



# PhD in INGEGNERIA AMBIENTALE E DELLE INFRASTRUTTURE / ENVIRONMENTAL AND INFRASTRUCTURE ENGINEERING - 38th cycle

Research Area n. 1 - Water Science and Engineering

**PARTENARIATO PNRR Research Field: FARM PRECISION IRRIGATION AND  
SUSTAINABLE WATER MANAGEMENT AT BASIN SCALE FOR DIFFERENT CROP TYPES  
AND CLIMATE**

**Monthly net income of PhDscholarship (max 36 months)**

**€ 1200.0**

In case of a change of the welfare rates during the three-year period, the amount could be modified.

**Context of the research activity**

**Motivation and objectives of the research  
in this field**

**CN-AGRITECH: CENTRO NAZIONALE DI RICERCA  
AGRITECH**

CUP D43C22001350001 – Decreto di concessione D.D.  
1032 del 17/06/2022

Bando D. D. 3138 del 12/16/2021 rettificato con D.D.  
3175 del 18/12/2021 “Avviso pubblico per presentazione  
Proposte di intervento per il Potenziamento di strutture di  
ricerca e creazione di “campioni nazionali” di R&S su  
alcune Key Enabling Technologies da finanziare  
nell'ambito del Piano Nazionale di Ripresa e Resilienza,  
Missione 4 Componente 2 Investimento 1.4  
“Potenziamento strutture di ricerca e creazione di  
“campioni nazionali di R&S” su alcune Key Enabling  
Technologies” finanziato dall'Unione europea -  
NextGenerationEU”.

Irrigation is one of the biggest user of water and plays a  
significant role in the hydrographic basin water balance.  
Although it is generally characterized by low efficiency, (in  
a way proportional to the availability of water in the



	<p>irrigation areas) has high potentiality of improving its efficiency due to the big gap existing between modern technologies and the largely diffused ancient traditional practices.</p> <p>Climate changes and human pressure together with traditional irrigation practices have already enhanced and will enhance the conflicts among food, energy and water, also in territories traditionally rich in water.</p> <p>The PhD research will improve the agricultural water use efficiency in agriculture integrating soil water energy balance models, ground and satellite measures. Soil moisture dynamic and crop water needs will be then computed at present and future time considering different irrigation techniques.</p>
<p><b>Methods and techniques that will be developed and used to carry out the research</b></p>	<p>Different tools will be used as: numerical soil moisture energy - water balance models, satellite data of visible and thermal infrared data, ground stations for soil moisture and evapotranspiration, meteorological forecasts. Strategies to manage and optimize irrigation and production will be considered according to soil and crop characteristic.</p> <p>The candidate should have adequate knowledge in numerical analysis, hydrology and hydrological water balance, programming skill in different languages (fortran, python, matlab etc). In addition the candidate should also has attitude to team work.</p>
<p><b>Educational objectives</b></p>	<p>The project will provide candidate with: knowledge of the sector in which the research project is developed; methodological competences at both the theoretical and applied level; capabilities to interact with people of diverse background; problem setting and solving capabilities.</p>
<p><b>Job opportunities</b></p>	<p>Private enterprises, public water authority, irrigation consortia.</p>
<p><b>Composition of the research group</b></p>	<p>1 Full Professors 2 Associated Professors 3 Assistant Professors 3 PhD Students</p>
<p><b>Name of the research directors</b></p>	<p>Marco Mancini</p>



Contacts
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Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

Scholarship Increase for a period abroad	
Amount monthly	600.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p><u>Universities, Companies, Agencies and/or National or International Institutions that are cooperating in the research:</u></p> <ul style="list-style-type: none"> <li>•University of Naples</li> <li>•University of Padoa</li> <li>•Milan University</li> <li>•University of Newcastle (Uk)</li> <li>•Princeton University</li> <li>•USDA Center</li> <li>•CESBIO ( France)</li> <li>•Chouaib Doukkali University Morocco.</li> </ul> <p>Additional centers for collaboration will be possible.</p> <p><u>Educational activities</u> (purchase of study books and material, funding for participation in courses, summer schools, workshops and conferences): approximately 1630,00 euros per PhD candidate per year, on average.</p> <p><u>Teaching assistantship</u> (availability of funding in recognition of support to teaching activities by the PhD candidate): there are various forms of financial aid for activities of support to the teaching practice. The PhD candidate is encouraged to take part in these activities, within the limits allowed by the regulations.</p> <p><u>Computer availability:</u> PhDs have their own computer for individual use. They will also have access to CFDHub (<a href="http://www.cfdhub.polimi.it">www.cfdhub.polimi.it</a>), an Interdepartmental laboratory of PoliMi, with a state-of-the-art infrastructure and scientific computing system.</p>



Desk availability: individual assignment for the entire career.