakeholders on the project and its activities focused on the development of Decision Support System (DSS) to improve the efficient use of water, nutrients and energy. This intermediate sustainability plan includes the project keys stakeholders, the sustainability approach, the strategies to increase the involvement of end users and organizations in the project for a better sustainability of PRECIMED. This also includes its activities and the description of the activities to deploy the sustainability strategies across the Mediterranean basin.



1. Introduction

This deliverable is the Intermediate Sustainability Plan of the Project "Precision irrigation management to improve water and nutrient use efficiency in the Mediterranean region".

A sustainability plan is a roadmap for achieving long-term goals and documents strategies to continue the program, activities and partnerships. Sustainability can be defined in different ways a) the sustainability of the values that the project promotes, b) the sustainability of relationships between organizations and c) the sustainability of services (1). In our case, there is a need to sustain the project results and the project continuation after the funding period. It is question to involve/track more and more end users of the services planned to be developed under PRECIMED project (Decision support system tool "DSS" using intensive ICTs), to disseminate widely the project results increasing awareness of stakeholders of the PRECIMED project and its activities.

This intermediate sustainability plan will be completed by a final sustainability plan at the end of the project considering end user's feedback in terms of expected sustainability for PRECIMED initiatives.

2. Project Sustainability plan

To create a sustainability plan some important steps need to be followed like the identification of what needs to be sustained, what resources are required, key partners and determining the financing strategies. In this intermediate sustainability plan, we will focus on the project PRECIMED exploitation results; the key stakeholders of the project, the strategies to involve more end users in the project and, finally, the identification of activities to deploy the sustainability strategy of the project innovations.

Objectives of intermediate sustainability plan

Globally, the objective of this initial sustainability plan, under the PRECIMED project, is to sustain the main results related to the Decision support system (DSS) developed by involving/make interested, gradually, more end users and to propose an action plan to disseminate the project, its activities and results for targeted user groups.

3. PRECIMED project keys stakeholders

Considering the potential interests of stakeholders is key to sustainability. In this context, the PRECIMED project aims to:

- **Develop an IoT platform able to optimize the water and fertilizer** both in open air and in hydroponic greenhouse. The PRECIMED platform integrate heterogeneous sensors using communication interfaces to a common API, which will enable data interoperability between the different hardware components providing scalability solutions;



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- **Reinforce agribusiness sector.** The proposed PRECIMED solution enables third-party companies to develop specific applications over the same framework platform, to optimize any irrigation or nutrition process over the different crop systems;
- **Develop a software as Service approach** tacking into account an economic model to make the PRECIMED solution feasible to commercialize;

Therefore, the implementation of these PRECIMED solutions related to water and nutrients management will involve a lot of stakeholders acting first as developers (case of OdinS which is, in same time, project partner), second as a companies of services, third as the end users (farmers) etc.

The key stakeholders of the project could be as follow:

➤ **Designers of Decision support system (DSS):**

It refers to the developers of the PRECIMED platform and associated software's that includes, notably, the PRECIMED project Consortium. Their role is to develop, test, validate, use and disseminate widely the PRECIMED results. Among these results, we can cite the driven irrigation and fertilization systems, up scaling the on-farm, water and fertilizers use efficiency gain via the PRECIMED platform and associated software's, deliver the functional interoperability of PRECIMED IoT Smart Farming, the IoT based advisory services. The other role of the developers of DSS is the management of the PRECIMED platform, including the water and fertilizer management software's.

➤ **Service providers (companies)**

At a commercial level, the DSS developed need to reach the market. Companies can be interested by the services developed and hereby to propose it to the stakeholders interested, notably farmers.

The PRECIMED solution, FIWARE-based enables third party companies to develop specific applications over the same framework PRECIMED platform, using Big Data processing algorithms.

The companies involved in the field of irrigation technologies and plant nutrition could be, also, interested, by the services offered by PRECIMED since these services includes devices for water and fertilizer management.

➤ **Farmers**

Farmers are among the most impacted actors after the adoption of the PRECIMED solutions related to the efficient use of water, fertilizers and reducing the cost of energy. During the implementation of the project, 7 pilot farms (2 in Algeria, 2 in Spain, 2 in Greece and 1 in Tunisia) had been already selected to test and validate the DSS for irrigation and fertilization management. The deployment of the seven pilots were integrated from the beginning of the implementation of the project. Participatory approach was adopted to define the needs of farms in term of data requirements of IoT devices. In addition, meetings/consultations with other farmers, which are not engaged with the project consortium, were achieved by the four



participant countries. These pilot farms act as end users and gradually could involve more users / farms. The project expects to involve more than 1000 farms 3 years after the project-funding period is finished.

According to Goedknecht and Silvius, 2012, stakeholder participation requires *"a process of dialogue and ultimately consensus building of all stakeholders as partners who together define the problems, design possible solutions, collaborate to implement them, and monitor and evaluate the outcome"*.

➤ **Environmental organizations:**

PRECIMED will have an important impact on climate change due to its expected impacts on the improvement of water and nutrient use efficiency. These expected results suggest a reduction of water use and fertilizers. In many cases, an uncontrolled water and fertilizer management affects the quality of soil and ground water resources and induces a waste a water in despite of the water scarcity in Mediterranean regions. Hence, these organizations could be considered as key stakeholders for the sustainability of the project and its results.

➤ **Policy makers**

Local and national authorities are concerned by the DSS, so, they need to be convinced to adopt/accept the PRECIMED innovations since PRECIMED will support the local and national agricultural development by implementing programs, initiatives and aids that can facilitate the market uptake of smart precision farming products. In addition, the policy makers can be considered as a strong funding source if a positive impact of the project is demonstrated. Therefore, a socio-economic and environmental impact assessment study must, necessary, to be implemented after, at least, 3 years following the end of PRECIMED project funding to show the positive impact of smart farming on the crop productivity, the water and fertilizers use efficiency, the preservation of the quality of soil and underground water resources from pollution due to uncontrolled fertilization and irrigation.

➤ **Research institutes and university**

The project partners include 2 universities (University of Thessaly, UTH, in Greece and University of Sfax in Tunisia), 2 research institutes (Spanish National Research Council, CSIC, in Spain and National Institute of Agronomic Research, INRAA, in Algeria) and a spin-off of Murcia University (OdinS). These institutions include potential developers of applications and researchers for including, for example, other crops and other agricultural exploitation types. Young researchers and students need to be also involved in the project. Students will be trained and will most probably use the PRECIMED solutions when they finish their studies.

4. The sustainability approach

The PRECIMED activities must ensure the sustainability of the project results and their wide adoption by end users during and after the PRECIMED funding is finished. In this context, the plan for dissemination and exploitation results activities and the plan for communication need to be taken into consideration when developing the sustainability plan as several aspects, such as demonstrations in pilot farms, dissemination methods of the project results to the stakeholders.... Hence, the sustainability plan must be associated with other WP5 tasks as T5.1 "Communication and Dissemination activities" and T5.2 "Exploitation and IPR management of the project's results".

The sustainability strategy of the PRECIMED project must be considered at short and long term:

a) Short term (During funding period):

The project developed some activities related to the communication, dissemination and exploitation of the results. In this context, two plans (Communication and Dissemination Plan "D5.1" and Plan for Dissemination and Exploitation of Results "D5.2") were established with the objective to:

- Raise awareness among actors in the entire AgroFood value chain of the role of the PRECIMED project;
- Raise awareness among public authorities in the Med area of how project partners work together to support Entrepreneurship and Innovation;
- Ensure that the SMEs in the AgroFood sector in the Mediterranean area are aware of the PRECIMED project and its activities;
- Communicate the results of the project to Research and Development bodies;
- Define a roadmap for the results exploitation.

b) Long term (Sustainability after the funding period is finished)

A roadmap for the results exploitation during and after the project funding needs to be defined. The funding source is an important aspect needed to be taken into account. This aspect is considered as key for the sustainability. Business plan have also the same importance than the funding sources.

5. Strategy to increase the end users

The actions allowing attracting and engaging the end users are an important aspect of the sustainability strategy. The intermediate sustainability included the following actions:

➤ **The involvement of end users in the project:**

Initially, the consortium includes the project partners and 7 pilot farms. Each partner must to identify others farmers interested to participate to the project. Thus, the owners of seven pilot farms, involved in the PRECIMED project from the beginning of its starting to develop the DSS according to the needs of farms and farmers, has committed to contribute to the project. During the implementation of the WP2/ task2.1 related to *the Identification of farmers participating in the project and establishment of experimental approach in the pilot farms*, others farmers were associated in the discussions.

In addition, the selected pilot farms will be used to achieve the dissemination activities related to the demonstration of the DSS, presentations, organizing open days and workshops. During these events, others stakeholders as local policy makers, ICT companies, universities and farmers will be invited to participate. These dissemination actions in the pilot farms can raise awareness of end users on the PRECIMED project and its activities.

Others important dissemination activities are planned in the project, like the website, the social media and Forum (Facebook and LinkedIn) can raise awareness more potential users on the PRECIMED solutions to improve the efficient use of water and nutrients management. In this context, the project created a website (<https://www.precimed-prima.org>), two social media (Facebook and twitter count) (<https://www.facebook.com/precimed.prima/>, <https://twitter.com/precimedp>) and a forum (LinkedIn count) (<https://www.linkedin.com/company/precimed-prima/>). An intense dissemination is planned to be achieved under these communication tools.

➤ **The involvement of entities in the project**

Different entities can act as end users need to be involved in the project. Among these entities, we can cite:

- **The Agricultural Services** could act as users of DSS through their regional development programs on irrigation and agricultural development. In some countries, these services are in charge of local agricultural development.
- **The Agricultural Technical Institutes** could be also involved with the consortium and could act as user for testing and the validation of the PRECIMED solution. In some countries, these organizations are in charge for the development of new agricultural practices and for the transfer of technology.
- **Public Authorities (Agricultural Ministry)** could be considered as potential stakeholder of PRECIMED solution. In fact, the use at wide scale of DSS depend on its acceptance/adoption by the policy makers. For that, it's important to associate these entities to the PRECIMED project.
- **The High School of Agriculture and University** need to be associated to the PRECIMED project. They can act for the training of future users of DSS.



For all these organizations, there is a need to invite them to participate in the different events planned to be organized by the project, like workshops, conferences, open day, demonstrations, so that they become aware on the project, its activities and its outcomes.

6. Strategy for business

In order to ensure that the developed platform and associated software's is competitive in terms of business, the Consortium will develop business models with a view towards the sustainability of the platform and the services provided. In this context, it's planned to test some generic business models to see the possibilities of success with them like Subscription models, Publicity and Data selling, Affiliation models, etc.

7. Actions to implement in sustainability plan

To sustain the activities and the project results, a series of activities to implement during the project's lifetime have been identified. These actions are planned within the 3 years of the project and all PRECIMED partners (INRAA, UTH, OdinS, OPTIM and CSIC) are in charge of their implementation.

Description of the required activities to deploy sustainability strategies of innovation across the Mediterranean basin

The initial sustainability activities to achieve during the lifetime of the project are presented in Table 1.

Actions	Steps	Who	Related WP/Task	When	Prerequisite	Results indicators
Involvement of users	Identify the stakeholders (farmers, farms, company services...) that will be interested in PRECIMED solutions	All partners	WP5/T5.1	Year 1 Year 2 Year 3	Work within WP2/T2.1	List of stakeholders identified
	Small meetings in pilot areas on the vision of PRECIMED project	All partners	W5/T5.1	Year 1	All the project coordinators are responsible on their respective countries to organize meetings with potentials stakeholders	Number of different comments collected
	Multi-stakeholder meeting in pilot area	All partners	W5/T5.1	Year 1	All the project coordinators are responsible on their respective countries to organize meetings	Number of different comments collected
Involvement of entities	Identification of entities which could be involved in the project	All partners	W5/T5.1	Year 1 Year 2 Year 3	All the project coordinators are responsible on their respective countries to identify the potential entities	Number of entities identified
Dissemination plan preparation	Development of website to present the project and its results	INRAA	WP5/T5.1	Year 1 Year 2 Year 3	None	Visits on Website
	Creation of social	UTH	WP5/T5.1	Year 1	None	Visits on



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	media (Facebook and twitter)					Facebook and Twitter
	Creation of a Forum (LinkedIn)	UTH	WP5/T5.1	Year 1	None	Visits on LinkedIn
	Preparation of workshop (practical user's guide for fertigation)	All partners	WP5/T5.2	Year 2	Work within WP2/T2.1	1-day workshop in each of the PRECIMED regions
	Selection of events (conferences, workshops, etc.) to participate	All partners	WP1, WP2, WP3, WP4 and WP5	Year 2 Year 3	All partners are responsible of proposing conference papers, panels, symposia, roundtables or any other type of public presentations.	Number of conferences. Number of workshops
Preparation of dissemination material	Preparation of project leaflets, posters, banners, pens and bags	UTH INRAA	WP5/T5.1	Year 1 Year 2 Year 3	None	Number of project leaflets, posters, banners, pens and bags prepared
	Preparation of project newsletters	UTH INRAA	WP5/T5.1	Year 1 Year 2 Year 3	Work within WP2, WP3 and WP4	Number of newsletters written
	Design and writing of the project's Brochures	UTH	WP5 / T5.1	Year 1 Year 3	None	Number of brochures written
	Farmers practical guides	All partners	WP2/T2.3	Year 2	None	-
	Preparation of project video demonstrating the PRECIMED platform and services provided to optimize irrigation and fertilization	OdinS OPTIM	WP3/T3.3 WP4/T4.3	Year 2 Year 3	None	-
	Preparation of project videos on IoT device	OdinS OPTIM	WP2/T2.3	Year 2	None	-



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	Preparation of video of PRECIMED	CEBAS-CSIC	WP5/T5.1	Year 2	WP2, WP3, WP4	-
	Preparation of online training course	CEBAS-CSIC, UTH, OdinS	WP5/T5.2	Year3	None	Number and duration of training
Update of dissemination material	Update website for the dissemination of the project and its results	INRAA	WP5/T5.1	Year 1 Year 2 Year 3	Work within WP2, WP3 and WP4	Website visits
	Update project Facebook, Twitter and LinkedIn	All partners	WP5/T5.1	Year 1 Year 2 Year 3	All partners must to publish at least one post by week on Facebook	Average number of followers in different social
Distribution of dissemination material	Project leaflets, posters, banners, pens and bags	All partners	WP5/T5.1	Year 1 Year 2 Year 3	All partners must to distribute the dissemination material	Number of project leaflets, posters, banners, pens and bags distributed
	Project newsletters	UTH	WP5/T5.1	Year 1 Year 2 Year 3	All partners must to distribute the newsletters	Number presented in website and social media; Number distributed and downloaded
	Project brochures	All partners	WP5/ T5.1	Year 1 Year 3	All partners must to distribute the project brochures	Number of brochures distributed
	Farmers practical guides	All partners	WP2/T2.3	Year 3	All partners are responsible for the distribution of farmers practical guides	Number of farmers interested
	Project videos demonstrating the PRECIMED platform to	OdinS OPTIM	WP3/T3.3 WP4/T4.3	Year 2 Year 3	None	Number of people having downloaded the video or



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	optimize irrigation and fertilization on social media and website					participated to the projection of video
	Project videos on IoT device on social media and website	OdinS OPTIM	WP2/T2.3	Year 2 Year 3	None	Number of people having downloaded the video or participated to the projection of video
	Video of PRECIMED on social media and website	CEBAS- CSIC	WP5/T5.1	Year 2 Year 3	WP2, WP3, WP4	Number of people having downloaded or used the video
Presentation of results in conference, scientific magazines, workshops and open days	Organizing two open days per country / virtual events	All partners	WP2, WP3, WP4 and WP5	Year 2 Year 3	All partners are responsible for the organization of two open days during the life of the project	Number of the participants per country
	Organizing of workshop (1-day workshop in each of the PRECIMED regions)	All partners	WP5 / T5.2	Year 2 Year 3	Work within WP2/ T2.1	Number of participants to the workshop
	Publications	All partners	WP2, WP3, WP4 and WP5	Year 1 Year 2 Year 3	All partners are responsible of proposing of Publications in scientific journals	Number of publications
	Online Final Conference	All partners	WP2, WP3, WP4 and WP5	Year 3	All partners will be responsible to organize this event	Number of participants



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Trainings, meetings and workshops	Online Training for young researchers involved in the project on the use of PRECIMED platform	OdinS CEBAS- CSIC UTH	W5/T5.2	Year 3	OdinS, CEBAS- CSIC and UTH will be lecturers of course trainings	Number of fellows trained
Ensuring the continuation of the PRECIMED platform and offered services after the project's lifetime	Investigation of different funding sources (national projects, potential users and EU programs)	All partners	WP1, WP2, WP3, WP4 and WP5	Year 3	Each country is responsible to identify the possible funding sources	Number of funding sources identified

8. Conclusions

In this Intermediate Sustainability Plan, the key stakeholders of the project and the strategy to be followed for achieving the sustainability objectives, notably, the raising awareness of the main stakeholders on the project, its activities and results are presented. An implementation plan to deploy the project strategy during the lifetime of the project is, also, presented. This intermediate sustainability plan will be revised and completed on M34. The final sustainability plan could include the introduction of new actions based on the final plan of dissemination and exploitation of project results planned for M32.

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