

Research topic:

- Research group: LASEG (Social-Ecological-Systems)

CONTACT:

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TOPIC INTRODUCTION:



Nature-based solutions (NBS) have been proposed as a key tool to address urban challenges through the restoration, rehabilitation of (peri)urban ecosystems to promote the (re)connection of natural and social processes between places to advance towards more liveable, resilient and inclusive cities. NBS effectiveness in this context relies on a transdisciplinary collaboration of actors. Furthermore, there is the need to take into account the needs of all social groups to make NBS most effective.

Supervisors:
Sara Maestre,
PhD
Johannes
Langemeyer,
PhD

Main aim: NBS stakeholder network analysis in Granollers

MAIN TASKS:

- (1) Identify core stakeholders in restorative NBS in the city of Granollers and conduct a stakeholder network analysis.
- (2) Conduct semi-structured interviews with key stakeholders in order to examine core challenges, perceptions and preferences by different actors in the network.
- (3) Support the design and implementation of an online stakeholder workshop..

Research topic:

- Research group: Sostenipra



Integrated System
Analysis of
Urban Vegetation
and Agriculture

CONTACT: Eckelman, Matthew
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Healthcare systems are responsible for nearly 5% of global GHG emissions, and similar fractions of air and water pollution that impact public health. Healthcare Sustainability is a movement to improve resource efficiency and reduce emissions while maintaining or improving patient care. In this project, the student will use tools from environmental economics and industrial ecology to estimate emissions associated with the Spanish healthcare sector. The student will couple data from the Ministerio de Sanidad with environmentally-extended input-output models to explore the following questions:

How have total and per-capita healthcare emissions in Spain changed over time?

How much of Spain's emissions is embodied in imported healthcare goods and services?

What are the major healthcare activities that are driving emissions, and how might they be reduced in the future?

Supervisors:
Matt Eckelman
(Northeastern University)
Gara Villalba
(UAB)

Main aim: understand and quantify the impact of the health care system using industrial ecology tools.

References:

<https://journals.plos.org/plosmedicine/article/comments?id=10.1371/journal.pmed.1002623>

https://www.euro.who.int/__data/assets/pdf_file/0008/378620/hit-spain-eng.pdf

<https://www.mscbs.gob.es/en/estadEstudios/estadisticas/sisInfSanSNS/finGastoSanit.htm>

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Learn how to use the SWMM tool developed by the US EPA to predict runoff quantity and quality from urban land use. The student will run a test-case study of a tile (1 km by 1 km) made up of typical urban land uses such as built impermeable, vegetation, and permeable bare soil. The expected outputs are runoff quantity and quality. As a second step, the URBAG group will help the student prepare all the input required to run a tile of the Metropolitan Area of Barcelona where the Pla Director Urbanistic is planning to implement green infrastructure (park or green corridor), and to perform basic life cycle assessment of wastewater treatment and its related infrastructure, to answer the following questions for different scenarios:

Supervisors:
Matt Eckelman
(Northeastern University)
Gara Villalba (UAB)
Cristina Madrid (UAB)

- For rainfall events that are typical of Barcelona, how effective is the green infrastructure in retaining runoff and capturing nutrients (N, P)?
- What are the life cycle benefits resulting from avoiding runoff water and unrecovered nutrients from reaching wastewater treatment plants and/or water bodies?
- What is the contribution of water runoff to the overall water budget (evaporation, water consumption, rain, etc)?
- How would the situation change for different scenarios of green infrastructure development?

Main aim: to estimate runoff quantity and quality from urban land use, and perform LCA.

References:

Consequential Environmental and Economic Life Cycle Assessment of Green and Gray Stormwater Infrastructures for Combined Sewer Systems. Ranran Wang, Matthew J. Eckelman, and Julie B. Zimmerman. Environmental Science & Technology 2013 47 (19), 11189-11198
DOI: 10.1021/es4026547

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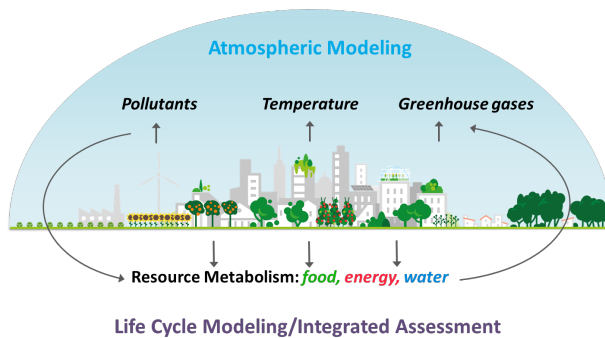


Integrated System
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Supervisor:

Dr. Cristina Madrid López (ICTA)



In the ERC Project [URBAG](#), we assess the current trade-offs between water, energy and food supply and consumption due to changes in green spaces in Barcelona with a social metabolism perspective. Through our collaboration with the office preparing the next [Urban Development Plant \(PDU\)](#) we provide policy-makers with information about the impacts of the urban development scenarios they propose.

In this Master Thesis, the student will include irrigation technologies in the URBAG agriculture map and with the support of the URBAG team, perform a Life Cycle Assessment of the irrigation infrastructure in terms of energy use and GHG emissions. The trade offs of different scenarios of change in the irrigation technologies will be examined in terms of reduction of water demand vs energy use. The scenarios will include those given by the Pla Director Urbanístico of the AMB as URBAG collaborated with the team developing the plan.

Main aim: Assess impacts of irrigation infrastructure in AMB

MAIN TASKS:

- 1) To perform a detailed literature survey on current irrigation infrastructure at AMB
- 2) To make an georeferenced inventory of irrigation infrastructure and technologies
- 3) To assess the trade-offs between water use-food production and the life cycle impacts of related water metabolism infrastructure
- 4) To model scenarios of the urban development plan

Research topic:

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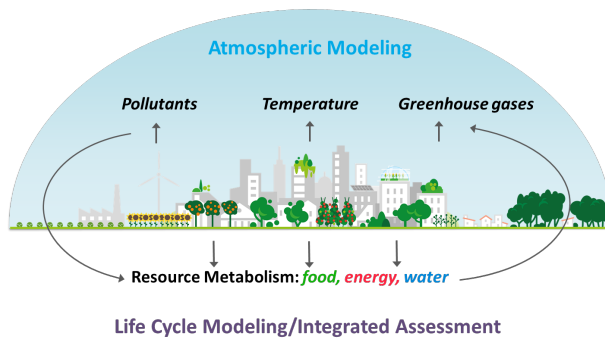


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In this Master Thesis, the student will work on the development of new indicators of the impact of water metabolism with a regionalized perspective. Using the studies on water demands and the indicator of influence area developed in URBAG, they will design new LCIA characterization factors with a regional perspective. Those factors will be tested in a case study in Cerdanyola del Valles that will consider the scenarios given by the Pla Director Urbanistic of the AMB as URBAG collaborated with the team developing the plan.

Main aim: Assess impacts of irrigation infrastructure in AMB

MAIN TASKS:

- 1) To perform a detailed literature survey on current regionalized LCIA water related methods and characterization factors
- 2) To redefine characterization factors for AMB in selected LCIA methods
- 3) To assess impact over water resources with a metabolism and a LCA perspective in Cerdanyola del Valles
- 4) To model scenarios of the urban development plan