Interreg V- A Greece-Italy Programme 2014 -2020

Large Scale Irrigation Management Tools for Sustainable Water Management in Rural Areas and Protection of Receiving Aquatic Ecosystems.

OVERALL PROJECT PROGRESS

Reporting activities and results of CIHEAM-IAMB

Presented by
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OUTLINE

Overview of project and work plan

Reporting activities and results

Planned activities

Conclusions & Outlook

IR_2MA project at a glance

01 Capitalization of scientific knowledge, expertise and good practices regarding irrigation-drainage

02 To develop and promote practical recommendations regarding the use of recycled water from various sources for irrigation

03 Improvement of skills through lifelong learning for the enhancement of institutional capacity of public authorities and stakeholders regarding water issues.

6 partners

CIHEAM-IAMB WORKING GROUP

Mladen Todorovic

Coordination, Climate change, Water management

Nicola Lamaddalena

Hydraulic analysis of irrigation network/s

Andi Mehmeti

Energy & Environmental analyis, LCA, LCC

Carlo Ranieri

Experimental field, technical support

Anas Jarrar

GIS, agronomic & hydraulic analysis

Daniela D´Agostino

Water management

Alessandra Scardigno

Economics

Wanda Occhialini

Communication & Social media

Milica Colovic

Remote sensing

DELIVERABLES & WORK PACKAGES

WP1: Management cost (Preparation and Project management activities).

WP2 Information and publicity.

WP3 Mainstreaming efficient irrigation and drainage practices.

WP4 Cooperation with Water and Land Reclamation Organizations and Environmental Agencies.

WP5 Demonstration activities and applied research.

WP6: Activities outside of eligible area.

WP1: PROJECT MANAGEMENT ACTIVITIES

1) Procurement Plan and milestones for 2019 established.
2) The first two project meetings of Italian partners have taken place.
3) GANNT chart elaborated.

Kick-off May 14 and 15, 2018 (GR)

Project management and mplementation of IR_2MA

Meeting 31st May 2018 (IT)

Agreed on a common agenda regarding research and experimental work.

Meeting 25th September 2018 (IT)

Update on current and upcoming research activities

WP1: PROJECT MANAGEMENT ACTIVITIES

PROJECT IR2MA

"Large Scale Irrigation Management Tools for Sustainable Water Management in Rural Areas and Protection of Receiving Aquatic Ecosystems"

Project management plan for IR_2MA project / CIHEAM - IAMB

Version 1.0 - Date 04/06/2018

GANNT chart of IAMB activities

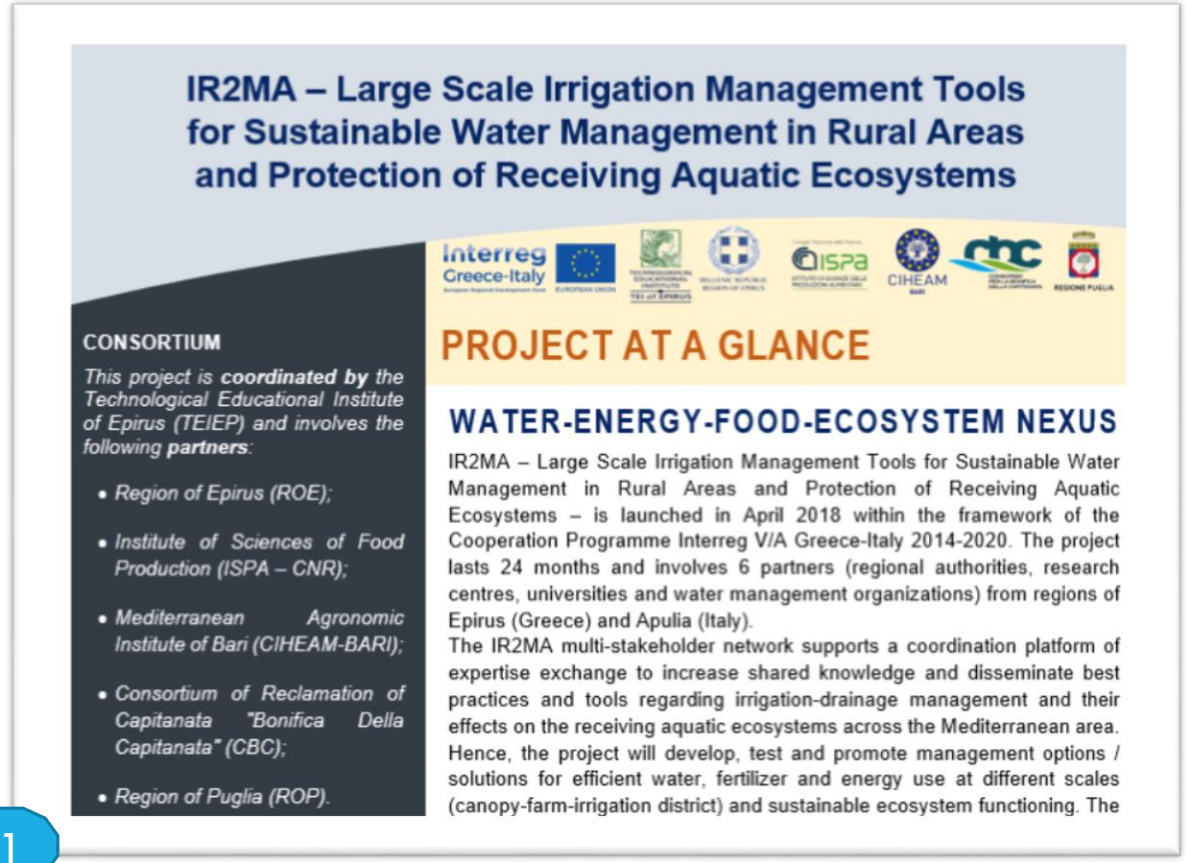
IR_2MA Project Gantt Chart

WP	Deliverable	Deliverable title	Sub-activity	Year/Month																							
				2018									2019												2020		
				Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Management cost																										
1	1.4.1	Preparation activities	Participation/organization of project meetings, organization and evaluation of activities, progress reports.																								
1	1.4.2	Project management activities	Assisting in Project management meetings and auditing services																								
2	Information and publicity																										
2	2.4.1	Guide, technical notes and publications	Preparation of leaflets, report and peer-review papers.																								
2	2.4.2	Dissemination events	Contribution to project dissemination activities (organization/participation to seminars and workshops on																								
2	2.4.3	Participation to third parties within the programme area	Participation to third parties event to promote the project anb disseminate the results.																								
2	2.4.4	Guidebook for performance of large scale participatory systems	Coordination activities to synthetize the project results into a guidebook for of large scale participatory systems																								
3	Mainstreaming efficient irrigation and drainage practices																										
3	3.4.1	Soil and water quality audits	Data collection and audit in selected districts of Sinistra Ofanto																								
3	3.4.1		Conduct applied research regarding the use of recycled water (from various sources) for irrigation of crops.																								
3	3.4.1		Digitization of case study data, relevant studies, plans and maps																								
3	3.4.1		Development of a dynamic large scale DSS tool for sustainable																								
4	Cooperation with Water and Land Reclamation Organisations and Environmental Agencies																										
4	4.1.1	Participatory system performance	Participatory system mapping and evaluation. Gathering feedba																								
4	4.1.2	Results presentation	Results presentation and guidebook publishing for performanc																								
5	Demonstration activities and applied research																										
5	5.4.1	Water-energy food (WEF) nexus	Create a framework and set of methodologies that define the linkages between the interconnected resources of water,																								
5	5.4.2	Recycled water DSS development	Upgrade and evaluation of DSS tool for use of non-conventional water for irrigation on farm scale.																								
5	5.4.3	Recycled water DSS evaluation	Evaluation of DSS tool for irrigation non-conventional waters and comparison with other models which do not consider the use of non-conventional waters for irrigation. Collaboration																								
6	Activities outside of eligible area																										
5	6.4.1	International networking	Participating in international events to present the progress and outcomes of the project and																								

WP2: INFORMATION AND PUBLICITY

Tool action	Audience		
	Policy makers and public authorities	Scientific community	End-user, stakeholders and general public.
Website	x	x	x
Project Leaflet, flyers and brochures	x	x	
Events organisation & participation	x	x	
Social media			x
Publications (sci. Articles)		x	
Presentation materials	x		x

WP2: INFORMATION AND PUBLICITY : PROJECT LEAFLETS (D 2.4.1)



IR2MA – Large Scale Irrigation Management Tools for Sustainable Water Management in Rural Areas and Protection of Receiving Aquatic Ecosystems

CONSORTIUM

*This project is **coordinated by** the Technological Educational Institute of Epirus (TEIEP) and involves the following **partners**:*

- *Region of Epirus (ROE);*
- *Institute of Sciences of Food Production (ISPA – CNR);*
- *Mediterranean Agronomic Institute of Bari (CIHEAM-BARI);*
- *Consortium of Reclamation of Capitanata "Bonifica Della Capitanata" (CBC);*
- *Region of Puglia (ROP).*

PROJECT AT A GLANCE

WATER-ENERGY-FOOD-ECOSYSTEM NEXUS

IR2MA – Large Scale Irrigation Management Tools for Sustainable Water Management in Rural Areas and Protection of Receiving Aquatic Ecosystems – is launched in April 2018 within the framework of the Cooperation Programme Interreg V/A Greece-Italy 2014-2020. The project lasts 24 months and involves 6 partners (regional authorities, research centres, universities and water management organizations) from regions of Epirus (Greece) and Apulia (Italy).

The IR2MA multi-stakeholder network supports a coordination platform of expertise exchange to increase shared knowledge and disseminate best practices and tools regarding irrigation-drainage management and their effects on the receiving aquatic ecosystems across the Mediterranean area. Hence, the project will develop, test and promote management options / solutions for efficient water, fertilizer and energy use at different scales (canopy-farm-irrigation district) and sustainable ecosystem functioning. The

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LARGE SCALE IRRIGATION MANAGEMENT TOOLS FOR SUSTAINABLE WATER MANAGEMENT IN RURAL AREAS AND PROTECTION OF RECEIVING AQUATIC ECOSYSTEMS

IR2MA

About the Project

IR2MA project was launched in April 2018 within the framework of the Cooperation Programme Interreg V/A Greece-Italy 2014-2020. The project lasts 24 months and involves 6 partners (regional authorities, research centres, universities and water management organizations) from regions of Epirus (Greece) and Apulia (Italy).

The IR2MA multi-stakeholder network supports a coordination platform of expertise exchange to increase shared knowledge and disseminate best practices and tools regarding irrigation-drainage management and their effects on the receiving aquatic ecosystems across the Mediterranean area. The IR2MA partners will interact designating joint experimental, research and training activities in both target regions.

The outputs of this project will lead to valuable feedback and applicable recommendations for the application of innovative approaches based on cross-border collaboration and common interest to improve resource efficiency and integrated environmental protection of both water and waste sectors with regard to socio-economic development, health and welfare of society.

WATER-ENERGY-FOOD-ECOSYSTEM NEXUS
The use of recycled water for irrigation of crops.

IRRIGATION MANAGEMENT SCENARIOS
Performance evaluation of irrigation networks.

SMART DECISION SUPPORT TOOLS
On-farm optimization of water and nutrient use.

DEMONSTRATION SITES
Cloud-based technologies, Guidebooks.

IR2MA Timer
Water & Soil Management

Tel: +302681050249
Fax: +302681050240
https://www.irrigation management.eu/

Interreg Greece-Italy

IR2MA INTERREG GREECE-ITALY EUROPEAN UNION

The PROJECT Partners

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WP2: INFORMATION AND PUBLICITY: EVENTS PARTICIPATION (D 2.4.3)

Target: Policy makers and public authorities, Scientific community, End-user, stakeholders and general public.

Sept. 18-20 | MEDFORUM 2018

MEDITERRANEAN FORUM FOR PHD STUDENTS AND YOUNG RESEARCHERS

Dec. 3-7, 2018 | Long Beach, California, USA

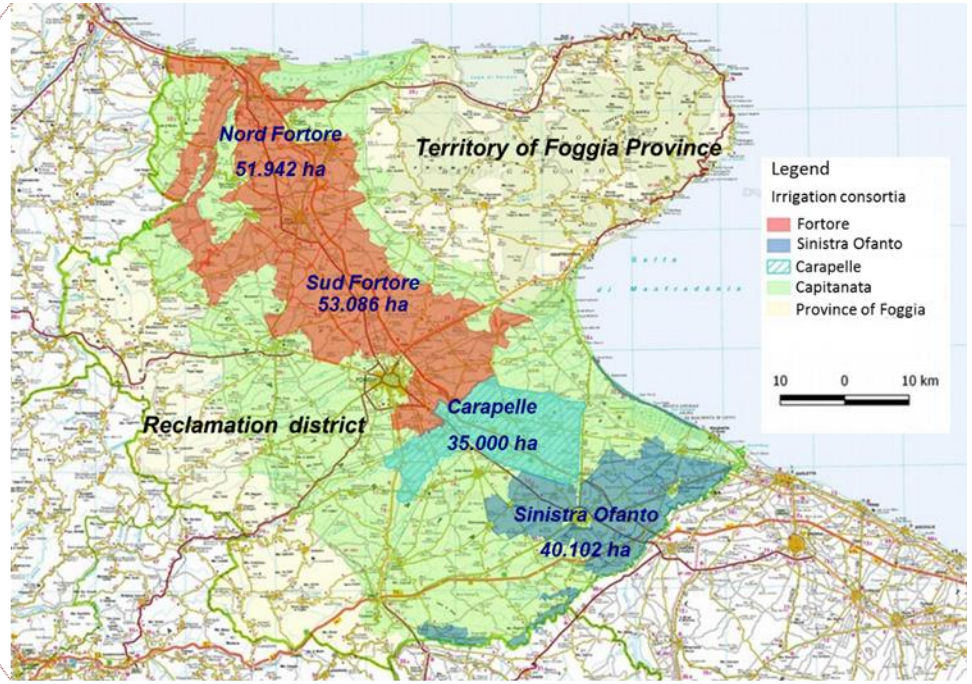
IRRIGATION SHOW & EDUCATION CONFERENCE

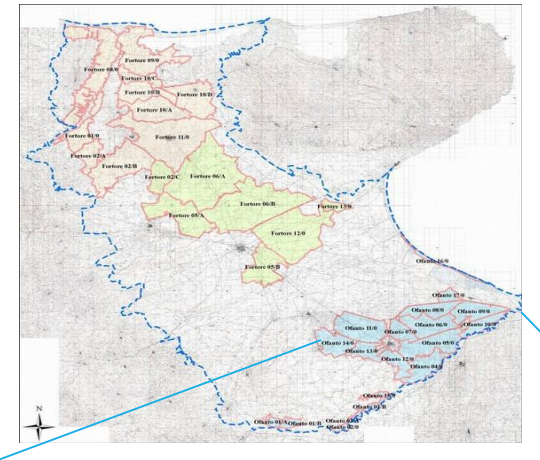
Dec. 6, 2018 | Workshop Vienna, Austria

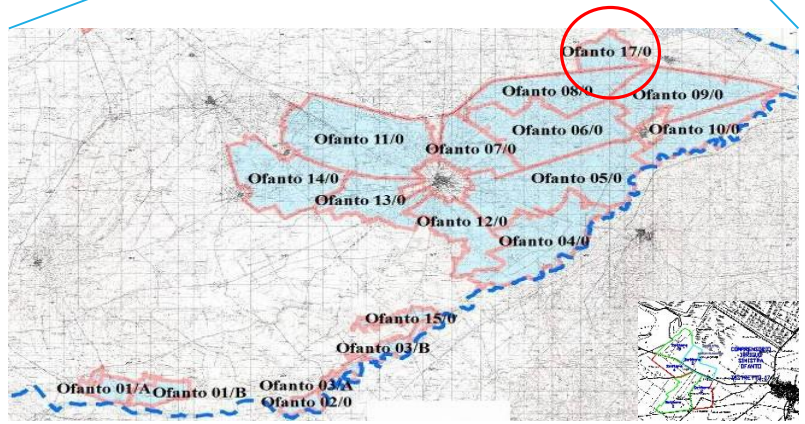
WORKSHOP "EARTH OBSERVATION INFORMATION IN WATER MANAGEMENT"

WP3: MAINSTREAMING EFFICIENT IRRIGATION AND DRAINAGE PRACTICES: STUDY AREA (SINISTRA OFANTO, DISTRICT 17)

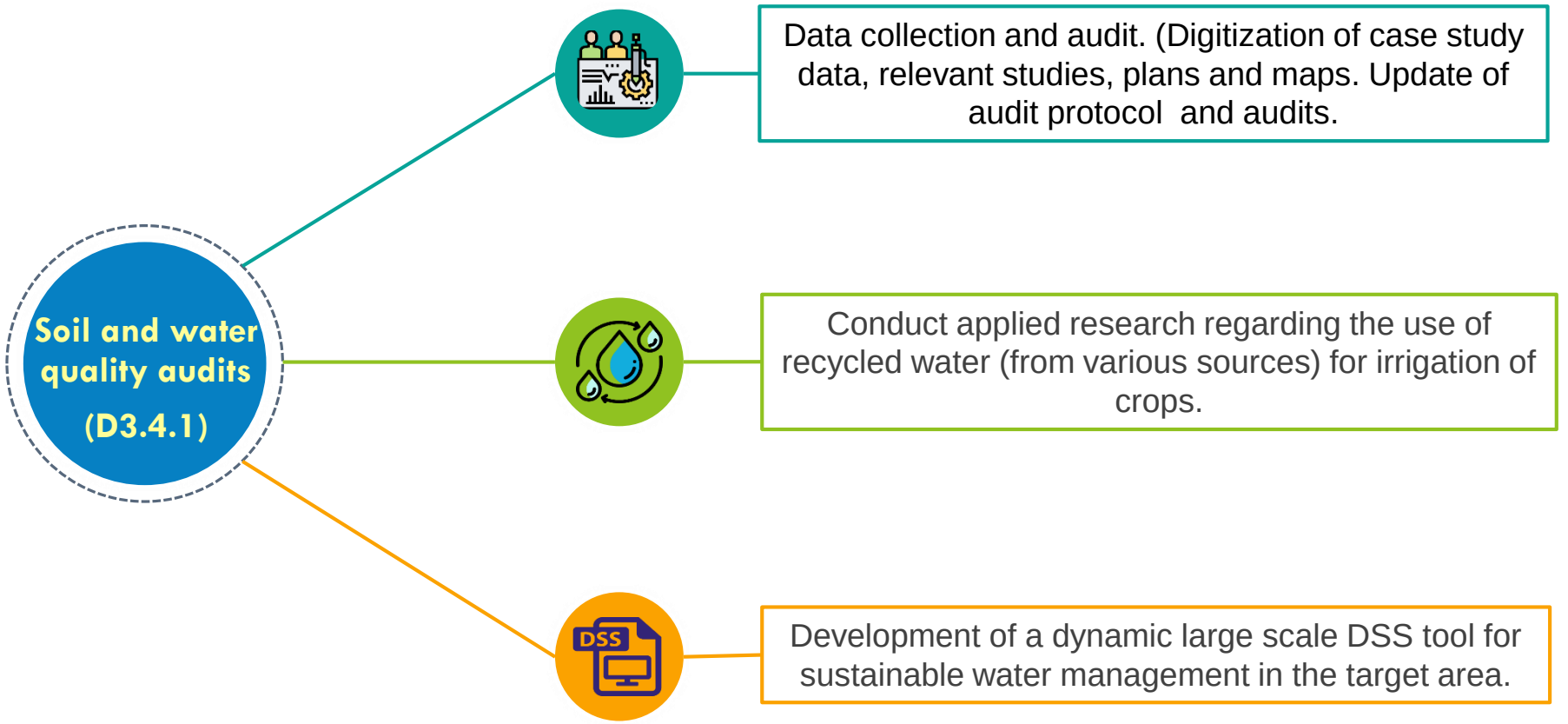
The Capitanata Reclamation Consortia







WP3: MAINSTREAMING EFFICIENT IRRIGATION AND DRAINAGE PRACTICES

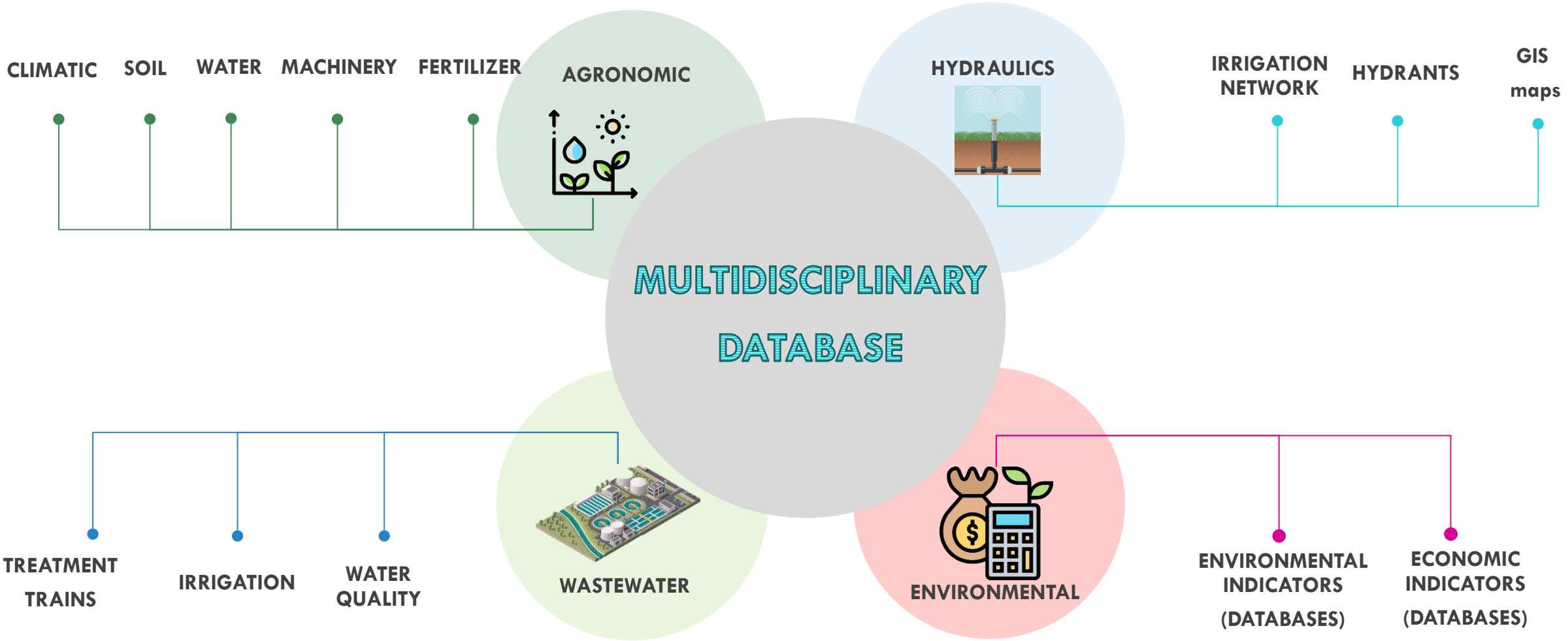


Majority of data collected, in progress data analyses and cataloging.

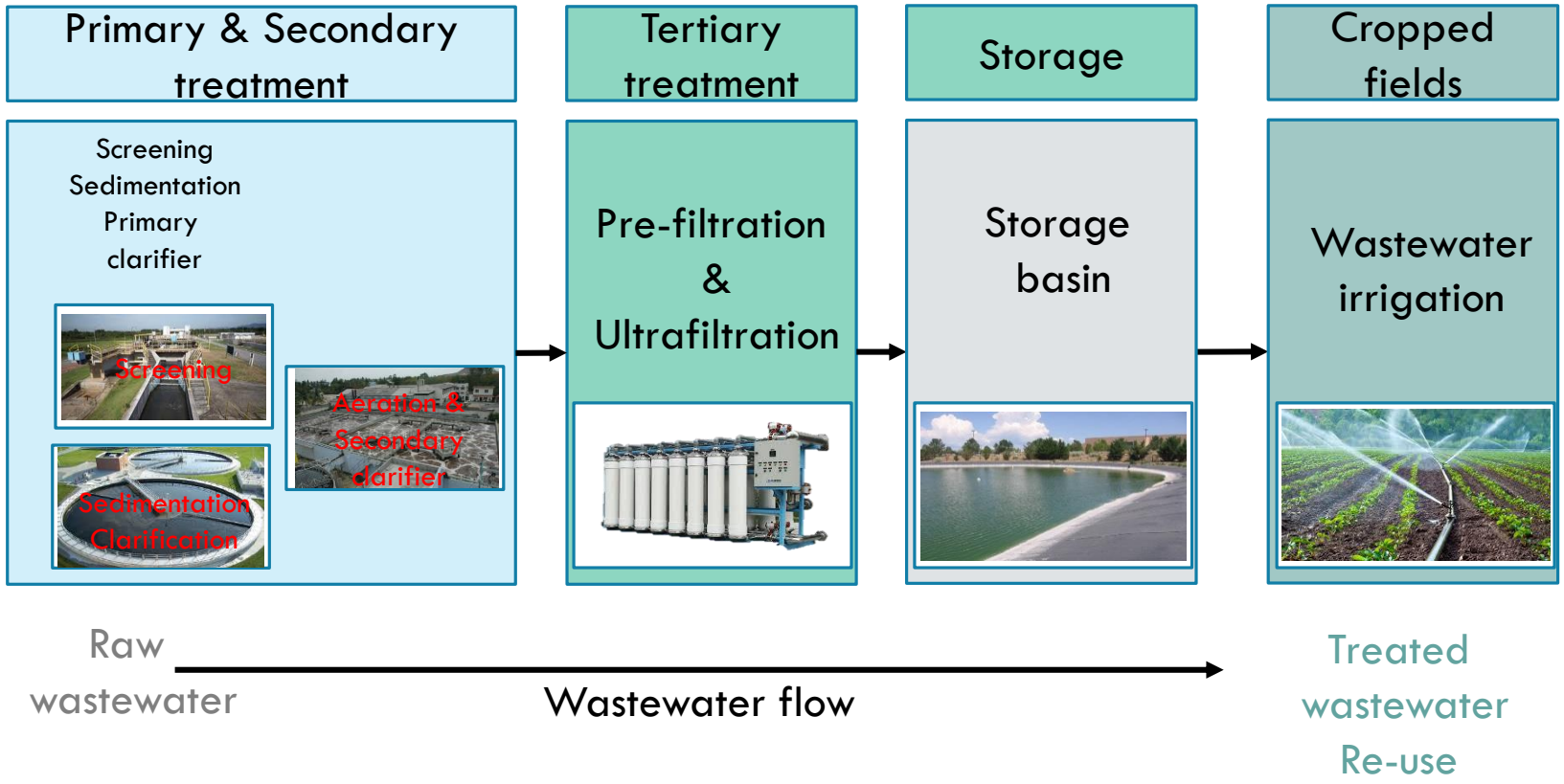
Not yet conducted field work. Sensors already acquired.

Review of literature is being conducted.

WP3: MAINSTREAMING EFFICIENT IRRIGATION AND DRAINAGE PRACTICES: SOIL AND WATER QUANTITY AND QUALITY AUDITS DATA COLLECTION



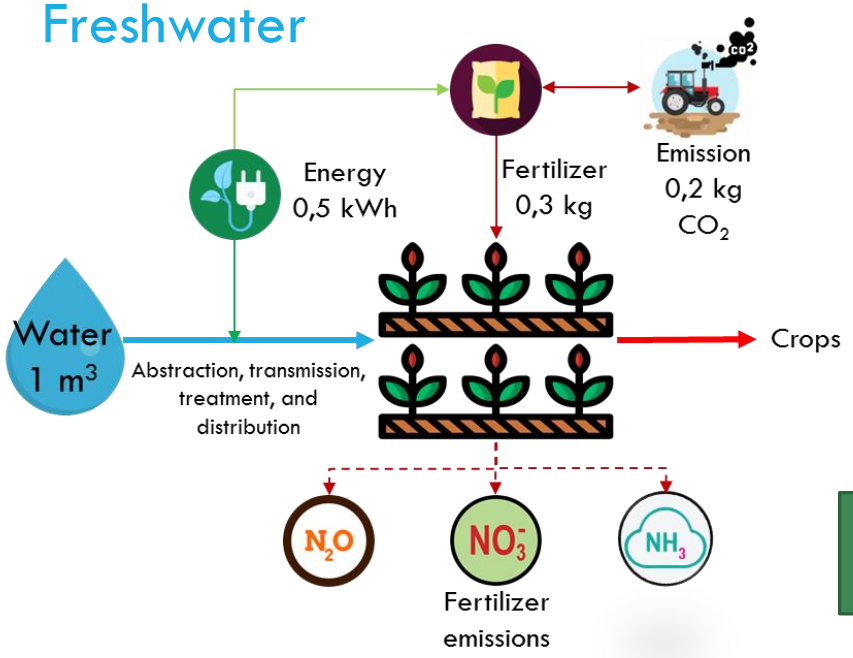
WP3: MAINSTREAMING EFFICIENT IRRIGATION AND DRAINAGE PRACTICES: SOIL AND WATER QUANTITY AND QUALITY AUDITS, UPSTREAM



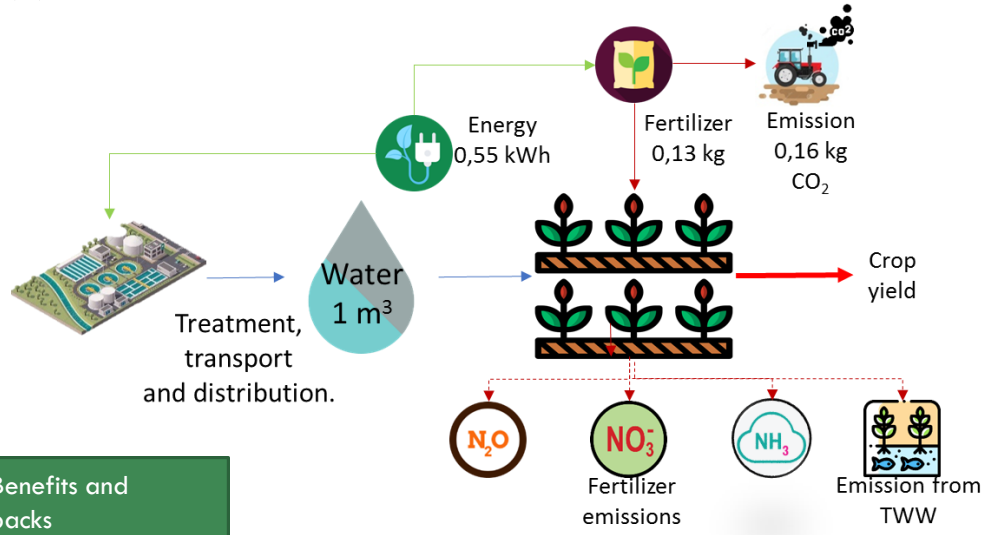
Technology;
Treatment type;
Data about infrastructure and chemical consumption etc

WP3: MAINSTREAMING EFFICIENT IRRIGATION AND DRAINAGE PRACTICES: DATA MODELING USING A HOLISTIC PERSPECTIVE, UPSTREAM-DOWNSTREAM

Freshwater



Wastewater



Quantifying Benefits and Drawbacks
Which are the effects of TWW?

Economical and Environmental benefits

1. Abstraction of fresh water.
2. Fertilizers due to content in wastewater.
3. Fuel used in farm operations
4. Benefits from reduced abstraction from rivers or aquifers.
5. Increase of yield

Economical and Environmental drawbacks

- Infrastructure to treat water
- Energy & chemical consumption in wastewater treatment
- Agronomic, environmental and economic effects, chemicals and pathogenic microorganisms in TWW

WP4: COOPERATION WITH WATER AND LAND RECLAMATION ORGANIZATIONS AND ENVIRONMENTAL AGENCIES

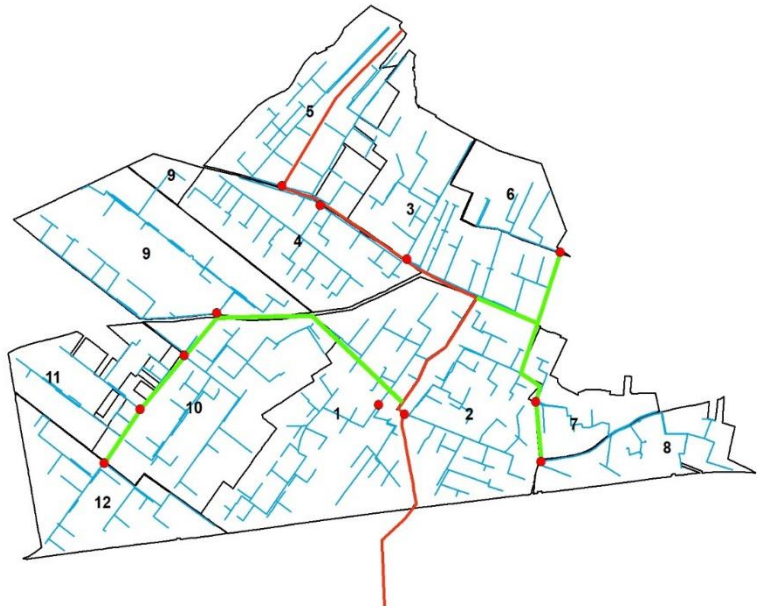
1. Participatory systems performance.

2. Guidebook (Results presentation).

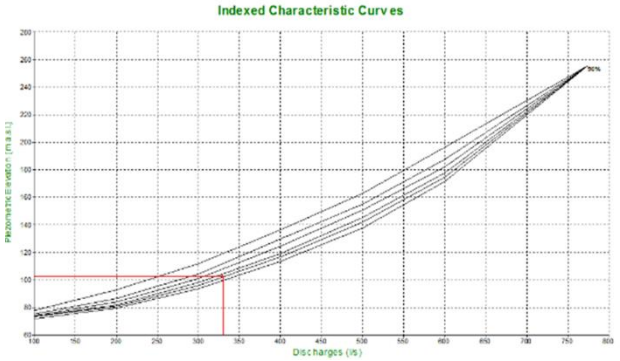
WP4: COOPERATION WITH WATER AND LAND RECLAMATION ORGANIZATIONS AND ENVIRONMENTAL AGENCIES: PARTICIPATORY SYSTEMS PERFORMANCE

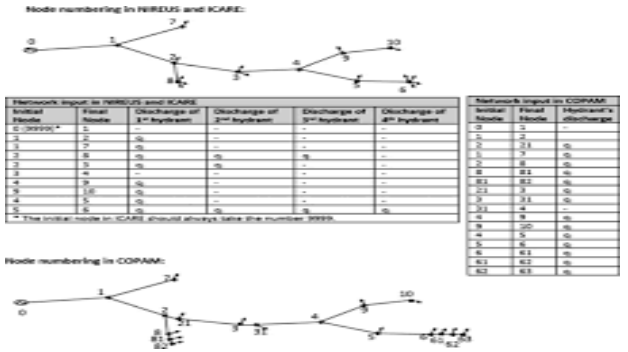
1. Participatory systems performance.

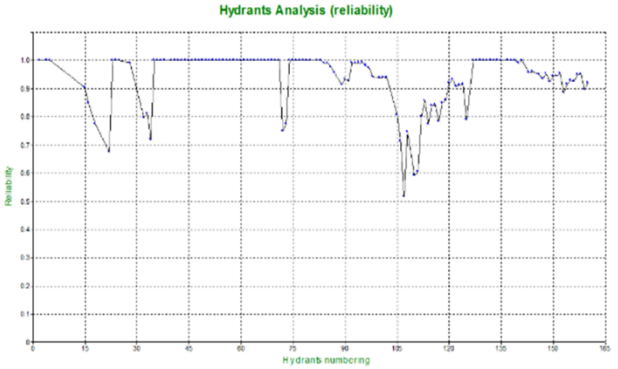
Objective: The Hydraulic Performance Analysis of On-Demand Pressurized Irrigation Systems using the AKLA model.

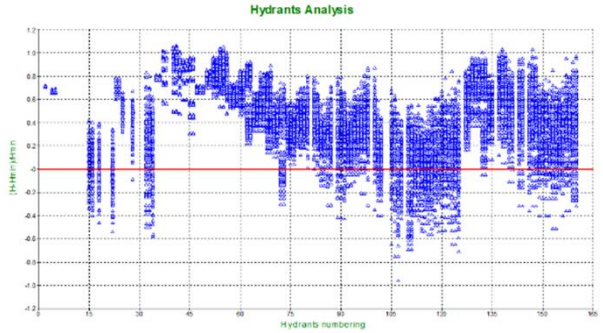


GIS Model is produced/ Data is being introduced to AKLA model



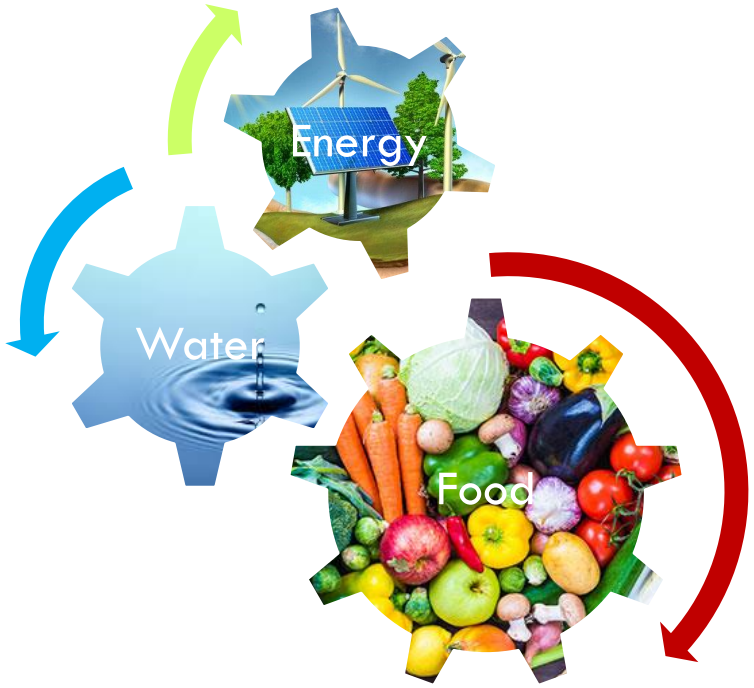






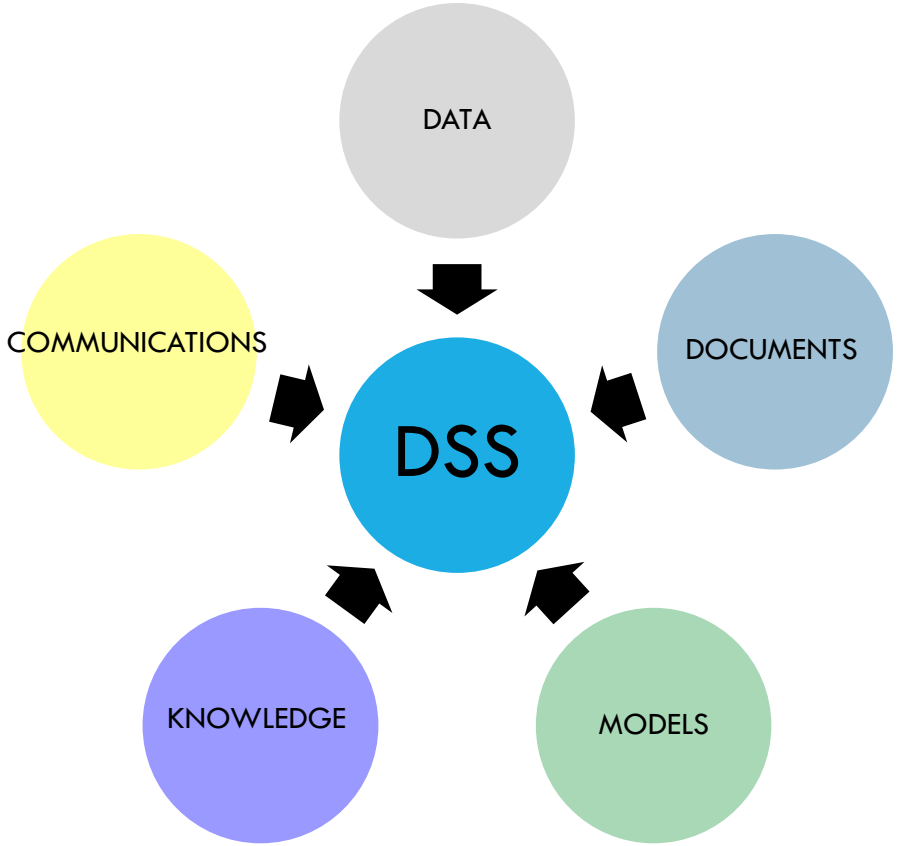
WP5: DEMONSTRATION ACTIVITIES AND APPLIED RESEARCH

1. Water-energy food (WEF) nexus



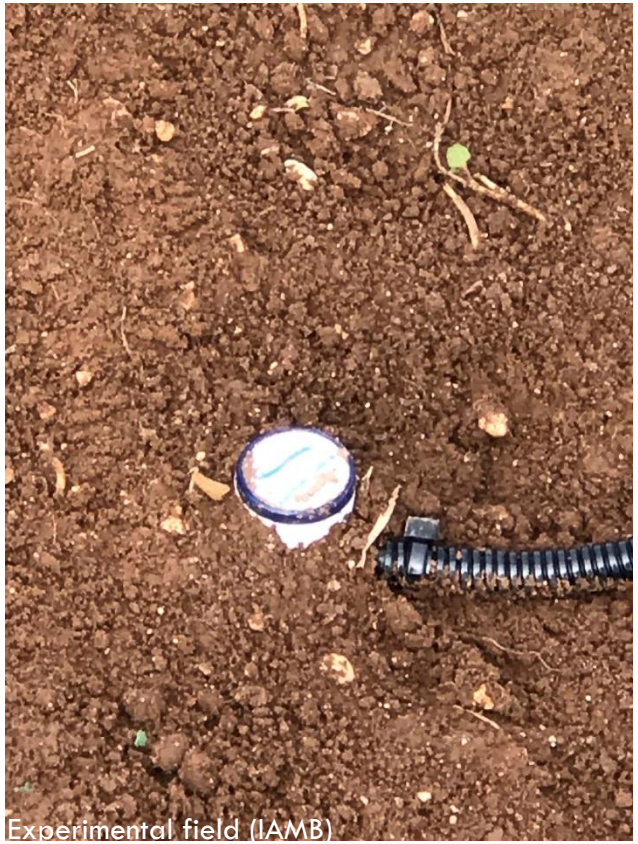
Input data collected and analyzed using a **life cycle assessment** tool with multiple impact categories.

1. Recycled water DSS development and DSS evaluation



DEMONSTRATION ACTIVITIES


Experimental field (IAMB)

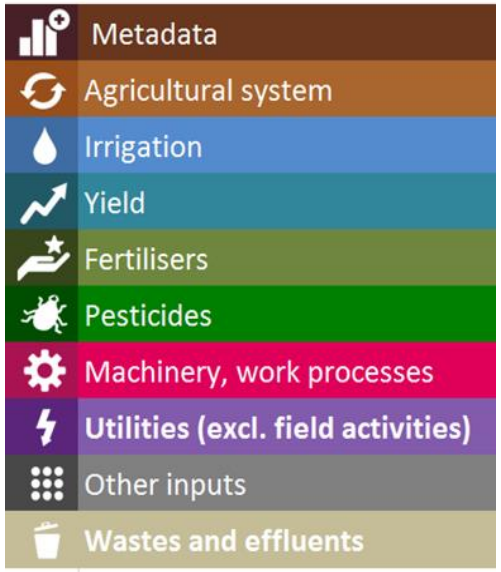

Experimental field (IAMB)

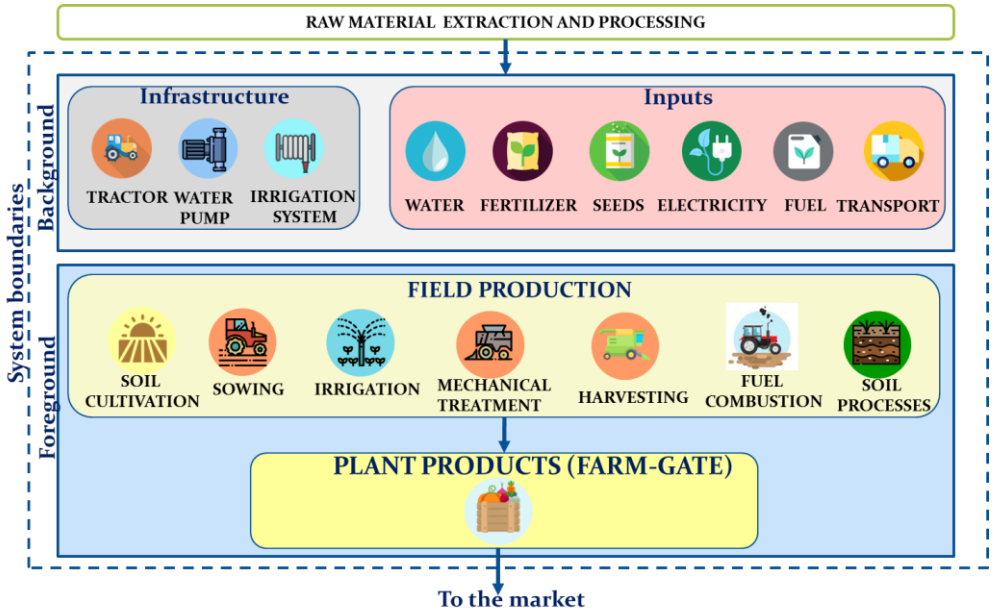

Experimental field (IAMB)

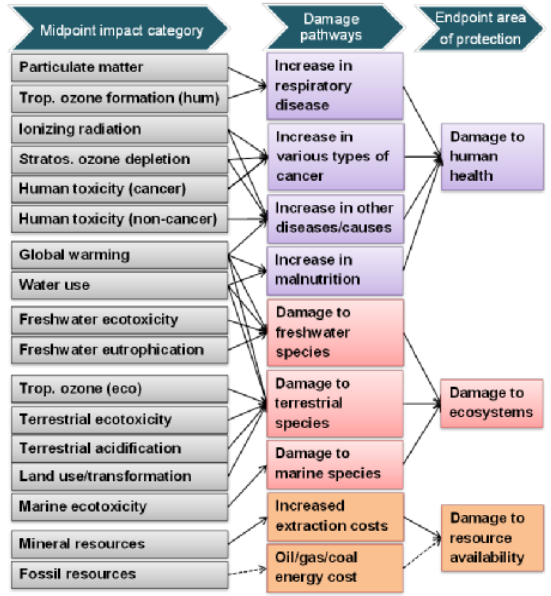
Soil sensors acquired, tested and are being calibrated On-field

WP5: DEMONSTRATION ACTIVITIES AND APPLIED RESEARCH: MODELING WEF NEXUS USING LIFE CYCLE ASSESSMENT (LCA)

Data input ☑ → Modeling → Results







Input data collected for each crop

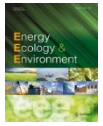
Data analyzed using a **LCA** tool with multiple impact categories (Global warming, water consumption, human health, ecosystem quality etc.)

WP5: DEMONSTRATION ACTIVITIES AND APPLIED RESEARCH: SOME PRELEMINARY RESULTS

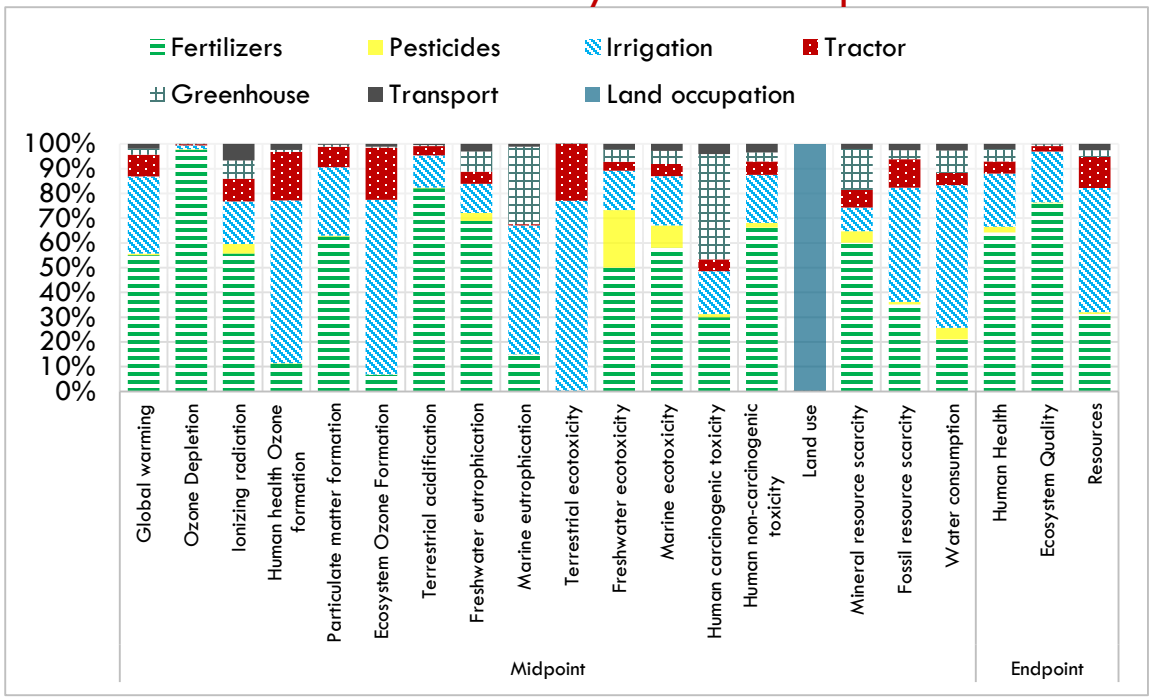
GREENHOUSE TOMATO PRODUCTION

Characterization factor	Unit	LCIA System 1 ha	LCIA Foreground 1 ha	LCIA Background 1 ha
Midpoint impact categories				
Global warming	kg CO_2-eq	3038.2	1864.5	1173.7
Stratospheric ozone depletion	kg CFC11-eq	0.0292	0.0286	0.0006
Ionizing radiation	kBq Co-60-eq	145.73	-	145.73
Human health ozone formation	kg NOx-eq	17.74	14.68	3.06
Fine particulate matter formation	kg PM2.5-eq	10.39	8.51	1.89
Ecosystem Ozone Formation	kg NOx-eq	38.86	35.67	3.19
Terrestrial acidification	kg SO_2-eq	52.72	45.87	6.84
Freshwater eutrophication	kg P-eq	0.46	0.05	0.41
Marine eutrophication	kg N-eq	138.2	11.8	126.4
Terrestrial ecotoxicity	kg 1,4-DCB-eq	902.17	901.05	1.12
Freshwater ecotoxicity	kg 1,4-DCB-eq	47.25	10.25	37.00
Marine ecotoxicity	kg 1,4-DCB-eq	59.61	5.03	54.59
Human carcinogenic toxicity	kg 1,4-DCB-eq	79.43	0.22	79.21
Human non-carcinogenic toxicity	kg 1,4-DCB-eq	37875	175	37700
Land use	m^2a crop-eq	7323.2	7300	23.23
Mineral resource scarcity	kg Cu-eq	13.78	-	13.78
Fossil resource scarcity	kg oil-eq	744.4	-	744.4
Water consumption	m^3 consumed	4937	2500	2437
Endpoint impact categories				
Human Health	DALY	0.0317	0.0152	0.0166
Ecosystem Quality	Species × year	0.00104	0.001	0.000039
Resource Availability	USD2013	298	-	298

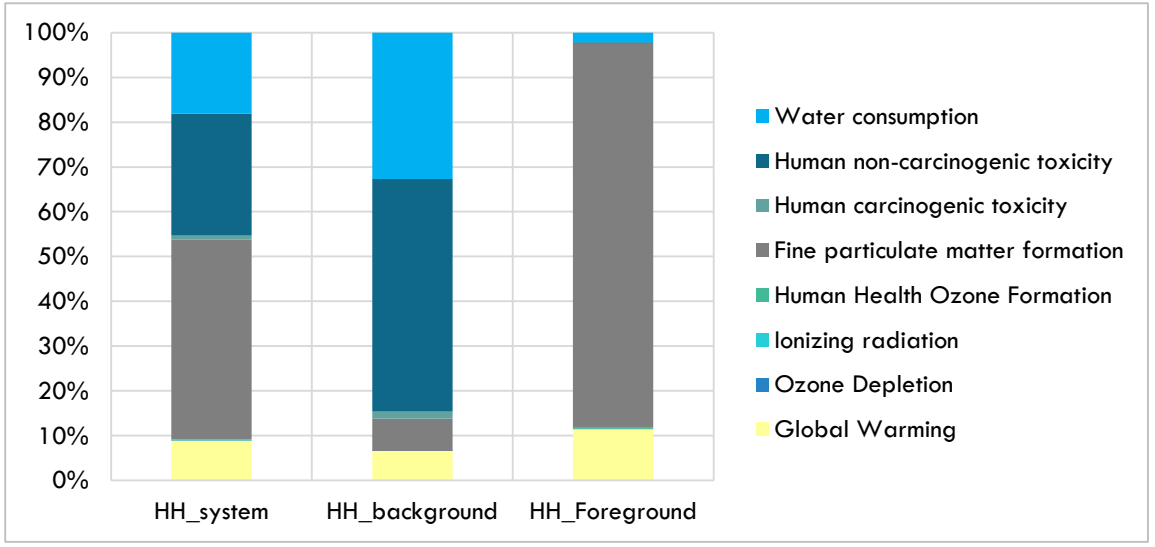
CANAJ et al., 2019, Under review



Contribution analysis for each process

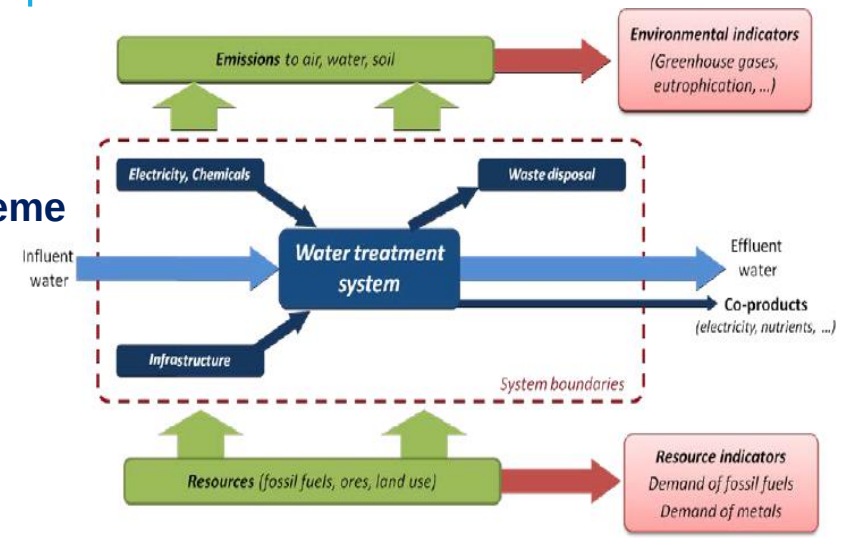


Identifying critical impact categories, e.g. to human health

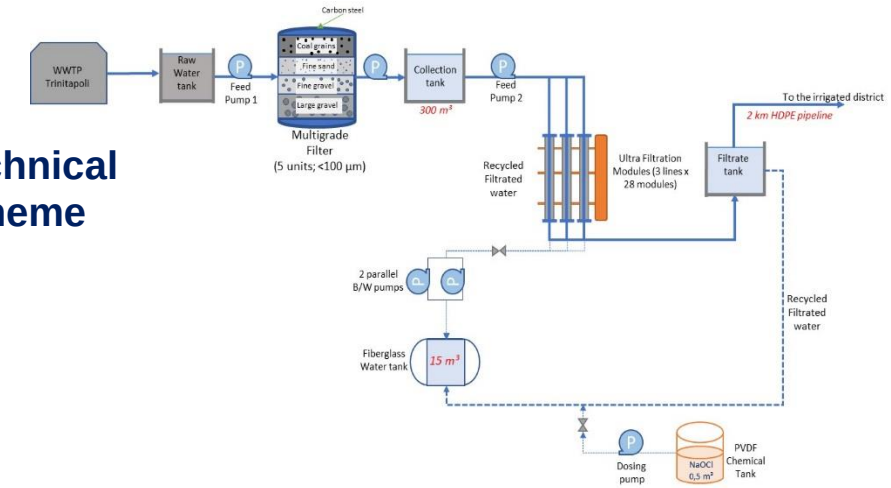


WP5: DEMONSTRATION ACTIVITIES AND APPLIED RESEARCH:

LCA scheme



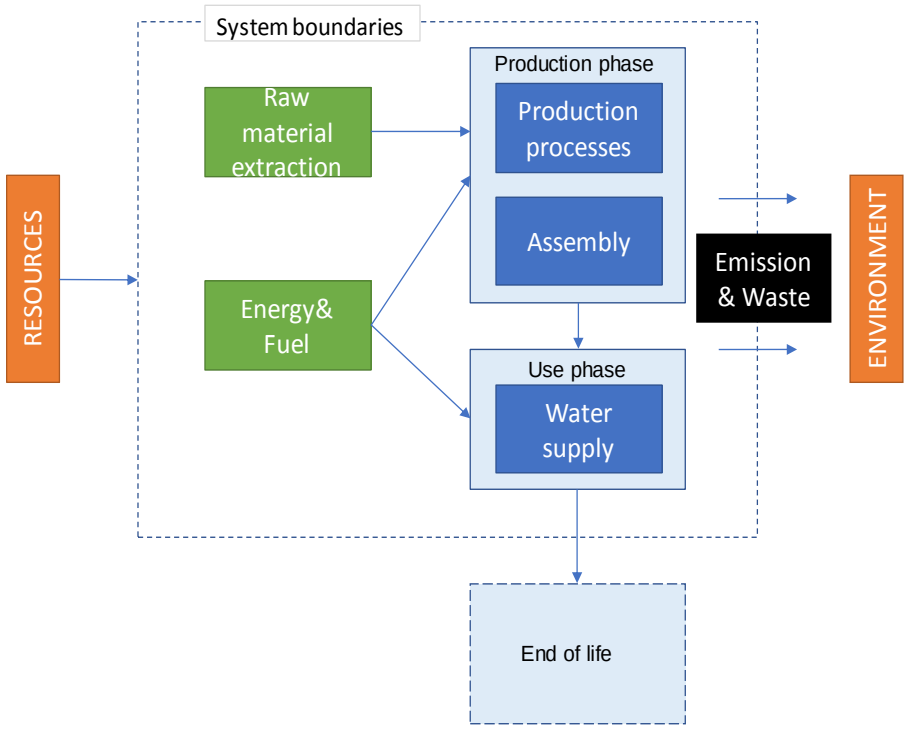
Technical scheme



1 m³ supply of treated water via ultrafiltration

Characterization factor	Unit	LCIA System
Midpoint		
Global warming	kg CO_2-eq	0,130203
Stratospheric ozone depletion	kg CFC11-eq	6,2E-08
Ionizing radiation	kBq Co-60-eq	0,02016
Ozone formation, human health	kg NOx-eq	0,000265
Fine particulate matter formation	kg PM2.5-eq	0,000135
Ozone formation, Terrestrial ecosystems	kg NOx-eq	0,000269
Terrestrial acidification	kg SO_2-eq	0,000507
Freshwater eutrophication	kg P-eq	3,09E-05
Marine eutrophication	kg N-eq	0,000546
Terrestrial ecotoxicity	kg 1,4-DCB-eq	4,69E-05
Freshwater ecotoxicity	kg 1,4-DCB-eq	0,001047
Marine ecotoxicity	kg 1,4-DCB-eq	0,001576
Human carcinogenic toxicity	kg 1,4-DCB-eq	0,002476
Human non-carcinogenic toxicity	kg 1,4-DCB-eq	1,118316
Land use	m^2a crop-eq	0,000425
Mineral resource scarcity	kg Cu-eq	8,14E-05
Fossil resource scarcity	kg oil-eq	0,038063
Water consumption	m^3 consumed	0,84918
Endpoint		
Damage to Human Health	DALY	2,11E-06
Damage to Ecosystem Quality	Species × year	1,2E-08
Damage to Resource Availability	USD2013	0,012233

WP5: DEMONSTRATION ACTIVITIES AND APPLIED RESEARCH



1 m^3 from groundwater Sinistra OFANTO with diesel or electricity

Indicators	Abbreviation	Electric Pumps	Diesel Pumps
Global warming	GWP	152.7213	171.7
Stratospheric ozone depletion	ODP	0.0001	0.00010
Ionizing radiation	IRP	23.6470	6.2
Ozone formation, Human health	HOFP	0.3104	1.9
Fine particulate matter formation	PMPF	0.1581	0.3
Ozone formation, Terrestrial ecosystems	EOFP	0.3155	1.939
Terrestrial acidification	TAP	0.5944	1.050
Freshwater eutrophication	FEP	0.0362	0.011
Marine eutrophication	METP	0.6410	0.048
Terrestrial ecotoxicity	TETP	0.0551	0.499
Freshwater ecotoxicity	FETP	1.2280	1.2
Marine ecotoxicity	METP	1.8482	3.8
Human carcinogenic toxicity	HTPc	2.9045	544.6
Human non-carcinogenic toxicity	HTPnc	1311.7297	0.4
Land use	LOP	0.4981	0.3
Mineral resource scarcity	SOP	0.0954	91.5
Fossil resource scarcity	FFP	44.6463	76.9
Water consumption	WCP	996.0461	0.00053
Human Health	HH	0.0025	2.00E-06
Ecosystems	EQ	0.0000	40.6
Resources	RA	14.3488	3300.5

NEXT STEPS

Planned activities to March 2020

Project management activities

- Prepare and deliver period reports (progress and financial).
- Continuous reporting through Deliverables and Milestones.

Information & Publicity

Webinar

The Mediterranean Youth for Water (MedYWat) Network, The Center for Mediterranean Integration (**CMI**) and World Bank.
Date: First week of May

THE WORKSHOP

Where: CIHEAM IAMB - Mediterranean Agronomic Institute of Bari
Date: October – December 2019 (tbd)

- 1 article submitted
- 2 - 4 under development

CONFERENCES

- Participation in events

Demonstration and modeling activities

Perform end-users irrigation and drainage audits in Foggia

Finalize DSS assist in the implementation of the DSS

Obtain full set of results about agronomic, environmental and hydraulic performance of D17

Finalize Guidebook

CONCLUSIONS

- Project activities are progressing according to the plan and following the procedures established in consortium agreement.
- Active collaboration with project partners permitted a smooth collection and exchange of data in the study area.
- Some minor deviations have been faced mainly in delivery time of project's deliverables, due to the large volume of data and necessity to check their integrity and consistency.
- Communication and dissemination activities are progressing regularly according to the plan including the participation in several conferences and workshops and preparation of research papers.
- There is a need to identify urgently the experimental field in the study area in order to install soil sensors and to start data collection and elaboration.

Thank You for your Interest and Attention

Any Questions?

LARGE SCALE IRRIGATION MANAGEMENT TOOLS FOR SUSTAINABLE WATER MANAGEMENT IN RURAL AREAS AND PROTECTION OF RECEIVING AQUATIC ECOSYSTEMS

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