



Blended Intensive Training Program on:

Water management and remote sensing for sustainable agricultural intensification

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Premise

The Blended Intensive Training Program (Program) will provide integrated training on the link between water and food security. It will be structured with a series of online sessions in November and December 2023, followed by a week of in-person training in Tunisia in January 2024. Emphasis will be placed on some innovative concepts and technologies for the sustainable management of water resources.

The Program targets doctoral students and young researchers interested in food security and sustainable water management for agriculture in Africa and the Mediterranean Region.

The Program will be developed building on the long-term relationship between the University of Florence (UNIFI), one of IHEA’s members, and the University of Carthage (UCAR), which are linked by an International Agreement signed in 2016.

Topics of the Program

The Program will cover the following topics:



- Sustainable water resources management, water-energy-food-ecosystems nexus and ecosystem services (**module WEFE**)
- Use of non-conventional waters for sustainable water management (**module NCW**)
- Assessment of the impacts of climate change on water systems (**module CCWS**)
- Remote sensing technologies and applications for water management (**module RSWM**)

Objectives of the Program

At the end of the Program, participants will be able to:

- Constitute and/or consolidate specific knowledge around water-related challenges according to the topics addressed
- Achieve a global dimension in their research on water management and sustainable agriculture in a current context of accelerating socio-environmental changes
- Build a network of potential contacts with international experts

Key data

Official name	Water management and remote sensing for sustainable agricultural intensification
Academic Year	2023-2024
Lead organizers	University of Florence, University of Carthage
Coordinator	Dr. Giulio Castelli (UNIFI) / Ms. Hajer Ferchichi (UCAR)
Other coordinating teachers	Prof. Elena Bresci (UNIFI) Prof. Giorgia Giovannetti (UNIFI) Prof. Guido D'Urso (Università Federico II) Prof. Nedra Asses (UCAR) Prof. Anissa Hanafi (UCAR)
Local Implementation partner	Fondazione Dante Alighieri - Tunis
Topics of the Program	<ul style="list-style-type: none"> • Sustainable water resources management, water-energy-food-ecosystems nexus and ecosystem services • Use of non-conventional waters for sustainable water management • Assessment of the impacts of climate change on water systems • Remote sensing technologies and applications for water management
Duration and period of the training	<p><i>Online part:</i> 2 hours per day, on Thursdays and Fridays, starting from the 16 of November for 4 weeks (16 hours in total)</p> <p><i>In-person part:</i> from the 15th to the 19th of January 2024 (32 hours in total) including 1 day field visit</p>

Number of Training Credits released (CFU for the Italian system)	6(48 hours of training)
Minimum number of participants	10
Maximum number of participants	26
Language requirements	English B2 or equivalent
Teaching language	English
Final evaluation	Written test
Evaluation of the quality of the Blended Intensive Training Program by the trainees	By questionnaire in the last day of the Training Program

Practical details and logistics

The courses will be held at the University of Carthage, provisionally at the Institut National Agronomique de Tunisie (INAT). A field visit will be organized in the Managed Aquifer Recharge Station in the Souhil region, where also fields irrigated with reclaimed wastewater will be visited.

Selection procedure

The deadline for submission will be: **November 9th 2023**, at 23:59 GMT+1.

Selected candidates will be informed, by e-mail, of the results of their applications.

The documents to be provided are as follows:

- A description of your research project of 500 words maximum, written in English.
- An updated English CV with a scanned copy of relevant supporting documents in the attachment.
- A language certificate (level B2 in English or equivalent), or proof of previous studies held in English.
- A motivation letter written in English.
- Proof of the status of the applicant (letter/certificate of the University or of the research center for researchers, or a certificate of registration for the Academic Year 2023-2024 for doctoral students).
- A valid identity document.

Applications will be evaluated according to the following criteria:

- Age (maximum 5 points – 30 years or lower: 5 points, from 31 to 35 years: 3 points; from 36 to 40 years: 1 point; others: 0 points)
- Suitability of the research project with the general topic of the event (maximum 5 points)
- CV (maximum 10 points – Academic CV: maximum 5 points; Professional CV: maximum 5 points)
- Motivation expressed with the motivation letter (10 points)

A ranking will be established to fill the 26 available places. A strict 50-50% gender balance rule will be applied (namely, after the selection of 13 candidates of one gender, the other candidates of the same gender will not be considered until 13 candidates of the second gender

are selected or until they are no other candidates of the second gender). In case of a tie, the youngest candidate will be preferred.

The administrative fees for the 26 students selected will be paid by the IHEA Foundation.

Training plan

Lessons are coded with the label x.ABCD, where x is the lesson's number and ABCD is the module's code. For instance, code 1.WEFE represents the first lesson of the module on “Sustainable water resources management, water-energy-food-ecosystems nexus and ecosystem services”

Online part

Date	Time	Topic
16.11.2023	3.00 pm – 5.00 pm	<p>Presentation of the IHEA Foundation and Introduction to the Program Prof. Eugenio Gaudio Director of IHEA Foundation Sapienza University Rome</p> <p>Institutional welcome by DAGRI Department, University of Florence Prof. Simone Orlandini, Head</p> <p>Self-presentation of the Program's Student</p> <p>Sustainable Water Management and Water-Energy-Food-Ecosystems Nexus challenges in the Mediterranean Area – Lesson 1.WEFE Prof. Giorgia Giovannetti University of Florence</p>
17.11.2023	2.00 pm – 4.00 pm	<p>Sustainable Water Management and Water-Energy-Food-Ecosystems Nexus challenges: a focus on Tunisia– Lesson 2.WEFE Prof. Asma Sakka University of Carthage</p>
23.11.2023	2.00 pm – 4.00 pm	<p>Introduction to Non-Conventional Water Technologies: Principles and concepts – Lesson 1.NCW Dr. Mohamed Ouessar Institute of Arid Regions (Medenine, Tunisia)</p>
24.11.2023	2.00 pm – 4.00 pm	<p>Advanced concepts of water harvesting (part 1) – Lesson 2.NCW Prof. Elena Bresci University of Florence</p>
30.11.2023	2.00 pm – 4.00 pm	<p>The impacts of climate change on Mediterranean and African Agro-ecosystems: an overview – Lesson 1.CCWS Prof. Hamadi Lhbaeib University of Carthage</p>

01.12.2023	2.00 pm – 4.00 pm	The impacts of climate change on Mediterranean and African Agro-ecosystems – Lesson 2.CCWS Dr. Elena Matta Politecnico di Milano
14.12.2023	2.00 pm – 4.00 pm	Remote Sensing for Water Management part 1 – Lesson 1.RSWM Prof. Zohra Lili University of Carthage
15.12.2023	10.00 am – 12.00 pm	Remote Sensing for Water Management part 2 – Lesson 2. RSWM Prof. Guido D’Urso University of Naples

In-person part

Daily Schedule:

9:00 - 10:30	SLOT 1
10:30 - 10:45	Break
10:45- 12 :15	SLOT 2
12 :15- 13:30	Lunch break
13:30– 15:00	SLOT 3
15:00 - 15:15	Break
15:15- 16:45	SLOT 4

Total 6 hours of lesson per day, 4 slots of 1h30, one field visit

Day 1 – 15.01.2024

SLOT	Title	Lesson	Teacher
	Introduction to the program and welcome		Rector of the University of Carthage
1	Ecosystem Services for the WEF E Nexus management – part 1	3.WEFE	Dr.Tommaso Pacetti University of Florence
2	Ecosystem Services for the WEF E Nexus management – part 2	4.WEFE	Prof. Slim Rouz University of Carthage
3	The WEF E nexus in the context of global health	5.WEFE	Prof. Maria Cristina Rulli Politecnico di Milano

4	Policy solutions for implementing the Nexus in the Mediterranean Area	6.WEFE	Prof. Ali Sahli University of Carthage
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Day 2 – 16.01.2024

SLOT	Title	Lesson	Teacher
1	Application of nature-based solution for reuse and reclamation of non-conventional waters – part 1	3.NCW	Dr. Giuseppe Mancuso University of Bologna
2	Advanced concepts of water harvesting (part 2)	4.NCW	Dr. Giulio Castelli University of Florence
3	The use of managed aquifer recharge for water management in arid areas	5.NCW	Dr. Mongi Ben Zaied Institute of Arid Regions (Medenine, Tunisia)
4	Application of nature-based solution for reuse and reclamation of non-conventional waters – part 2	6.NCW	Ismail Trabelsi Director of CERTE Center, partner of the University of Carthage

Day 3 – 17.01.2024

Field Visit to a Managed Aquifer Recharge station and fields irrigated with reclaimed wastewater will be visited in the Souhil region.

Day 4 – 18.01.2024

SLOT	Title	Lesson	Teacher
1	The impact of climate and land use changes on water resources in Africa	3.CCWS	Dr. Giulio Castelli University of Florence
2	Future social and economic impacts of climate change for African agriculture	4.CCWS	Prof. Khaled Sassi University of Carthage
3	Climate change impacts and measures of adaptation in coastal groundwater systems	5.CCWS	Dr. Aurora Ghirardelli University of Padua
4	Transnational experiences of cooperation for climate change adaptation and	6.CCWS	Prof. Yadh Zahar University of Carthage

	mitigation in the water sector		
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Day 5 – 19.01.2024

SLOT	Title	Lesson	Teacher
1	Remote sensing for irrigation monitoring: challenges and perspectives	3.RSWM	Dr. Oscar Belfiore University of Naples
2	Applications of remote sensing in agriculture: monitoring crop growth, water stress and irrigated areas	4.RSWM	Prof. Riadh Abdelfattah University of Carthage
3	Final exam and course evaluation questionnaire		
4	Awarding ceremony		

