

## WATERWORKS 2017 RDI FUNDED PROJECTS BOOKLET

**Title of the project: Strategies for increasing the water use efficiency of semi-arid mediterranean agrosilvopastoral systems under climate change**

### **Outcomes and expected impact:**

The Project will have positive social and economic impacts. The FLUXMED objectives respond to priorities of H2020 Societal Challenge 5, Call topic SC5-11-2016 because we propose to increase the efficiency of Mediterranean water resources and innovate the approach for water resources planning and management for both current and future climate change scenarios. The proposal supports the requests of innovative solutions of the UN SDG6, providing new techniques and methodologies for increasing the water-use efficiency of water-limited Mediterranean regions, which are suffering water scarcity. Integrated water resources management will be implemented, linking Southern European and North African partners, and address the need of international cooperation in water research. In most Mediterranean regions water and environmental plans are missing and when available they don't properly include future scenario impacts. One key objective of the research project is to combat climate change impacts, supporting the UN SDG 13, because future climate change scenarios are predicting a decrease in water resources availability. As consequence existing water resources plans are wrong, because these are based on water input (surface and groundwater) that will not be any longer available. At the same time environmental plans need to consider the climate change effect on both CO2 budget and water resources use of vegetation and water resources availability to vegetation growth, which can impact on species type (in drier climate more resistant species should survive) and their spatial distribution (less water implies less density). Instead, our proposed methodology is strongly innovative and integrate new knowledge, allowing to adequately develop water resources and environmental planning also for future climate change scenarios.

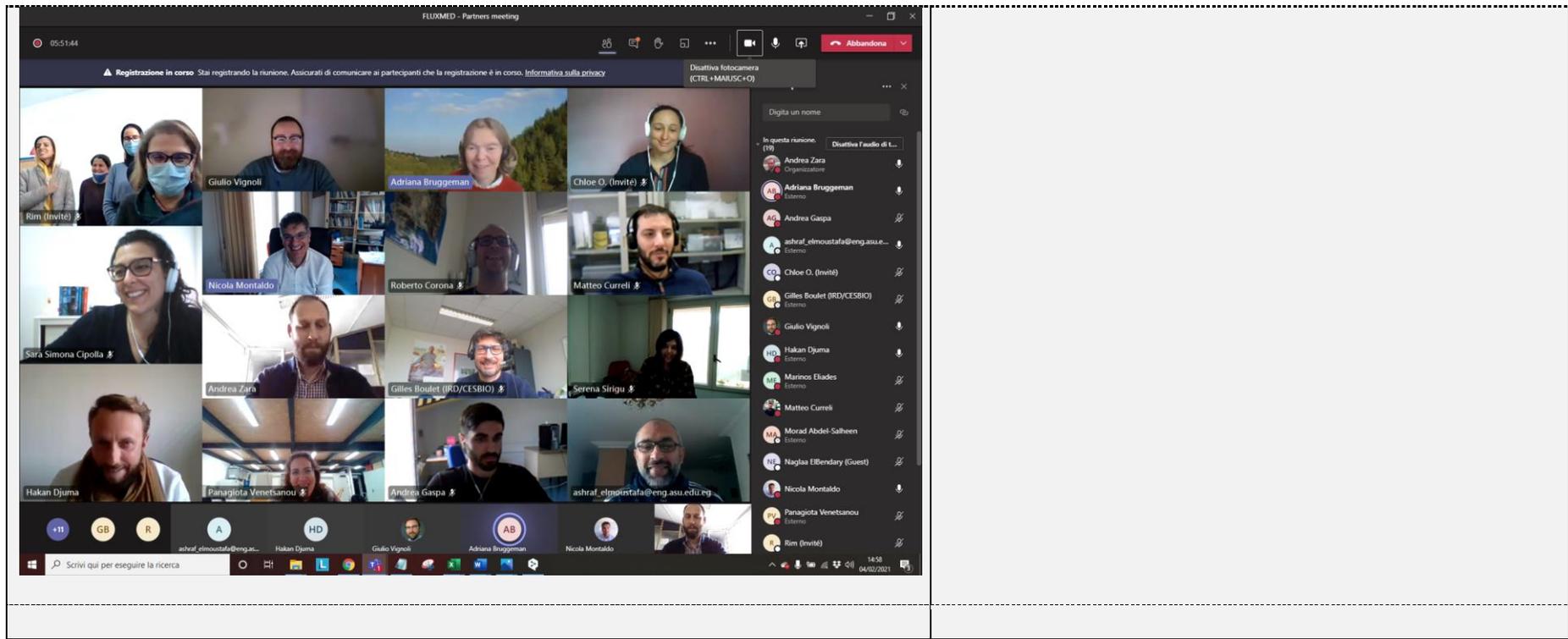
The project's economic impact will be significant for agricultural development and its sustainability because the project aims to increase the system efficiency and decrease the costs. Stakeholders will be involved and will have a main role in the project. The project will provide the stakeholders the scientific approach and results for defining the planning and management strategies for both current and future climates. A main part of the project will be the dissemination of the results to the stakeholders and to the society in general, due to the impact on social customs and traditions.

The strong international cooperation of this project is a central tenet. Climate change is affecting water resources in Mediterranean region, and there is the need to develop international cooperation in water research between Mediterranean countries. Southern European partners will collaborate with North African partners providing a unique opportunity for knowledge and experience exchanges. Indeed, the wide and international partnership of FLUXMED is a key point of the project. All the academic partners have strong expertise formed at the best international schools, with aspiration to collaborate for knowledge and experience exchanges. Experts of a wide range of complimentary fields, e.g. hydrology, hydraulic, ecology, forestry, agronomy, micrometeorology, geophysics and environmental economics are involved, providing an excellent opportunity to advance water resources science of semi-arid and arid Mediterranean regions. FLUXMED offers a unique opportunity of exchanges of research and knowledge, which is the base for increasing the research development in water resources. Only through analyzing sites with contrasting spatial scales, vegetation covers and climate will be possible to understand deeply the complex ecohydrologic processes, and the strongly nonlinear dynamics between soil, vegetation and atmosphere, which is the key element of environmental planning strategies for optimizing the water use and increase the resilience of agrosilvopastoral systems.

<b>List of deliverables expected:</b>	
D1.1: Kick-off meeting and its minutes. D1.2.1: Data management plan. D1.2.2: Mid term project meeting and its minutes. D1.2.3: Updated schedules of activities. D1.2.4: Final project meeting and its minute	
D2.1: database from Task 2.1. D2.2: database from Task 2.2. D2.3: two submitted publications about data analysis.	
D3.1: report with calibration and validation of LSM-VDM models at field scale for the experimental sites. D3.2: developed distributed LSM-VDM models at basin scale. D3.3: 2 submitted publications about modeling at basin scale. D3.4: submitted publication on model intercomparison and optimization.	
D4.1: remote sensing images database. D4.2.1: Leaf are index (LAI) and surface temperatures (Ts) estimates from satellite images. D4.2.2: 1 submitted publication about estimates from satellite images. D4.3.1: data assimilation system. D4.3.2: 1 submitted publication about data assimilation system.	
D5.1: submitted publication on historical data analysis. D5.2: multiple future climate scenarios in the project database. D5.3: 2 submitted publications about the effect of land cover strategies and cli-mate change scenarios.	
D6.1: scientific manuscript on water management model application in 6 Mediterranean case study sites. D6.2: submitted publication about strategies for water management optimization.	
<b>Contact person(s) for Communication activities</b> (name and e-mail)	
Nicola Montaldo- nmontaldo@unica.it	
<b>Contact person(s) for Dissemination activities</b> ( (for open data & open access activities, name and e-mail)	
Nicola Montaldo- nmontaldo@unica.it	
<b>Expected research results to communicate and disseminate</b> (in very general terms)	<b>Target groups for communication and dissemination activities:</b>
1. development and implementation of innovative methodologies for evapotranspiration measurements and estimate in typical heterogeneous Mediterranean agrosilvopastoral systems;	Water, environmental and agricultural international and European associations

2. Improvement the eco-hydrologic monitoring in ephemeral rivers and wadis along the Mediterranean biome and climate types, establishing a transnational Mediterranean watershed monitoring system	Water, environmental and agricultural international and European associations
3. development of a data assimilation systems for assimilating remotely sensed and field data into ecohydrological models at the watershed or agricultural district scales for optimal characterization of soil water balances	Scientific community
4. Impacts of vegetation and crop types on soil water balance, surface runoff, and water use under current and past climates	Scientific community, and National, regional and local authorities
5. Predictions of the impact of future climate on soil water balance, runoff and water use effects of land use and climate change in the Mediterranean area	Scientific community, academics or non-academics, students, engineers
6. Land cover strategies planning for climate change scenarios to optimize the use of water resources	National, regional and local authorities, scientific community
<p>Experiments / Case studies (if any): location, type of experiments:</p> <ul style="list-style-type: none"> <li>• Flumendosa basin, Italy: Meteo, micrometereological, soil moisture, LAI, sapflow, and streamflow measurements.</li> <li>• Marganai Park, Italy: Meteo, micrometereological, soil moisture, LAI, sapflow, and geophysics measurements.</li> <li>• Wadi Watir basin, Egypt: Rain, streamflow, Meteo and soil moisture measurements.</li> <li>• Béni Khalled Tunisia: Meteo and micrometereological measurements.</li> <li>• Taous Sfax site, Tunisia: micrometereological, soil moisture, LAI, sapflow, and radiometric measurements.</li> <li>• Peristerona basin, Cyprus: sapflow, through-fall, soil moisture, meteo, runoff and micrometereological measurements.</li> </ul>	
Water Policy context / project contribution to policies (National, European, International – UN SDGs):	

<p>The project objectives respond to priorities of H2020 Societal Challenge 5, Call topic SC5-11-2016 because it propose to increase the efficiency of Mediterranean water resources and innovate the approach for water resources planning and management for both current and future climate change scenarios. FLUXMED supports the requests of innovative solutions of the UN SDG6, providing new techniques and methodologies for increasing the water-use efficiency of water-limited Mediterranean regions, which are suffering water scarcity. We will implement integrated water resources management, linking Southern European and North African partners, and address the need of international cooperation in water research. One key objective of the research project is to combat climate change impacts, supporting the UN SDG 13, because future climate change scenarios are predicting a decrease in water resources availability</p>	
<p><b>Funder of the project:</b>  Institutions: <b>Ministero dell'Istruzione, dell'Università e della Ricerca (MIUR)</b>  Country :<b>Italy</b></p> <p>Institutions: <b>Research Promotion Foundation (RPF)</b>  Country: <b>Cyprus</b></p> <p>Institutions: <b>Academy of Scientific Research and Technology (ASRT)</b>  Country :<b>Egypt</b></p> <p>Institutions: <b>Agence National de la Recherche (ANR)</b>  Country : <b>France</b></p> <p>Institutions: <b>Ministry of Higher Education and Scientific Research (MHESR)</b>  Country :<b>Tunisia</b></p>	
<p><b>Photo of the Research Team, if available:</b></p>	



*By completing this format you accept that all of the information supplied will be used for the purposes of WJPI Communication activities. The information and data collected shall be processed in accordance with the [Water JPI Privacy Policy](#) and the current regulations regarding the [General Data Protection Regulation \(GDPR\)](#)*

*Compiled by Carla Piras*

*Date, 05/03/2022*