Interreg V- A Greece-Italy Programme 2014 -2020

Interreg Greece-Italy IR2MA

European Regional Development Fund

EUROPEAN UNION

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

SUMMARY PROJECT PROGRESS

Reporting activities and results of CIHEAM-IAMB (PB4)

3° management meeting

Presented by

Dr. Andi Mehmeti

mehmeti@iamb.it

WP1: PROJECT MANAGEMENT ACTIVITIES

Arta, Greece

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

Project management and mplementation of IR$_2$MA

1st management meeting

Agreed on a common agenda regarding research and experimental work.

IAMB-Bari, Italy

Project meeting, 25th September 2018 (IT)

Update on current and upcoming research activities

2nd management meeting

Reporting activities and results of each partner.

CNR-Bari, Italy

TODAY

Foggia, Italy

3rd management meeting

Reporting activities and results of each partner.

WP2: INFORMATION AND PUBLICITY (PB4)

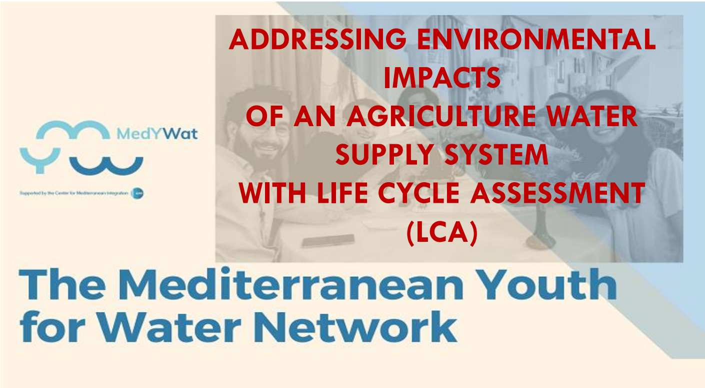
18-20th September, 2018

3-7 December, 2018

06th December, 2018

Theme: Water saving in Mediterranean Agriculture

20th March, 2019



June 6th, 2019

July 11-13th, 2019

More than 6 events, 2 leaflets produced.

WP3: MAINSTREAMING EFFICIENT IRRIGATION AND DRAINAGE PRACTICES

Soil and water quality audits (D3.4.1)

Desk research
Retrieving general data about study area, wastewater, technologies etc..

Field Surveys
Characterization of study area regarding soil and water (e.g. Trinitapoli irrigation district)

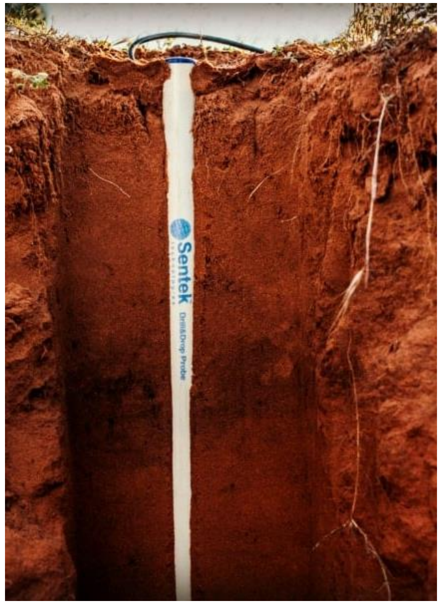
Automated sensors
Research regarding the use of conventional and treated waste water for irrigation of crops.

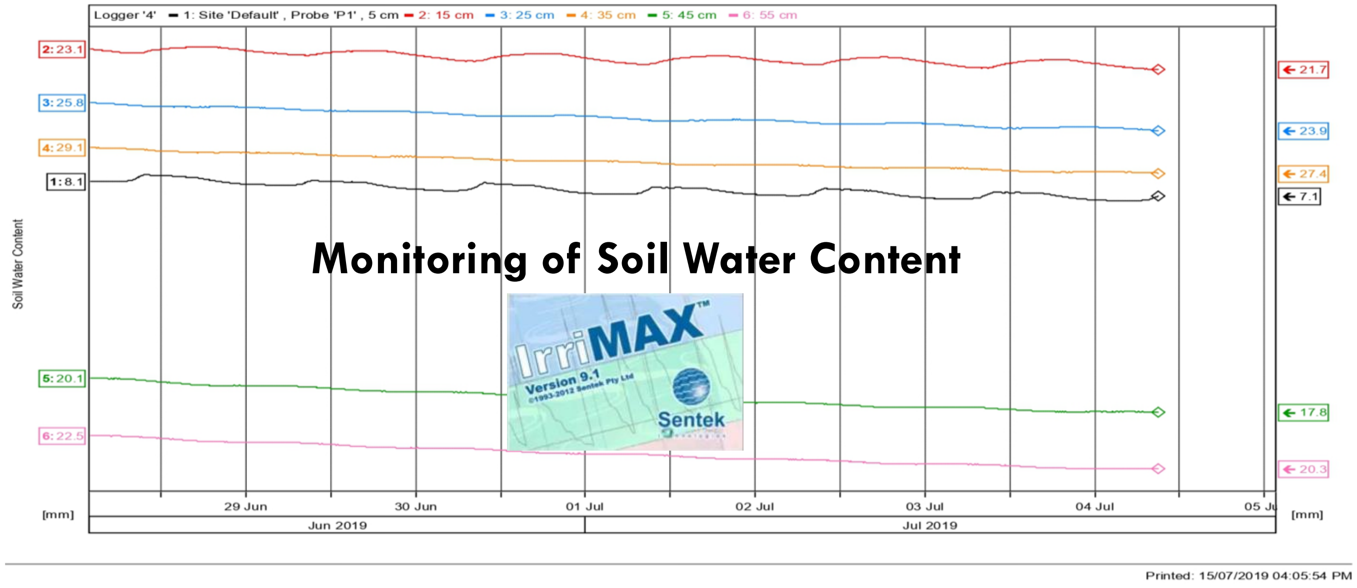
WP3: SOIL & WATER AUDITS, 15th March, 2019

Sample No.	Sand	Silt	Clay	Soil Classification	Soil pH	Soil pH interpretation	Soil water electrical conductivity (ECw)	Interpretation of ECw
	Percentage (%)							
1	43.1	12.8	44.1	Loam	8.6	Alkaline	0.27	Non Saline
2	42.5	12.8	44.7	Loam	8.4	Alkaline	0.24	Non Saline
3	38.5	14.2	47.3	Loam	8.2	Alkaline	0.25	Non Saline
4	37.8	15.3	46.9	Loam	8.1	Alkaline	0.45	Non Saline
5	38.5	15.2	46.3	Loam	7.8	Neutral	0.95	Non Saline
6	38.5	15.1	46.4	Loam	7.8	Neutral	2.5	Very Slight Saline
7	70.4	7.8	21.8	Sandy loam	8	Alkaline	0.15	Non Saline
8	45.5	8.0	46.5	Loam	8.2	Alkaline	0.49	Non Saline
9	72.3	5.5	22.3	Sandy loam	8.7	Alkaline	0.11	Non Saline
10	45.5	8.0	46.5	Loam	8.3	Alkaline	0.22	Non Saline
11	37.5	10.2	52.3	Silt loam	8.3	Alkaline	0.22	Non Saline
12	43.5	7.8	48.8	Loam	8	Alkaline	0.3	Non Saline

Sample	ECw* (dS/m)	Salt concentration mg/l	Water class
S1	21.3	7000-15.000	Highly saline
S2	21.2	7000-15.000	Highlysaline
S3	21.1	7000-15.000	Highly saline
S4	20.8	7000-15.000	Highly saline

Thanks to: O.Moro, P.Zdruli, C.Ranieri, D. Tribuzio, A.Jarrar, G. Dragonetti, M. Causo





WP3: DRILL & DROP SENSORS

8 fully operational sensors:

3 Conventional Water
3 Wastewater

Thanks to: C. Ranieri, D. Tribuzio, V. Raspatelli

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

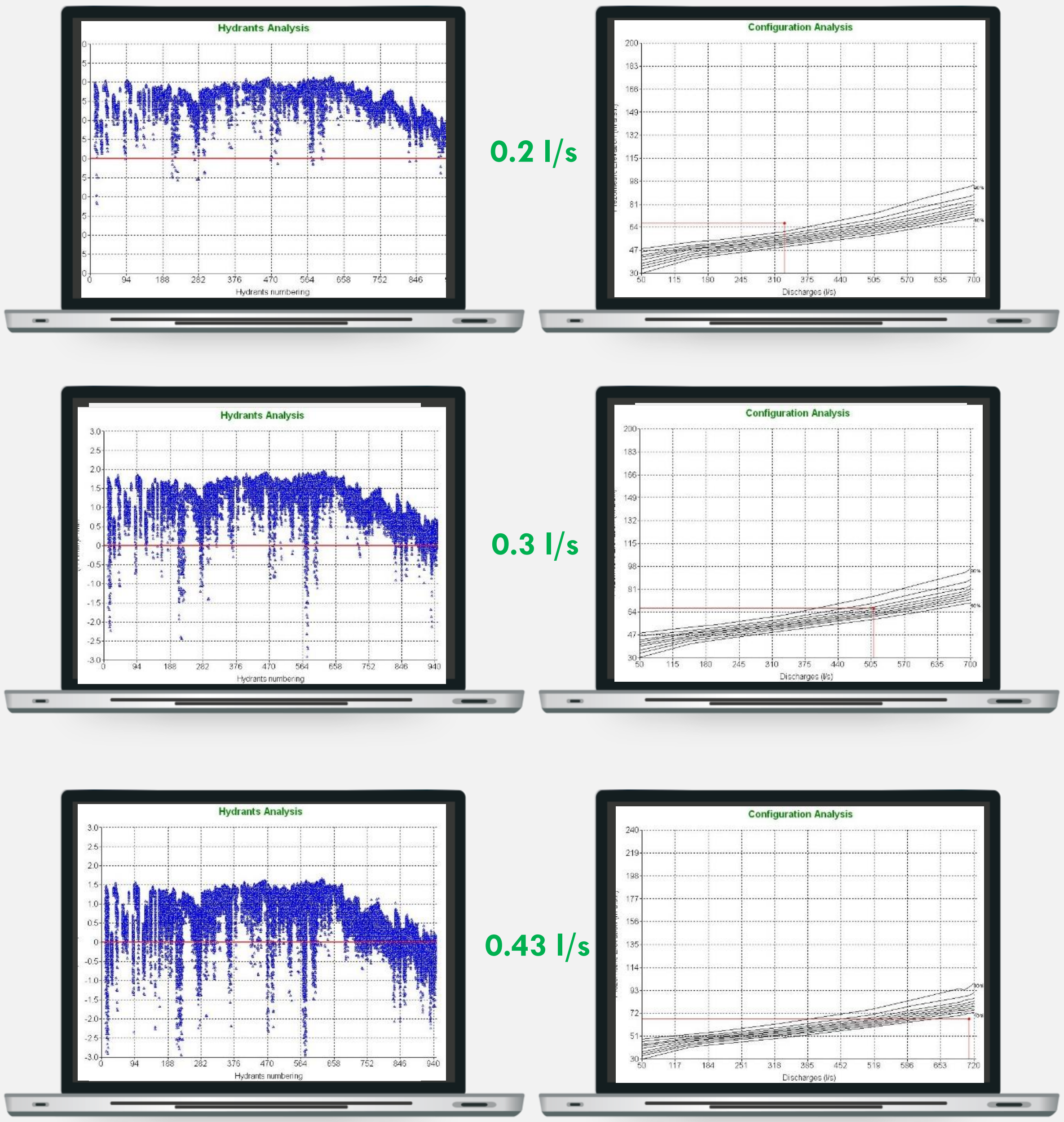
1. Participatory systems performance.

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

2. Guidebook (Results presentation).

Thanks to: N. Noviello, A. Jarrar

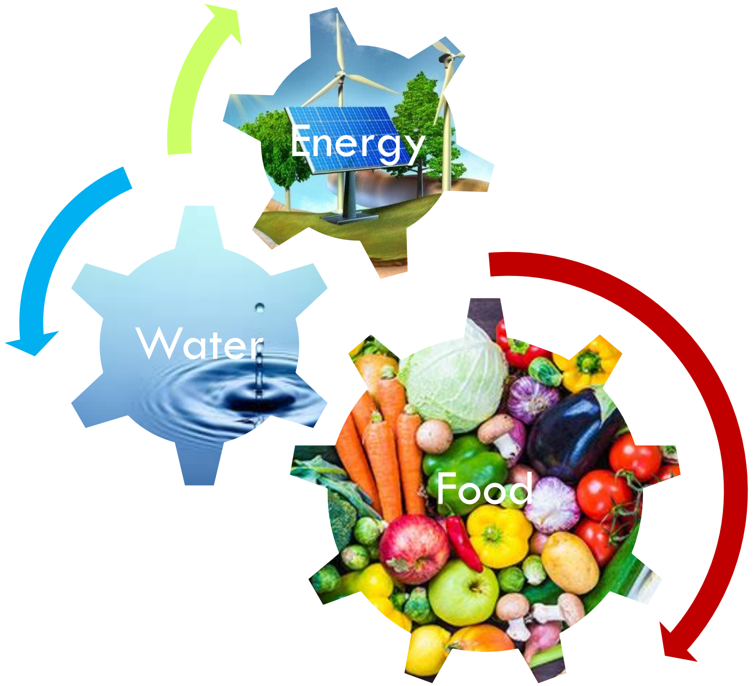
RESULTS WITH AKLA MODEL



Credits to: A. Jarrar

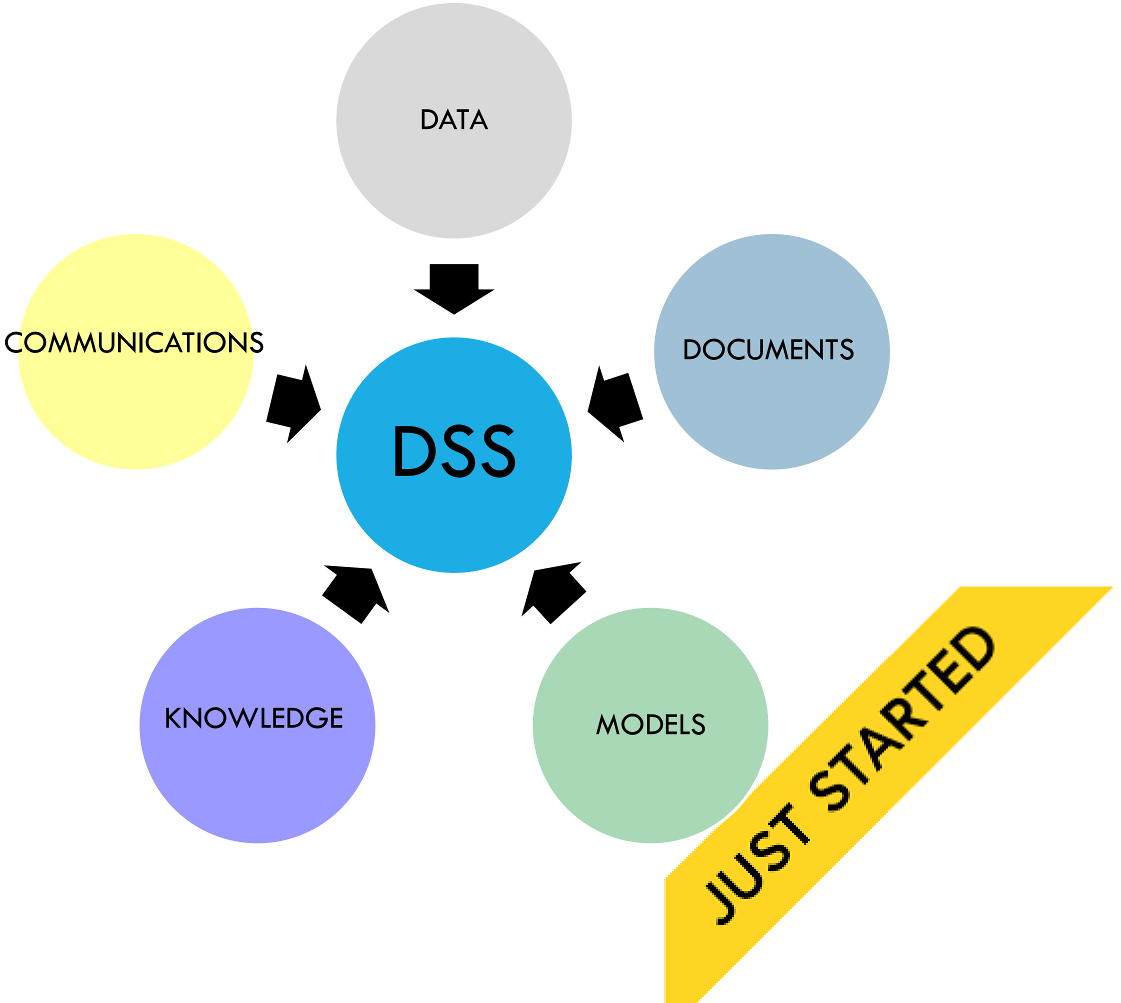
WP5: DEMONSTRATION ACTIVITIES AND APPLIED RESEARCH

1. **Water-energy food (WEF) nexus (D5.4.1)**

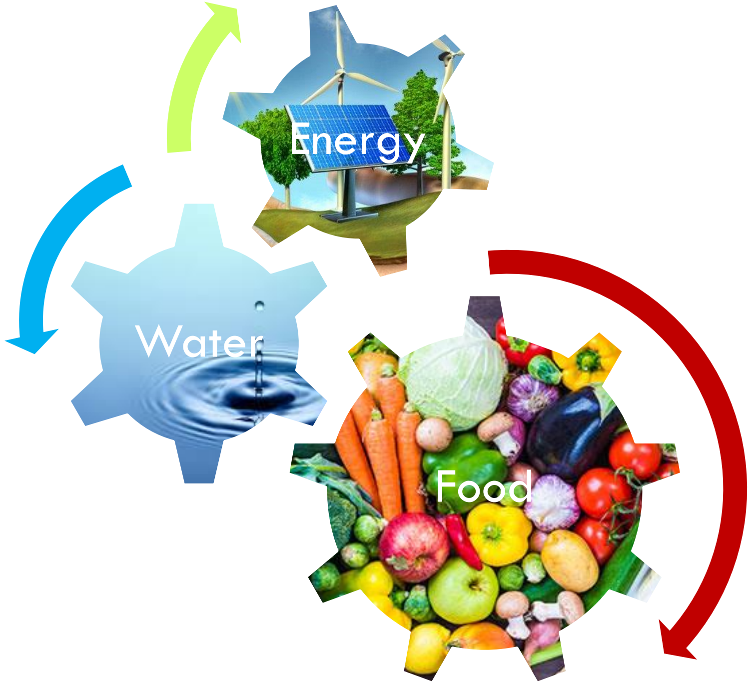


PRELEMINARY RESULTS AVAILABLE

2. **Recycled water DSS development & evaluation (D5.4.3)**



WP5: WEF NEXUS



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

01

OBJECTIVE 1

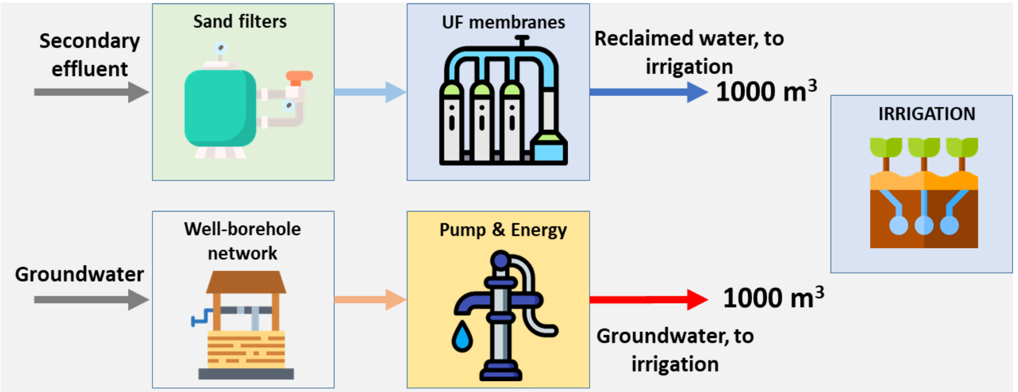
Comparison of the existing reuse scheme to a system without water reuse to show benefits and drawbacks of water reuse in general

02

OBJECTIVE 2

A Comparative Environmental Life Cycle Assessment of Crop Systems Irrigated with the Groundwater and Reclaimed Water in Capitanata Region

WP5: WEF NEXUS (0.1)



NO REUSE vs REUSE

Global warming potential ($kgCO_2$-eq)
280.2 (R) vs 125.12 (NR)

Eutrophication Potential (kgP-eq)
0.03 (R) vs 14.3 (NR)

Cumulative Energy Demand (MJ)
5921(R) vs 1922 (NR)

Fine particulate matter formation (kg PM2.5-eq)
- 0.0034 (R) vs 4.64 (NR)

Mineral Resource Scarcity (kg Cu-eq)
1.02 (R) vs 0.44 (NR)

Water consumption potential (m^3)
- 747 (R) vs 500 (NR)

DRAFT PAPER AVAILABLE

UNDERSTANDING WATER REUSE USING MULTIPLE LCA-BASED INDICATORS: A SOUTHERN ITALY CASE STUDY

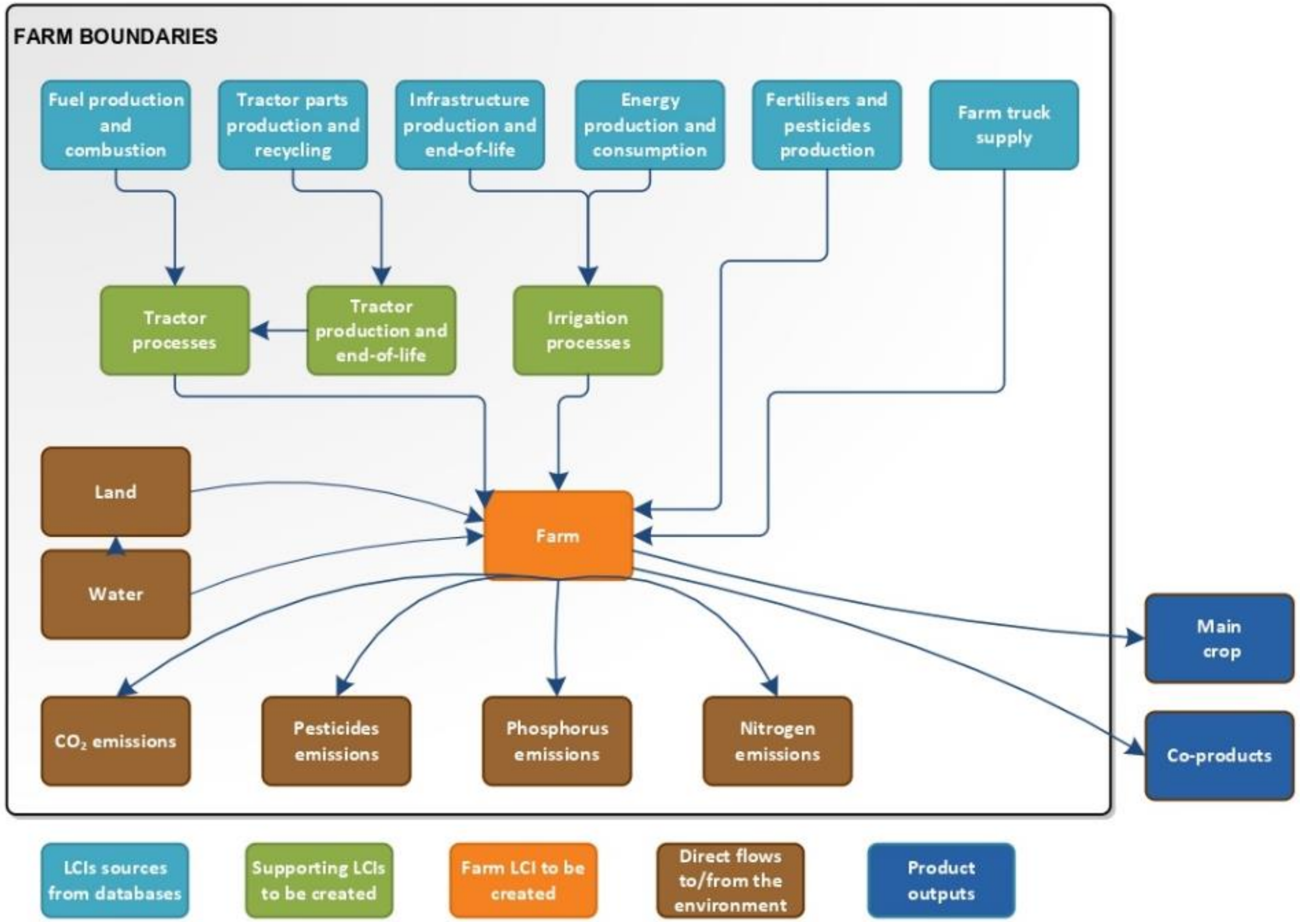
Abstract

Climate-related hazards and over-exploiting the local groundwater resulting in seawater intrusion is forcing stakeholders in Apulia region to seek out new water sources. Treated wastewater is one of the alternatives experimentally implemented, however, the advanced treatment processes necessary to obtain a water quality suited for high-quality reuse which consumes additional chemicals, materials, and energy and disposal of chemical substances into the aquatic environment are main concerns. These issues raise many questions if water reuse is beneficial for the environment from a life cycle perspective? Using life cycle assessment (LCA) with multiple impact indicators interpreted at midpoint and endpoint level, this study analyzed the environmental and water footprint of the existing wastewater reuse scheme at WWTP Trinitapoli, Southern Italy. Furthermore, the inherent trade-off between environmental efforts and the benefits versus groundwater-based irrigation supply were quantified. The chosen functional units were "supply of 1000 m^3 treated wastewater with optimal quality to agricultural reuse at the farm gate" and "1000 m^3 additional water supplied at the farm gate". LCA-based Cumulative Energy Demand, ReCiPe 2016 hierarchical version, and WULCA AWARE were used for energy, LCA and water-related assessment. The results show that water reuse comes with a considerable energy burden and associated midpoint environmental impact mainly due to the electricity required for treatment; however the water footprint decrease significantly producing a positive effect in terms of groundwater recharge and mitigating the damages in terms of water consumption, water scarcity footprint, human health, and ecosystem quality. Since in the Apulia region, the focus is on improving water supply for agriculture, boosting wastewater reuse in agriculture sustained by the support for quality management is therefore of paramount importance.

Keywords: agricultural reuse, environmental impact, LCA, Southern Italy, wastewater

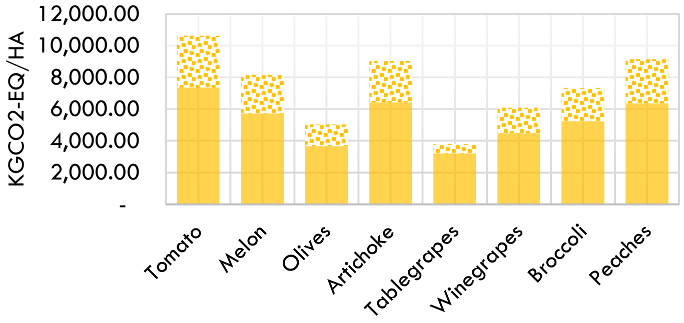
Section Break (Next Page)

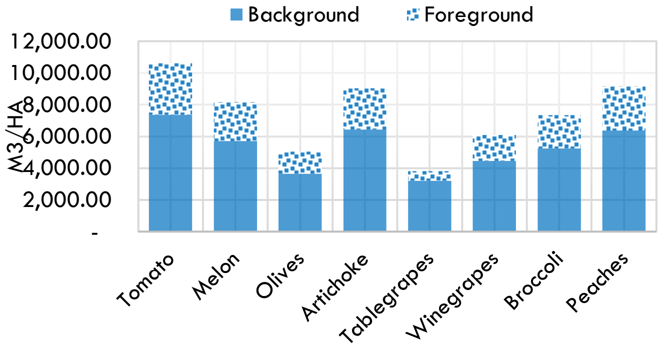
WP5: WEF NEXUS (0.2)



HOLISTIC ASSESSMENT FOR EACH CROP

RESULTS AVAILABLE WITH GROUNDWATER



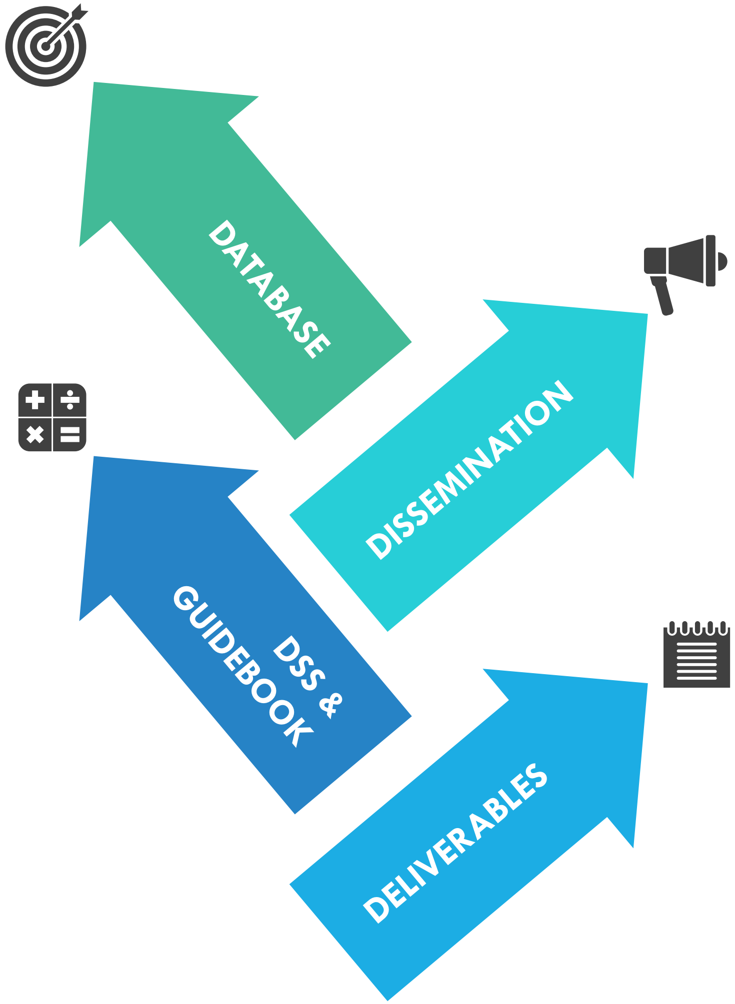


	Tomato	Melon	Olives	Artichoke	Tablegrapes	Winegrapes	Broccoli	Peaches
Global warming	23.4	34.2	154.0	119.3	84.3	64.6	89.3	40.6
Stratospheric ozone depletion	1.60E-04	2.29E-04	1.15E-03	9.84E-04	7.71E-04	4.21E-04	8.27E-04	3.09E-04
Ionizing radiation	2.52	3.51	15.00	10.67	7.16	6.43	8.51	4.22
Ozone formation, Human health	0.07	0.12	0.52	0.44	0.34	0.28	0.23	0.11
Fine particulate matter formatio	0.08	0.13	0.60	0.51	0.40	0.25	0.38	0.16
Ozone formation, Terrestrial eco	0.11	0.21	0.84	0.79	0.62	0.49	0.35	0.17
Terrestrial acidification	0.49	0.73	3.60	3.04	2.39	1.37	2.44	0.96
Freshwater eutrophication	0.009	0.014	0.074	0.040	0.037	0.029	0.032	0.016
Marine eutrophication	1.44	1.31	6.27	4.31	3.01	2.28	6.06	1.22
Terrestrial ecotoxicity	1.6	3.7	13.5	15.4	12.2	9.7	4.9	2.5
Freshwater ecotoxicity	0.61	0.79	3.95	2.74	3.07	1.89	1.59	0.93
Marine ecotoxicity	0.62	0.87	4.55	2.75	2.87	1.90	1.90	1.04
Human carcinogenic toxicity	0.60	0.80	3.81	2.44	1.95	1.54	2.15	0.93
Human non-carcinogenic toxicity	365.7	536.3	2915.3	1601.3	1597.4	1118.1	1246.8	654.6
Land use	73.2	133.0	812.8	348.4	351.0	280.6	292.6	146.4
Mineral resource scarcity	0.10	0.14	0.73	0.45	0.51	0.32	0.35	0.17
Fossil resource scarcity	6.22	9.10	40.88	29.7	21.1	17.6	22.0	10.3
Water consumption	106.2	148.6	560.1	430.0	190.3	243.4	293.4	183.1
Human Health	5.09E-04	6.89E-04	2.91E-03	2.85E-03	1.72E-03	1.19E-03	2.16E-03	9.23E-04
Ecosystems	1.13E-05	1.40E-05	6.08E-05	8.94E-05	5.37E-05	2.29E-05	7.31E-05	2.23E-05
Resources	2.2	3.3	15.0	11.0	8.0	6.6	8.1	3.7

SUMMARY & OUTLOOK

Cataloging the data and produce final database

Continue work about the development of DSS and guidebook



Dissemination of project outcomes via social media, conferences and workshops

Update deliverables and deliver final files (where applicable)

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

Interreg
Greece-Italy
IR2MA
European Regional Development Fund

EUROPEAN UNION

INTERREG IR_2MA