



PhD in INGEGNERIA GESTIONALE / MANAGEMENT ENGINEERING - 38th cycle

PARTENARIATO PNRR Research Field: MEASURING SUSTAINABILITY OF SMART AGRICULTURE TECHNOLOGIES ALONG THE AGRI-FOOD SUPPLY CHAIN

Monthly net income of PhDscholarship (max 36 months)

€ 1450.0

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

The PhD research project is aimed at evaluating the sustainability of smart agriculture technologies, considering the impact on farmers, but also along the agri-food supply chain. In detail, the PhD candidate should design a multi-criteria assessment methodology to consider the environmental, social and economic impact of innovative smart agriculture technologies. The framework should have a supply chain scope, considering the actors who are the main adopters of smart agriculture technologies (i.e., farmers and farmers? cooperative) but also economic actors which can reap benefits or impose resistances on the adoption of these emerging technologies (e.g., food and beverages manufacturers, retailers). The definition of the assessment methodology includes the i) design of a high-level sustainability framework in consideration of key decision making steps in the evaluation process and of additional organizational and process innovations needed to accommodate smart agriculture technologies; ii) the definition of a set of key performance indicators (KPIs). Moreover, the candidate should apply the assessment framework and provides an evaluation of specific emerging technologies. The project has several motivations. On the environmental side, the agricultural sector is both highly vulnerable to climate change and it is a major contributor to greenhouse gas emissions causing climate change (FAO, 2019). FAO (2019) draws attention on climate-smart agriculture and on the need to continue testing practices and technologies



	<p>that can lead to climate-smart agriculture, calling for additional investment to scale-up these technologies and to build institutional frameworks to support their adoption. On the socio-economic side, agriculture resilience is fundamental to assure food security and rural incomes. Although smart and agriculture technologies are considered a way to positively impact environmental, social and economic performance of the agricultural system, there are still some open challenges connected to the actual measurement of their impact. For instance, the type of assessment to be performed is multi-dimensional and should be performed on an ecosystem of actors as well as on society as a whole, thus implying a variety of indicators of different nature and cascading effects, which are difficult to measure. Moreover, farms do not have reliable records on performance and do not generally adopt performance measurement systems for decision making purposes (Trendov et al., 2019).</p> <p>The scholarship is funded by a PNRR grant (Centro Nazionale per le Tecnologie dell'Agricoltura, AGRITECH).</p>
Methods and techniques that will be developed and used to carry out the research	<p>The research implies an initial review of the scientific and grey literature on sustainability assessment frameworks. The investigation should combine a "top-down" logic (i.e., from established frameworks, as GRI, SAFA, SDGs, LCA, S-LCA), with a bottom-up investigation (i.e. by analysing the KPIs used to evaluate currently adopted technological solutions). The PhD candidate is then asked to conduct the research by means of multiple methods. He/she may conduct case studies along multiple stages of the agri-food supply chain, design and administer a survey over a sample of Italian farmers, manufacturers, and retailers. From this investigation, the candidate will return a multi-dimensional measurement framework ready to be applied on a set of emerging technologies. The framework will represent a key decision-making tool for farmers but also for other actors along the agri-food supply chain.</p>
Educational objectives	<p>The involved PhD student will learn (i) to understand and analyze sustainable technologies and practices in agriculture and along the agri-food supply chain and the necessary organizational and process innovation; (ii) to</p>



	design and apply multi-dimensional methods to measure the sustainability impact of emerging technologies; (iii) to interact with public and private stakeholders for research and policy purposes
Job opportunities	Upon PhD completion, the candidate will be tasked with empirical research activities in interdisciplinary groups engaged with sustainability-oriented transformation, also developing team leadership competences. Public sector agencies and international organizations engaged with policy design and assessment are also a prospect employer, along with consulting organizations that advise agri-food companies and authorities on sustainable innovation.
Composition of the research group	4 Full Professors 2 Associated Professors 3 Assistant Professors 5 PhD Students
Name of the research directors	Prof.ssa Federica Ciccullo

Contacts
federica.ciccullo@polimi.it

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	725.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p>The PhD candidate will have the opportunity to attend courses on Management Engineering methods, sustainability-oriented innovation and agri-food sustainability at Politecnico di Milano and other Universities and research centres. He/she will be supervised by the research director through frequent meetings, and will receive feedbacks on his/her intermediate results during regular meetings with the Doctorate board and scientific conferences. The candidate will be involved in some teaching and communication activities, which are seen as a major opportunity to practice with dissemination of own and other relevant research results. He/she will be offered a</p>



desk and PC at the DIG building.

The Food Sustainability Lab research projects that are related to the PhD research topics include PNRR's Agritech center and Food Sustainability Observatory initiatives (https://www.osservatori.net/it_it/osservatori/food-sustainability). The research group cooperates with several academic groups and research centres, and various public, private and non-profit stakeholders, such as the Dunning Centre for International Business network, CIRAD Montpellier, Laurier Centre for Sustainable Food Systems at the Wilfrid Laurier University in Waterloo, Canada; the National Research Institute on Agronomy (INRA); Cardiff University; Wageningen University, Roskilde University, Fondazione Banco Alimentare, the Milan Urban Food Policy Pact network.

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Decreto Direttoriale Avviso:

Avviso è il Bando, nel vostro caso 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

Decreto di concessione: D.D. 1032 del 17/06/2022