POLITECNICO DI MILANO

PhD in INGEGNERIA AMBIENTALE E DELLE INFRASTRUTTURE / ENVIRONMENTAL AND INFRASTRUCTURE ENGINEERING - 39th cycle

Research Area n. 1 - Water Science and Engineering

PNRR 118 PNRR Research Field: SUSTAINABLE RURAL AND URBAN AGRICULTURE FOR GREEN TRANSITION

Monthly net income of PhDscholarship (max 36 months)
€ 1195.5 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	In recent years we have been observing, on a global scale, a growing demand for food and renewable energy, mainly motivated by the increase in population in Asia and Africa and by the effort towards a green transition. The agricultural and energy sectors are interlinked in the so called Food-Energy-Water (FEW) Nexus since they draw on the same pool of natural resources. Food and energy production can lead to potential conflicts between the two sectors over the use of natural resources. Objectives of the research are, in a perspective of water-food-energy nexus, the analysis of the use of natural resources and the competition for them, and the identification of strategies aimed at pursuing sustainable food and energy security. To this end, the possible potential offered by both urban and rural agriculture in both rainfed and irrigated conditions will be analysed. Possible synergies and/or tradeoffs with the sustainable production of energy from renewable sources will also be studied. Hence the need to study the actual use of natural resources for the green transition in order to identify where the availability of these resources makes possible an effective sustainable transition which corresponds to both environmental protection and an improvement of

	both environmental protection and an improvement of food and energy security in current conditions and also with respect to future agricultural expansion trends.
Methods and techniques that will be developed and used to carry out the research	Water used for agricultural production will be quantified and related to the water availability conditions of the site of withdrawal. Water resource competitions with other sectors, especially the energy sector, as well as the civil use, will also be considered. The agricultural water demand will be evaluated through an advanced and spatially distributed agro-hydrological modelling taking advantage also of remote sensing information, according to global scenarios of sustainable development. The induced competitions, the limits, as well as the potential synergistic solutions, will be investigated through the delineation of a highly transdisciplinary analytical framework oriented towards the water-food-energy nexus, which is capable, on the basis of the local conditions of availability and demand of natural resources, to identify the correlations between agricultural production and sustainable energy.
Educational objectives	The PhD program is oriented to improve the scientific background of each student, preparing the basis for a university researcher as professional specialist careers.
Job opportunities	Main opportunities in the job market include Universities, Research Centers, top level management in Authorities involved in environmental policy, and senior consultants for engineering companies.
Composition of the research group	1 Full Professors 1 Associated Professors 4 Assistant Professors 6 PhD Students
Name of the research directors	Maria Cristina Rulli and Chiara Corbari

Contacts
mariacristina.rulli@polimi.it phone: +39 02 23996292 www.glob3science.polimi.it chiara.corbari@polimi.it

phone: +39 02 23996231
https://www4.ceda.polimi.it/chiaracorbari

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	597.75 €
By number of months	6

National Operational Program for Research and Innovation	
Company where the candidate will attend the stage (name and brief description)	/
By number of months at the company	0
Institution or company where the candidate will spend the period abroad (name and brief description)	University of California at Berkeley - www.ucb.edu
By number of months abroad	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information

Educational activities (purchase of study books and material, funding for participation to courses, summer schools, workshops and conferences): approximately 1660,00 euros per PhD candidate per year, on average.

Teaching assistantship (availability of funding in recognition of support to teaching activities by the PhD student): there are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.

Computer availability and desk availability: individual assignment for the entire career.