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Dynamical resource nexus assessments: from accounting to sustainability approaches

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Continued economic development and population growth result in increasing pressures on natural resources, from local to international levels, for meeting societal demands on water, energy and food. To date there are a few tools that link models to identify the relationships and to account for flows of water, energy and food. However, these tools in general can offer only a static view often at national level and with annual temporal resolution. Moreover, they can only account flows but cannot consider the required amounts and conditions of the natural capital that supplies and maintains these flows.

With the emerging nexus thinking, our research is currently focused on promoting dynamical environmental analyses beyond the conventional silo mentalities. Our study aims to show new advancements in existing tools (e.g., dynamical life cycle assessment) and develop novel environmental indicators relevant for the resource nexus assessment. We aim to provide a step forward when sustainability conditions and resilience thresholds are aligned with flows under production (e.g., food, water and energy), process level under analysis (e.g., local production, transport, manufacturing, final consumption, reuse, disposal) and existing biophysical local conditions. This approach would help to embrace and better characterise the spatiotemporal dynamics, complexity and existing links between and within the natural and societal systems, which are crucial to evaluate and promote more environmentally sustainable economic activities.