



# Intel-Irris

## Intelligent Irrigation System for Low-cost Autonomous Water Control in Small-scale Agriculture

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### Deliverable D6.2

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*First year report*

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## DOCUMENT REVISION HISTORY

Version	Date	Changes
V1.1	Sep 7 <sup>th</sup> , 2022	PUBLIC RELEASE
V1.0	Sep 5 <sup>th</sup> , 2022	FIRST DRAFT VERSION FOR INTERNAL APPROVAL
V0.1	Aug 29 <sup>th</sup> , 2022	FIRST RELEASE FOR INTERNAL REVIEW

## EXECUTIVE SUMMARY

Deliverable D6.2a reviews the main activities conducted during the first year of the project. However, the purpose of this deliverable is not to duplicate the extensive and more complete information provided by the numerous project's specific deliverables. Therefore, we will briefly summarize the main activities and then provide links to the associated deliverables, resources and documents. We will then present the achieved KPIs with the initial proposed KPIs and will elaborate on the difficulties encountered.

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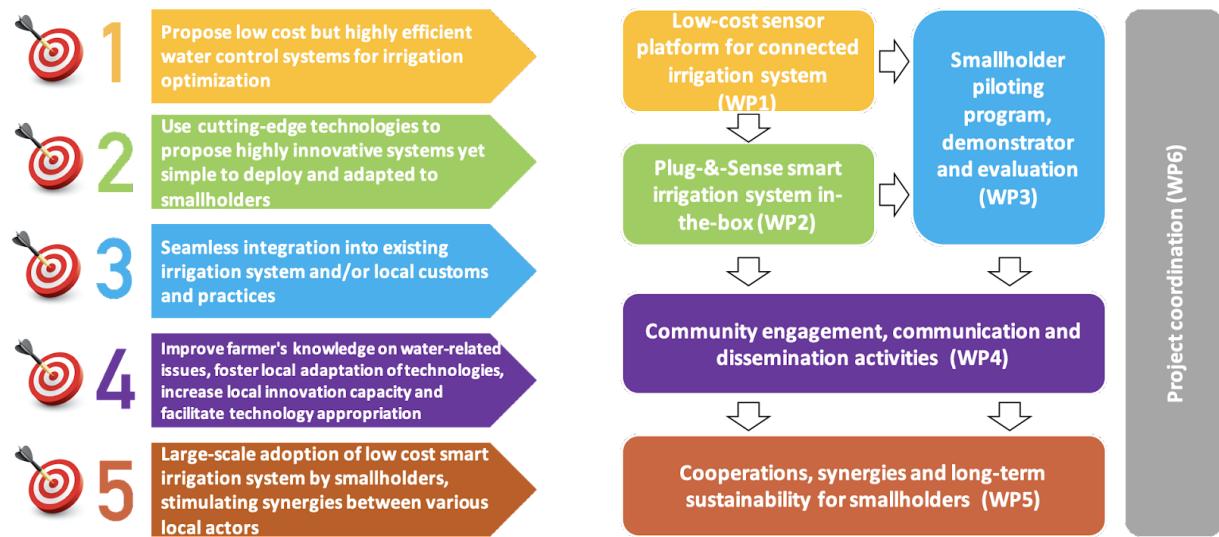
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## 1. INTRODUCTION

## **1.1. Review of project's structure**

The project's objectives and the mapping to the list of workpackages (WPs) is illustrated below.



The list of workpackages, tasks as well as WP & Task leaders are illustrated below.

The project Gantt chart is illustrated below.

WP/Task	Title	M01	M02	M03	M04	M05	M06	M07	M08	M09	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33	M34	M35	M36			
WP1	Low-cost sensor platform for connected agriculture	MS1					MS4	MS5																										MS11						
T1.1	Multi-actors technology adaptation, co-creation						D1.1																											D1.5						
T1.2	Design and development of low-cost soil-water sensors							D1.2a				D1.2b																							D1.2c					
T1.3	Development of advanced soil-water sensors								D1.3a																										D1.3b					
T1.4	Test and validation in controlled agriculture									D1.4a																									D1.4b					
WP2	Plug-&-Sense smart irrigation system integration	MS1							MS7			MS10								MS12															MS15					
T2.1	Design of an edge-enabled sensor-gate								D2.1a											D2.3a															D2.1b					
T2.2	Development of multi-level & multi-stakeholder communication																																		D2.3b					
T2.3	Development of advanced AI edge-processing																																		D2.4					
T2.4	Training procedures for AI processing																																		D2.5					
T2.5	Datasets for smart agriculture																																		D2.6					
T2.6	Integrating the irrigation "in-the-box"																																		D2.2c					
WP3	Smallholder piloting program, demonstration	MS1						MS4												MS11															MS16					
T3.1	Status on smallholders common irrigation								D3.1a		D3.1b									D3.1c															D3.4b					
T3.2	Smallholders Piloting Program & test campaign									D3.3										D3.5a														D3.5b						
T3.3	Farmer Training Program																			D3.6a														D3.6c						
T3.4	Evaluation and KPI assessment for the pilot																			D3.6b														D3.6d						
WP4	Community engagement, communication	MS1						MS2												MS14														MS17						
T4.1	Communication and dissemination materials								D4.1		D4.2									D4.3b														D4.3c						
T4.2	Organization of dissemination events																																		D4.4					
T4.3	Competitions and Challenges for Tech																																							
T4.4	Starter-kit program																																							
WP5	Cooperations, synergies and long-term exploitation	MS1						MS3												MS13		MS15												MS8						
T5.1	Partnership programs with local stakeholders									D5.1										D5.1a														D5.2a						
T5.2	Mediterranean Partnership programs																																							
T5.3	From piloting to long-term exploitation																																							
T5.4	Documentation and training materials																																							
WP6	Project management	MS1																																						
T6.1	Project coordination/administration								D6.1																													D6.2		
T6.2	Technical management																																							
T6.3	Quality and risk management																																						D6.4	

## 1.2. Gantt diagram for project's first year

WP/Task	Title	M01	M02	M03	M04	M05	M06	M07	M08	M09	M10	M11	M12
WP1	Low-cost sensor platform for connected agriculture	MS1						MS4		MS5			
T1.1	Multi-actors technology adaptation, co-creation							D1.1					
T1.2	Design and development of low-cost soil-water sensors												D1.2a
T1.3	Development of advanced soil-water sensors												D1.3a
T1.4	Test and validation in controlled agriculture												D1.4a
WP2	Plug-&-Sense smart irrigation system integration	MS1											MS7
T2.1	Design of an edge-enabled sensor-gate												D2.1a
T2.2	Development of multi-level & multi-stakeholder communication												
T2.3	Development of advanced AI edge-processing												
T2.4	Training procedures for AI processing												
T2.5	Datasets for smart agriculture												
T2.6	Integrating the irrigation "in-the-box"												D2.2a
WP3	Smallholder piloting program, demonstration	MS1						MS4					MS8
T3.1	Status on smallholders common irrigation								D3.1a				
T3.2	Smallholders Piloting Program & test campaign												D3.3
T3.3	Farmer Training Program												
T3.4	Evaluation and KPI assessment for the pilot												
WP4	Community engagement, communication	MS1						MS2					MS6
T4.1	Communication and dissemination materials								D4.1		D4.2		
T4.2	Organization of dissemination events												
T4.3	Competitions and Challenges for Tech												
T4.4	Starter-kit program												
WP5	Cooperations, synergies and long-term exploitation	MS1						MS3					
T5.1	Partnership programs with local stakeholders								D5.1				
T5.2	Mediterranean Partnership programs												
T5.3	From piloting to long-term exploitation												
T5.4	Documentation and training materials												
WP6	Project management	MS1											
T6.1	Project coordination/administration							D6.1					
T6.2	Technical management												
T6.3	Quality and risk management												D6.4

### 1.3. List of milestones for project's first year

YEAR 1 – MS1 to MS7 realized – MS8 delayed					
MS1	<b>Kick off meeting</b>	Define and launch all the actions, web site and repositories	All	M01	Meeting minutes
MS2	<b>Project web site</b>	The project web site is operational with information on project's objectives, consortium and scheduled events  <a href="https://intel-irris.eu">https://intel-irris.eu</a>	WP4	M04	Web site
MS3	<b>Stakeholders &amp; Experts Advisory Committee</b>	SEAC is operational with at least 8 members	WP4 WP5	M04	Activities for D1.1 & D3.1
MS4	<b>First iteration on needs, requirements and adaptation to local context</b>	Meetings with end users completed in order to collect needs and technical requirements adapted to local agriculture and irrigation practices	WP1 WP3	M06	D1.1 D3.1a
MS5	<b>Version 1 of low-cost connected sensor platform</b>	Version 1 of low-cost connected sensor generic platform (with simple soil sensors) ready for testing in controlled environment in order to validate general design and main building blocks	WP1	M08	D1.1 Platform v1 D3.1a
MS6	<b>First dissemination event</b>	First dissemination event in Morocco or Algeria to raise awareness and show the low-cost irrigation system approach targeting smallholders. Main innovations will be demonstrated to end-users and stakeholders	WP4	M10	Platform v1
MS7	<b>Version 1 of starter-kit</b>	Starter-kit is ready for packaging and distribution: low-cost connected sensor platform+simple control system with User Interface	WP2	M12	D2.1a D2.2a Starter-kit v1
MS8	<b>Smallholders Piloting Program</b>	The Smallholders Piloting Program has been launched	WP3	M12	D3.3 Starter-kit v1

## 1.4. List of deliverables for project's first year

D1.1	Status, needs and constraints of small-scale farms with regards to connected irrigation system features	WP1	UORANI	R	PU	M06
D1.2a	Low-cost sensor generic platforms for connected irrigation system – v1	WP1	UPPA	R	PU	M08
D1.2b	Low-cost sensor generic platforms for connected irrigation system – v2	WP1	UPPA	R DEM	PU	M12
D1.3a	First report on advanced soil-water-plant interaction models increasing accuracy of low-cost sensor systems	WP1	IRD	R	PU	M12
D1.4a	First report on test and validation in controlled agriculture environments	WP1	AUA	R	PU	M12
D2.1a	First report on specifications & functionalities of the edge-enabled sensor-gateway framework for smart irrigation system	WP2	WAZIUP eV	R	PU	M08
D2.2a	Starter-kit for smart irrigation system – v1	WP2	WAZIUP eV	R DEM	PU	M12
D3.1a	First report on smallholders common irrigation practices and irrigation techniques selection	WP3	INRA	R	PU	M06
D3.1b	Second report on smallholders common irrigation practices and irrigation techniques selection	WP3	INRA	R	PU	M10
D3.2	Definition of test and validation procedures in pilots	WP3	UMAB	R	PU	M10
D3.3	Presentation of the Smallholders Piloting Program	WP3	UORANI	R	PU	M10
D4.1	Project web site	WP4	WAZIUP eV	DEC	PU	M04
D4.2	Synthesis of communication & dissemination plan, tools and materials	WP4	WAZIUP eV	R	PU	M06
D4.3a	First year report on communication, dissemination & engagement activities	WP4	ENSA	R	PU	M12
D5.1	Definition of partnership framework program	WP5	INRA	R	PU	M06
D5.2a	First year report on partnerships, cooperations and synergies activities	WP5	INRA	R	PU	M12
D6.1	Project handbook	WP6	UPPA	R	PU	M03
D6.2	First year report	WP6	UPPA	R	PU	M12

All public deliverables are available on the project's web site in Documents/Deliverables menu:

- <https://intel-irris.eu/deliverables>

**INTEL-IRRIS**  
A PRIMA PROJECT FOR LOW-COST SMART IRRIGATION

OBJECTIVES | METHODOLOGY | CONSORTIUM | PILOTS | RESULTS

**Deliverables**

[Publications](#) | [Seminars/Talks](#) | [Tutorials/Videos/Slides](#) | **Deliverables** | [Links](#)

2022

- WP1. M6 D1.1 [Status, needs and constraints of small-scale farms with regards to connected irrigation system features](#).
- WP1. M8 D1.2a [Low-cost sensor generic platforms for connected irrigation system – v1](#), see the companion document listing all the [hardware parts](#).

## 2. QUICK REVIEW OF ACTIVITIES BY WPs

### 2.1. WP1

WP1 “Low-cost sensor platform for connected irrigation system”

The work conducted in WP1 has mainly focused on developing the hardware and software associated with the low-cost sensor platform. The low-cost approach and do-it-yourself methodology have been validated. Extensive tests have been carried out to verify the autonomy (running on battery) and the design robustness for outdoor deployment.

Extensive tests have also been carried out on the physical low-cost soil humidity sensors to verify their efficiency, accuracy and stability to propose calibration procedures and models to increase their performances.



Experimental hardware configurations have also been developed and tested to increase the accuracy of irrigation prediction. For instance, adding a soil temperature sensor and using 2 soil humidity sensors (tensiometers, see below) to better detect water movements in the soil.

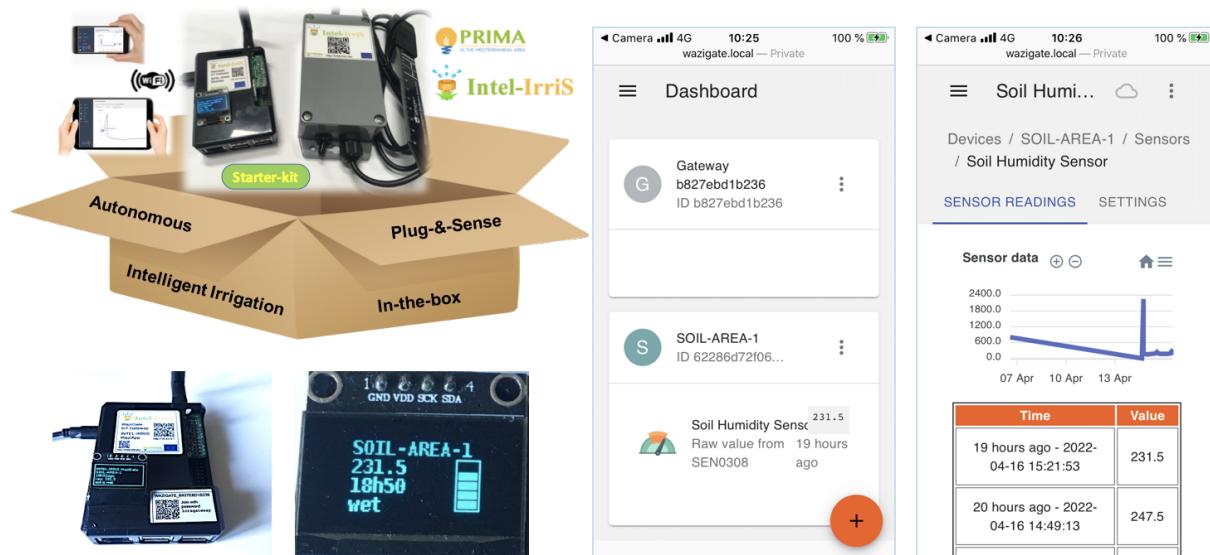


## 2.2. WP2

WP2 “Plug-&-Sense smart irrigation system in-the-box”

The work conducted in WP2 has mainly focused on developing the Plug-&-Sense smart irrigation system by integrating the low-cost sensor platform with the versatile IoT gateway into the INTEL-IRRIS starter-kit.

The IoT gateway framework, so-called INTEL-IRRIS WaziGate, has been developed from the generic WaziGate framework to provide an autonomous system that can be deployed out-of-the-box. A simple and intuitive user interface has especially been developed and integrated with the generic WaziGate to produce the INTEL-IRRIS starter-kit targeting smallholders.



One of the main outcomes of WP2 is to turn the INTEL-IRRIS starter-kit idea and initial proposition into reality with an operational Plug-&-Sense smart irrigation system to be deployed.



Works on adding embedded intelligence into the platform has also been initiated with several approaches: embedded irrigation application, datasets & machine learning techniques.

## 2.3. WP3

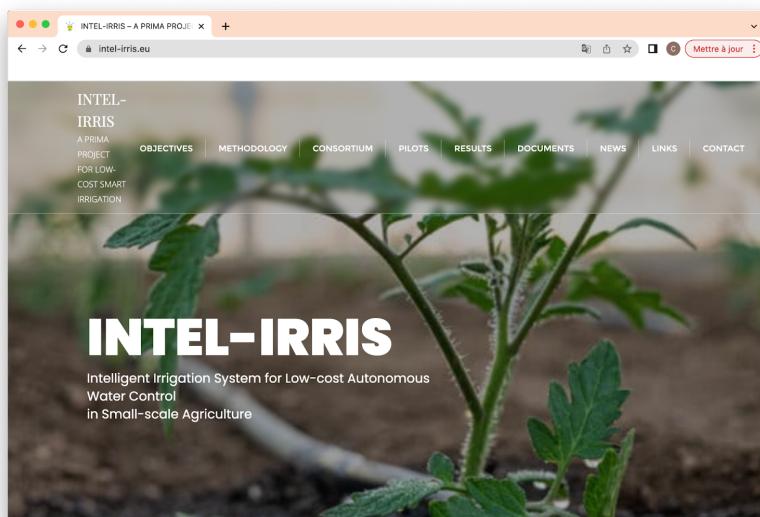
WP3 “Smallholders Piloting Program, demonstrator and evaluation”

The work conducted in WP3 has mainly focused on initiating the Smallholders Piloting Program. The main outcomes during the first year were to discuss with smallholders, review the main irrigation techniques used by smallholders and produce tutorials to better present the challenges of smart irrigation.

## 2.4. WP4

WP4 “Community engagement, communication and dissemination activities”

The work conducted in WP4 has mainly focused on maintaining the project web site with up-to-date and relevant contents, on producing communication materials and organizing dissemination events.





## 2.5. WP5

WP5 “Cooperations, synergies and long-term sustainability for smallholders”

For the first year, the work conducted in WP5 has mainly focused on developing collaborations with local stakeholders in order to better reach the smallholder communities and defining the Stakeholder & Expert Advisory Committee (SEAC).

## 2.6. WP6

WP6 “Project management”

The works conducted in WP6 are all aspects of project monitoring & management as well as engagement of project partners.

15 meetings including the project kick-off and 3 general meetings have been organized to regularly engage project partners. Except for 3 meetings, all other meetings were physical.

### LIST OF MEETINGS

Title	Date	Subject	Participants
<a href="#"><u>TM-KICKOFF</u></a>	23/06/2021 video-conf	KICKOFF	ALL
<a href="#"><u>TM-WEBSITE-01</u></a>	02/07/2021 video-conf	Design of the web site	UPPA+WAZIUP
<a href="#"><u>GM-OCT-21</u></a>	07/10/2021 video-conf	General Meeting	ALL
<a href="#"><u>TM-SOIL-SENSOR-01</u></a>	03/11/2021 at IRD	Discussion on soil-water-plant interactions, low-cost sensors and requirements	UPPA+IRD
<a href="#"><u>TM-COMM-PLAN-01</u></a>	06/11/2021 & 08/11/2021 at WAZIUP	Communication materials: roll-up, flyers, stickers. Graphic identity	UPPA+WAZIUP
<a href="#"><u>TM-STARTER-KIT-01</u></a>	06/11/2021 07/11/2021 08/11/2021	Definition of the various development lines.	UPPA+WAZIUP

	09/11/2021 at WAZIUP	Hardware requirements for the low-cost sensors platform and the starter-kit  Software architecture for the IoT-AI Edge Gateway	
<a href="#"><u>GM-DEC-21</u></a>	08/12/2021 09/12/2021	General Meeting	ALL
<a href="#"><u>TM-SOIL-SENSOR-02</u></a>	09/12/2021 at UPPA	Discussion on soil-water-plant interactions, low-cost sensors and requirements	UPPA+IRD+WAZIUP
<a href="#"><u>TM-SOIL-SENSOR-03</u></a>	28/03/2022 at IRD	Discussion on soil-water-plant interactions, low-cost sensors and requirements	UPPA+IRD+ENSA
<a href="#"><u>TM-ENSA-INRA-SETTAT</u></a>	30/03/2022 31/03/2022 01/04/2022 at ENSA & INRA	Seminars, webinars, visit of farms, meeting with stakeholders	UPPA+ENSA+INRA CCRA SETTAT+INRA RABAT
<a href="#"><u>TM-AUA</u></a>	05/04/2022 06/04/2022 at AUA	Discussions on AI for agriculture, digital platforms for agricultural knowledge	UPPA+AUA+EDEN LIBRARY
<a href="#"><u>TM-WAZIUP</u></a>	21/04/2022 22/04/2022 23/04/2022 at WAZIUP	Embedded AI on WaziGate, INTEL-IRRIS Irrigation WaziApp, Video on Edge-computing/Edge-AI and INTEL-IRRIS	UPPA+WAZIUP
<a href="#"><u>TM-UORAN1-UMAB</u></a>	24/05/2022 25/05/2022 at UPPA	Discussion on hardware supply, local technology adaptation, starter-kit, first deployment test in Algeria and the Smallholder Piloting Program	UPPA+UORAN1+UMAB
<a href="#"><u>TM-SOIL-SENSOR-04</u></a>	07/06/2022 at INRA Rabat	Discussion on soil-water-plant interactions, low-cost sensors and requirements	UPPA+IRD+INRA+ENSA
<a href="#"><u>GM-JUNE-22</u></a>	08/06/2022 09/06/2022 10/06/2022 13/06/2022	Scientific day General Meeting Smallholder event Seminar IWRI	all partners all partners all partners UPPA+ENSA+WAZIUP

## 3. SUMMARY OF MAIN ACTIVITIES DURING FIRST YEAR

The purpose of this deliverable is not to duplicate the extensive and more complete information provided by the numerous project's deliverables. Therefore, we will briefly summarize the main activities and then provide links to the associated deliverables, resources and documents.

### 3.1. Developing the technological IoT platform

These activities are related to WP1 and WP2 to develop the low-cost soil humidity sensor platform and the INTEL-IRRIS IoT gateway in order to integrate these components into the INTEL-IRRIS starter-kits.

Associated deliverables are:

- D1.2a: Low-cost sensor generic platforms for connected irrigation system – v1  
<https://intel-irris.eu/wp-content/uploads/2022/01/D1.2a.pdf>
- D1.2b: Low-cost sensor generic platforms for connected irrigation system – v2  
<https://intel-irris.eu/wp-content/uploads/2022/06/D1.2b.pdf>
- D2.1a: First report on specifications & functionalities of the edge- enabled sensor-gateway framework for smart irrigation system  
<https://intel-irris.eu/wp-content/uploads/2022/03/D2.1a.pdf>
- D2.2a: Starter-kit for smart irrigation system – v1  
<https://intel-irris.eu/wp-content/uploads/2022/06/D2.2a.pdf>

The project GitHub with all the technological components is:

- <https://github.com/CongducPham/PRIMA-Intel-IrriS>

The INTEL-IRRIS WaziGate framework:

- The INTEL-IRRIS WaziGate SD card ISO image  
<https://drive.google.com/uc?export=download&id=1BBM3GrNi1COJxpUcNtvVeopaQC9kU0r>

### 3.2. Developing the advanced calibration models

These activities are also related to WP1 and WP2 to test low-cost soil humidity sensors in various conditions and develop the calibration models to increase the accuracy of the soil humidity prediction. These activities are tightly linked to the tasks related to the IoT platform as the models have to be integrated into the low-cost soil humidity sensor platform and the INTEL-IRRIS IoT gateway. However, a dedicated deliverable also presents the calibration activities:

- D1.3a: First report on advanced soil-water-plant interaction models increasing accuracy of low-cost sensor systems  
<https://intel-irris.eu/wp-content/uploads/2022/08/D1.3a.pdf>

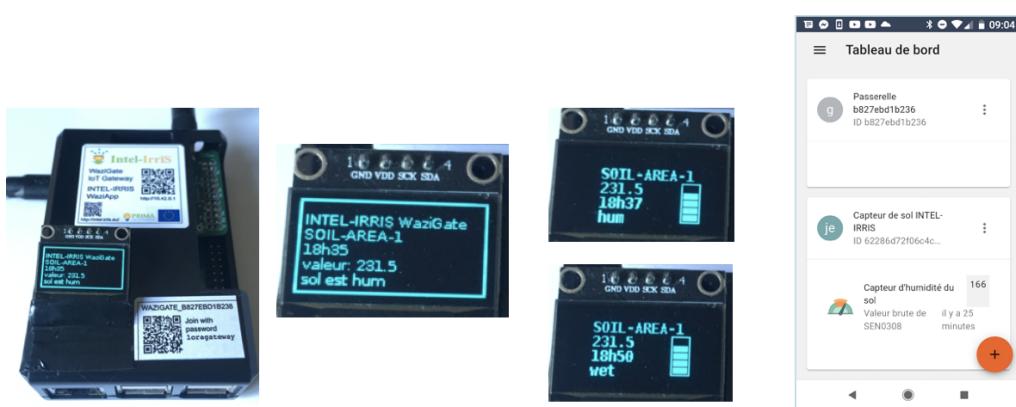
There are also specific tutorial materials that have been produced for various scientific events to present in a didactic manner the challenges of using low-cost sensors for optimizing irrigation.

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- **Les défis de l'irrigation 4.0 dans le contexte nord-africain.** Abdellah Elaissaoui, INRA CRRA SETTAT, Morocco.  
<https://intel-irris.eu/wp-content/uploads/2022/06/Rabat-A-El-Assaoui.pdf>
- **Utilisation de capteurs à faible coût pour optimiser l'irrigation.** Christian Hartmann, IRD, France.  
<https://intel-irris.eu/wp-content/uploads/2022/06/Rabat-C-Hartmann.pdf>
- **L'eau dans le sol et contraintes de l'irrigation.** Pr. Mohammed Benkhelifa, UMAB, Algeria.  
<https://intel-irris.eu/wp-content/uploads/2022/03/Talk-Mohammed-Benkhelifa-March-1-1-22.pdf>
- **Technologies des capteurs pour l'irrigation de précision : performance, choix technique et économique.** Pr. El Aissaoui Abdellah, INRA-CRRA Settat, Morocco.  
<https://intel-irris.eu/wp-content/uploads/2022/04/Talk-Abdellah-ElAssaoui-April-01-22.pdf>
- **Capteurs à bas coût pour la mesure de l'eau dans le sol : opérations préliminaires de calibration au laboratoire.** Dr. Christian Hartmann, IRD Paris, France.  
<https://intel-irris.eu/wp-content/uploads/2022/04/Talk-Christian-Hartmann-April-01-22.pdf>

### 3.3. Technology adaptation for the smallholder community

As one objective of INTEL-IRRIS is to provide a Plug & Sense smart irrigation solution targeting the smallholder community (WP2), the project has put a particular attention in providing a simple-to-use platform with an intuitive user-interface: a starter-kit ready to be deployed has been developed and simple irrigation notifications to end-user can be realized with the embedded OLED screen on the INTEL-IRRIS WaziGate while more detailed notifications and configuration possibilities can be accessed through a web interface from a smartphone. Language is also particularly important as most smallholders are not used to english. French traduction has been realized for INTEL-IRRIS WaziGate components while web-based interfaces rely on web browser's embedded translation features.



When possible, QR codes that can be scanned with a smartphone are generated and used. For instance, connection to the INTEL-IRRIS WaziGate's WiFi network can be automatically realized with a dynamically generated QR code displayed on the embedded OLED screen and connection to the INTEL-IRRIS WaziGate's dashboard can also be realized with a static QR code printed on a sticker on the WaziGate itself.



Presentation of the various user interfaces provided by the INTEL-IRRIS WaziGate is detailed in the following tutorial slides:

- Tutorial slides on building the INTEL-IRRIS IoT platform. Part 2: edge-enabled gateway  
<https://github.com/CongducPham/PRIMA-Intel-Irris/blob/main/Tutorials/Intel-Irris-edge-gateway.pdf>
- Tutorial slides on building the INTEL-IRRIS IoT platform. Part 3: the INTEL-IRRIS starter-kit  
<https://github.com/CongducPham/PRIMA-Intel-Irris/blob/main/Tutorials/Intel-Irris-starter-kit.pdf>

### 3.4. Technology transfer and capacity building

As one objective of INTEL-IRRIS is to promote open-source technologies and local entrepreneurship, the project has put a particular attention in providing materials for technology transfer and capacity building when developing the technological components.

All source code are available from GitHub community platform:

- Generic WaziGate framework: <https://github.com/Waziup/WaziGate>
- INTEL-IRRIS specific modules: <https://github.com/CongducPham/PRIMA-Intel-Irris>

And, most importantly, we produced numerous tutorial & training materials, including instructional videos, that are available on the project web site:

- Tutorials/Videos/Slides menu: <https://intel-irris.eu/tutorials-slides> and especially
  - List of parts to build the outdoor LoRa IoT soil sensor device  
<https://github.com/CongducPham/PRIMA-Intel-Irris/blob/main/Tutorials/Intel-Irris-low-cost-sensor-hardware-parts.pdf>
  - Tutorial slides building the INTEL-IRRIS IoT platform. Part 1: soil sensor device  
<https://github.com/CongducPham/PRIMA-Intel-Irris/blob/main/Tutorials/Intel-Irris-IoT-platform.pdf>
  - Tutorial slides on building the INTEL-IRRIS IoT platform. Part 2: edge-enabled gateway  
<https://github.com/CongducPham/PRIMA-Intel-Irris/blob/main/Tutorials/Intel-Irris-edge-gateway.pdf>
  - and related videos: video #1, #2, #3 and #4
- D4.3a “First year report on communication, dissemination & engagement activities” also lists a number of tutorial materials as well as related dissemination events.  
<https://intel-irris.eu/wp-content/uploads/2022/08/D4.3a.pdf>

### 3.5. Preparation of the Smallholder Piloting Program

The Smallholder Piloting Program (SPP) is an important part of the INTER-IRRIS project. It has to be prepared very carefully as the proposed technological solutions must be operational once deployed in order to preserve the trust of the participating smallholders. WP3 is devoted to the preparation of the SPP.

For the first year of the project, the SPP has mainly focused in contacting smallholders and preparing the logistics associated with the program. A dedicated deliverable presents these preparation activities:

- D3.3: Presentation of the Smallholders Piloting Program  
<https://intel-irris.eu/wp-content/uploads/2022/08/D3.3.pdf>

The preparation of the SPP also includes dissemination and raising awareness events to present the technologies, the challenges and the possibilities. These events are realized under the umbrella of WP4.

For instance, the first important event targeting smallholders has been organized by INRA CRRA SETTAT at the experimental domain of Sidi Aidi in Morocco on June 9th, 2022.



The preparation of the SPP also includes all the packaging to make the starter-kit visually attractive. Feedbacks are used by WP1 & WP2 to continuously improve the platform.



### 3.6. Communication & Dissemination activities

INTEL-IRRIS has put a particular effort in communication & dissemination. The project web site is regularly updated with the latest results and news. Newsletters as well as tweets on INTEL-IRRIS Twitter channel have been relayed on the large user and tech community built by our partner WAZIUP, thus reaching several thousands of persons & organizations interested in smart technologies for Africa. Printed materials such as posters, flyers, roll-ups and stickers have been designed, printed and distributed and also made available on the project web site in the Documents/Publications menu: <https://intel-irris.eu/publications>. Below, one of the posters in english and french language for instance.



The following deliverable details all the communication & dissemination activities, including those on the project's web site and social media:

- D4.3a “First year report on communication, dissemination & engagement activities” also lists a number of tutorial materials as well as related dissemination events.  
<https://intel-irris.eu/wp-content/uploads/2022/08/D4.3a.pdf>

## 4. SUMMARY OF KPIs

The following summary of project KPI is taken from:

- D4.3a “First year report on communication, dissemination & engagement activities” also lists a number of tutorial materials as well as related dissemination events.  
<https://intel-irris.eu/wp-content/uploads/2022/08/D4.3a.pdf>

Dissemination and Communication Actions		KPIs and Success Indicators (initial)	Reached after 1 year
Dissemination Events	<p><b>Smallholder-oriented events with demonstrations</b>  <b>Visits/meetings</b> to appropriate stakeholders (e.g., Ministries, Policy Makers, Regional Associations, Consultants, ICT Experts, SMEs, etc.)</p> <p><b>Number of dissemination events organized</b>  <b>Aim:</b> organize at least 10 communication &amp; dissemination events to create awareness on new smart technologies for intelligent low-cost irrigation systems to demonstrate the smallholders approach</p>	see D5.2a	5
Scientific peer-reviewed papers in conferences and journals	<p><b>Number of published peer reviewed papers</b>  <b>Aim:</b> publish at least 3 journals and 8 conference papers (of which at least 50% are joint-authored papers between Intel-Irris partners). All publications will be open access.</p>	1 joint conference article	
Technical Training/Tutorial Materials	<p><b>Number of Technical Training/Tutorial presentations produced</b>  <b>Aim:</b> release at least 8 Technical Training/Tutorial presentations/slides</p> <p><b>Number of Technical Training/Tutorial video produced</b>  <b>Aim:</b> release at least 4 Technical Training/Tutorial video  <b>Aim:</b> release at least 2 online course programs targeting different audiences</p>	4 (IT)+4 (AGRI)  4 (IT)+2 (AGRI) 0 (2 courses are under preparation from existing materials)	
Project Newsletters	<p><b>Usage of mailing-lists</b></p> <p><b>Number of Project Newsletters produced</b>  <b>Aim:</b> release at least 5 Project Newsletters.</p>	1	

<b>Communication Materials</b>	<p><b>Project logo, design/branding</b>  <b>Number of leaflets / brochures produced</b>  Aim: Preparation and distribution of 4 different brochures  <b>Number of posters</b>  Aim: publish at least 5 posters  <b>Number of press releases</b>  Aim: publish at least 4 press releases  <b>Number of different demonstration videos produced</b>  Aim: produce and publish at least 3 videos</p>	<b>3 flyers versions</b> <b>2</b> <b>1 (LaVieEco)</b> <b>4</b>
<b>Engagement &amp; Social Media</b>	<p><b>a) Presence in Social Media</b>  <b>Number of existing social media communities relevant to the project</b>  Aim: use Social Media channels (e.g., Facebook, Twitter, LinkedIn, YouTube and other useful networks)  <b>Number of videos on YouTube</b>  Aim: upload at least 4 Technical Training/Tutorial videos on YouTube  <b>Number of views for videos on YouTube</b>  Aim: a total number of views over 150000 views would be a positive result  <b>b) Flow of communication, number of posts</b>  Aim: publish continuous information contribution</p> <p><b>Number of Interviews on Media</b>  Aim: present in at least 3 major events</p>	<b>Twitter &amp; YouTube</b> <b>4 (IT)+2 (AGRI)</b> <b>through Twitter and web site</b> <b>1</b>
<b>Specialized online platforms for developers and tech-enthusiasts</b>	<p><b>Number of step-by-step tutorials produced</b>  Aim: Preparation of at least 6 step-by-step tutorials  <b>Number of high-visibility online platforms used</b>  Aim: create the step-by-step tutorials on at least 3 different high-visibility online platforms (e.g. diyprojects.com, create.arduino.cc, www.hackter.io, www.instructables.com,...)</p>	<b>3</b> <b>0</b> <i>currently we only use GitHub, web site and YouTube</i>

## 5. MODIFICATIONS & CORRECTIONS FROM INITIAL PLAN

The following modifications and/or corrections have been made:

1. D3.1a (WP3. M10) First report on smallholders common irrigation practices and irrigation techniques selection. Merged into D3.1b, due to delay in the activity.
2. D3.2 (WP3. M10) Definition of test and validation procedures in pilots. Merged into D3.3 to be better linked with the Smallholder Piloting Program

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## 6. DIFFICULTIES & RISKS

### 6.1. Difficulties

At the beginning of the project, the difficulties of having physical meetings had slightly delayed some tasks but the situation at the end of the project's first year is mostly back to normal.

Algerian partners had also been impacted by the delays of financial and administrative procedures. However, thanks to the engagement of the Algerian partners, many actions have still been able to be conducted and some deployments have been realized to validate the local assembling and configuration of the INTEL-IRRIS starter-kit.

The purchase of some hardware components is an issue in Algeria and Morocco. During the first year, UPPA provided most of the hardware components to enable local partners to build and deploy the INTEL-IRRIS starter-kit. However, a more sustainable solution needs to be implemented and local partners need to find local hardware providers to secure the availability of hardware components.

Another difficulty is the world-wide shortage of the Raspberry Pi single-computer board we use to build the INTEL-IRRIS WaziGate. UPPA, IRD, UORAN1, ENSA and INRA have managed to partially overcome this difficulty by using their own stock of Raspberry Pi (in total around 30 Raspberry Pi) in order to build a limited set of starter-kits. As the shortage is foreseen to last until end of 2023, this issue can have a significant impact on the number of starter-kits INTEL-IRRIS can provide. We already started to take into account this difficulty by having a more selective process when deploying starter-kits in pilot farms. We will especially try to avoid duplication of piloting farm profiles in order to have a representative set of piloting conditions to get smallholder's feedbacks with the limited number of starter-kits available.

Then, a major difficulty is to actually engage and reach the smallholders. INTEL-IRRIS receives help from local stakeholders but the task is still challenging and will represent the major efforts of the project during the second year in order to really start the Smallholder Piloting Program.

Finally, one difficulty was to maintain the initial schedule of deliverables as a typical delay of 2 to 4 months is usually observed. We are working on improving the schedule by having online meetings dedicated to deliverables more regularly and more engagement of WPs leaders. A General Meeting will take place in October 2022 and this issue will be discussed with highest priority.

### 6.2. Risks

After the project first year and the results we obtained, and despite the aforementioned difficulties we are confident that the consortium will still be able to meet all the initial objectives and milestones and KPIs, except for the number of starter-kits that will most likely be smaller due to the hardware shortage.

## ACRONYMS LIST

Acronym	Explanation
WP	Work Package

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