

Evaluation of Future Land Use Scenarios for Groundwater Protection and Territorial Sustainable Development

Context

- The Lille European Metropolitan Area seeks scientific support to develop and evaluate urban development scenarios to protect groundwater and ensure the well-being of local inhabitants
- 12 scenarios of actions in urban, agricultural and natural areas have been already co-constructed with local experts
- Evaluation criteria have been formulated participatively to reflect local sustainable development goals (e.g., biodiversity conservation, climate change mitigation, economic development)

Urban areas



Agricultural and natural areas

SCENARIO « THE RESIDENT'S WISHES/ PROJECT »

	Statu quo	Ambition levels		
		NIV 1	NIV 2	NIV 3
Artificialized areas, demography and habitat	1. URBAN DENSIFICATION Different ways of densifying urban areas to create new housing without urban sprawl	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2. REDEVELOPMENT Redevelopment of brownfield sites and land linked to economic and commercial zones into housing/ green spaces	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3. REDUCE WATERPROOFING Reduce waterproofing in urban areas (public spaces, school grounds, parking lots) to facilitate infiltration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Agricultural and natural areas	4. EXTENSION OF NATURAL AREAS Extension of natural areas (woods, wetlands, natural meadows)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5. DEVELOPMENT OF SEMI-NATURAL VEGETATION Development of agro-ecological infrastructures, semi-natural grasslands in connection with agroecology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	6. EVOLUTION OF CROP TYPES Introduction of new crops, lengthening of crop rotations in line with organic farming development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Proposed mission

The internship will contribute to evaluate the proposed future land use scenarios through:

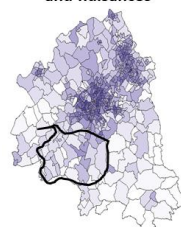
- proposing indicators adapted to the local context and available data,
- integrating multidimensional welfare indices (Usubiaga-Liaño and Ekins, 2024) and/ or the Doughnut Economics analysis framework (Raworth, 2012) into the scenario evaluation,
- quantifying the resulting indicators and indices using GIS data, data from the literature, and the ecosystem services evaluation tool used by the Hauts-de-France region (capacity matrix).

Research unit

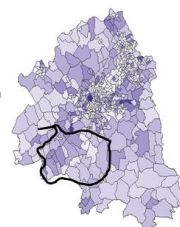
The student will be based in an interdisciplinary research unit at BRGM Montpellier within the UMR G-EAU, interacting with teams from BRGM Lille and Orléans involved in the project. The internship supervision team will consist of two researchers in economics from the [PRECOS](#) team of UMR G-EAU: Cécile Hérivaux (BRGM, mentor) and Stefano Farolfi (CIRAD, tutor).



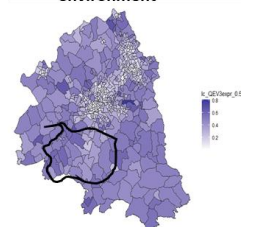
Exposure to risks and nuisances



Access to nature



Quality living environment



References:
[Raworth, K., 2012.](#) A safe and just space for humanity. Can we live within the doughnut?
[Usubiaga-Liaño, A., Ekins, P., 2024.](#) Methodological choices for reflecting strong sustainability in composite indices. Ecological Economics 221, 108192.

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