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Eco-Social Living Lab approaches

An overview of existing Eco-Social Living Lab Approaches

Deliverable 2.1

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Abbreviations

EU: European Union
ENoLL: European Network of Living Labs
NEB: New European Bauhaus
NBS: nature-based solutions
ULL: Urban Living Labs

1. Introduction

Living Labs have emerged over the past two decades as a significant methodology for integrating research and innovation in real-world community settings, enabling collaboration among academia, public authorities, civil society, and citizens to address complex societal challenges. Within this broader landscape, the INNATURE project develops a distinctive approach: **Eco-Social Living Labs** that foreground the interdependence of people and nature, treating biodiversity and social diversity as mutually constitutive dimensions of living environments.

Typically, living labs mostly focus on technological innovations, while social living labs focus on community well-being (Franz 2015). The Eco-Social Living Labs in INNATURE will focus on **people-diversity** (i.e. different stakeholders across disciplines and ensuring inclusion of often underrepresented groups of people) and **biodiversity** (i.e. connection to local biodiversity, meaning of biodiversity and nature to the local community and how biodiversity can be protected and enhanced). INNATURE Eco-Social Living Labs focus on emphasising the role of humans as an integrated part of a socio-natural ecosystem in living environments. Taking a deep participatory approach facilitates citizen engagement and helps to spread the benefits of inclusion to all sections of the community.

This deliverable, titled '**D2.1: Eco-Social Living Lab Approaches**', provides the methodological and analytical foundation for that work. It presents the outcomes of a systematic, collaborative mapping of existing Living Lab research and practice, undertaken as part of Task 2.1 of the INNATURE project, with particular relevance to the five demo case contexts: Pollinator Meadows (Tampere), Forest Classrooms (Brezoi), Green Street Delta (Antwerp), Rain Commons (Copenhagen), and Landscape Connector (Sheffield). The document offers a reflective and generative resource that situates INNATURE'S ambitions within the broader ecology of Living Lab practices.

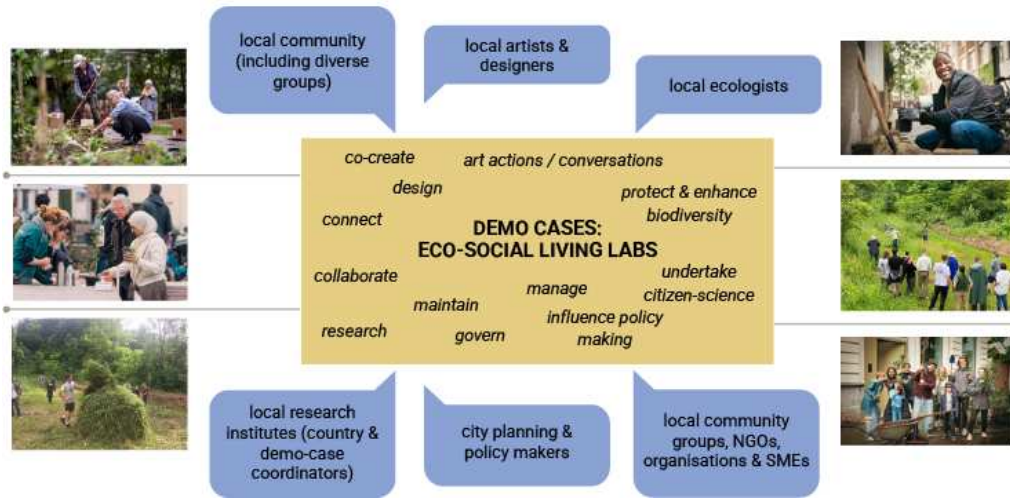

Figure 1. INNATURE Eco-Social Living Lab demo case framing. INNATURE Project, 2025

1.1 Purpose of this document

Deliverable 2.1 (D2.1) provides an overview of existing Living Lab approaches, drawing out transferable lessons from Living Lab research and prior case study processes to inform the INNATURE project, with particular relevance to the five demonstration case contexts. To achieve this, the task involved a collaborative, transnational mapping of existing Eco-Social Living Lab processes. This mapping exercise (WP2 / Task 2.1) combined a structured literature review with a systematic analysis of Living Lab case studies at global, European, and local scales, **focusing specifically on approaches that integrate social and ecological dimensions and act as a foundation to inform the context-specific INNATURE Eco-Social Living Labs.**

In doing this, our focus was to critically reflect on the innovations, methods, and operational approaches adopted within each studied Living Lab case study, as well as their successes, limitations, barriers, and (positive and negative) unintended consequences. A central objective was to identify key insights and lessons relevant to INNATURE, with particular attention to questions of transferability and scalability. This included unpacking the configurations of actors, stakeholders, and governance arrangements that enabled these Living Lab processes to emerge, function, and endure beyond their initial scope or funding scheme.

Deliverable D2.1 synthesises this initial research foundation. While this deliverable was originally intended as an internal (sensitive) deliverable, for the INNATURE collective only, it was then agreed to share it as a publicly available resource to stimulate reflection and further knowledge exchange beyond the consortium. As a foundational and evolving body of work, it is envisaged that this knowledge base will be expanded and refined throughout the duration of the INNATURE project, functioning as a dynamic deliverable that can accommodate future updates and iterations. It will also be a key part of the INNATURE Pattern Book at the end of the project (D1.3).

2. Executive Summary

The methodology adopted to document and critically reflect on Living Lab approaches combined three complementary phases: systematic mapping, a collaborative synthesis workshop, and a final interpretive analysis. Together, these stages aimed to establish a methodological foundation for developing Eco-Social Living Lab approaches within the INNATURE project.

The first phase involved a systematic mapping of existing Living Lab research and practice. An initial review compiled cases and key references based on three analytical dimensions: (1) topics and typologies (e.g., urban rooms, organic, civic, and strategic living labs); (2) methods and methodologies (e.g., co-creation, inclusive technologies, education), and (3) impact and policy (e.g., social and ecological inclusion, urban transformation). This review produced a curated set of 54 cases and academic sources. The dataset was then expanded through contributions from consortium researchers, who added locally grounded examples from five European INNATURE contexts, resulting in a consolidated library of 71 cases and references. Cases were analysed using a shared framework capturing methods, innovations, challenges, and potential for transferability and scalability.

The second phase consisted of a three-hour online workshop in which consortium researchers collectively reflected on insights from the mapping, with particular attention to lessons for INNATURE demonstration cases and issues of scaling and long-term resilience.

Finally, a synthesis phase integrated findings from the mapping and workshop discussions to identify cross-cutting themes, methodological insights and key conditions for implementing Eco-Social Living Labs across diverse contexts.

2.1 Summary State of the Art

Living Labs are collaborative, real-world environments where research and innovation are co-developed and tested with citizens and stakeholders. Originating from the concept of the “living laboratory” in operations research in the early 1990s, the approach expanded into business innovation and became widely adopted across Europe in the early 2000s. The European Union recognised Living Labs as innovative governance and experimentation frameworks that embed research and innovation within everyday community contexts. This led to the establishment of the European Network of Living Labs (ENoLL) in 2006, providing an international platform for collaboration, exchange, and validation.

Over the past two decades, Living Labs have become a key approach for fostering collaboration between academia, public authorities, industry, and civil society. Supported by EU programmes such as Horizon 2020 and initiatives targeting climate-neutral cities, they address complex societal challenges, particularly those linked to ecological transition.

By enabling collective experimentation and co-creation, Living Labs strengthen civic participation, enhance community resilience, and help translate research into locally relevant solutions.

Living Labs vary widely in scale, scope, and governance. Some operate at the neighbourhood level, focusing on specific communities or sites, while others function across cities or even internationally. Typologies include Urban Living Labs (ULLs), multi-scalar "meta-labs," and locally embedded urban rooms. Governance models also differ: 'strategic labs' are typically state-led; 'civic labs' are often driven by institutions such as universities; and 'organic labs' emerge from grassroots initiatives. In practice, many Living Labs combine these approaches, resulting in hybrid governance structures.

Thematically, Living Labs address diverse issues, spanning social, ecological, technological, and urban domains, as well as hybrid forms such as techno-social or eco-social labs. Increasingly, they engage with nature-based solutions (NBS) and ecological experimentation while also incorporating cultural dimensions, including arts, heritage, and diversity. Through the integration of creative practices and humanities perspectives, Living Labs can align with initiatives like the New European Bauhaus (NEB), promoting sustainability, inclusivity, and aesthetic quality in the built environment, the three key pillars of the NEB.

Methodologically, Living Labs rely on participatory and co-creative approaches, including ethnography, co-design, civic education, and hands-on experimentation. They often combine ecological and social innovation — for example, linking green infrastructure with community learning and skill-sharing. Tools such as participatory workshops, civic pedagogies, inclusive technologies, and on-site experimentation foster learning-by-doing, build ecological literacy, and strengthen long-term relationships among participants.

Governance typically follows a "quadruple helix" model, bringing together government, academia, industry, and civil society. Universities frequently act as mediators, providing research capacity and infrastructure, while local authorities offer policy access and legitimacy. Civil society organisations ensure projects remain grounded in local knowledge and social trust. However, challenges persist, particularly around power imbalances, unequal participation, and tensions between bottom-up initiatives and top-down structures.

In this context, The Eco-social Living Labs are defined as neighbourhood-centred initiatives with multi-stakeholder governance spanning civic to organic models. They integrate social and environmental dimensions, enabling local agency, civic learning, and ecological action through co-created nature-based solutions. Using participatory and experimental approaches, they can scale across cities and regions via networked, "meta" distribution models.

Scalability and resilience in Eco-Social Living Labs rely on translating practices across governance, knowledge, and cultural contexts rather than simple growth. Strong local roots combined with trans-scalar connections enable impact.

While digital and regional networks support exchange, challenges remain in engagement and policy integration, requiring hybrid governance and intermediary actors.

2.2 Summary Research Gaps

The literature review identified several research gaps that the INNATURE project seeks to address in the development of Eco-Social Living Labs. First, while Living Labs frequently involve spatial, material, and ecological experimentation in real-world settings, there is limited research focusing specifically on eco-social dimensions. **Hence the INNATURE project provides an opportunity to advance the state of the art by exploring how ecological interventions and social processes can be integrated within participatory experimentation.**

A key challenge identified in the literature is that knowledge generated within Living Labs often remains highly context-specific. **The INNATURE project aims to address this limitation by enabling the exchange of methodologies across different European demonstration cases in Belgium, Denmark, Finland, Romania and the UK, supporting translocal learning and the horizontal and vertical scaling of practices and insights.** Also, short-term funding cycles often conflict with the long-term processes that are required for meaningful experimentation and community engagement.

Another gap concerns the limited understanding of how Living Labs transform individual and collective capacities through learning, agency-building, behavioural change, and shifts in values. **The INNATURE project offers opportunities to enable, document and analyse such transformative processes.** In addition, collaboration among multiple actors in Living Labs raises questions about governance, particularly the persistence of top-down power dynamics. **Greater attention is therefore needed to eco-civic governance and multi-actor coordination, including the agency of underrepresented groups – a key aim of the INNATURE project and its activities in its Eco-Social Living Labs.**

Finally, significant gaps remain in understanding long-term sustainability and continuity of Living Labs, as well as the integration of ecological indicators with social and governance metrics within a unified framework, including more-than-human perspectives. **Again, the INNATURE project offers opportunities to enable and develop this.**

2.3 Summary Lessons for INNATURE

The analysed cases offer several lessons for the development of the INNATURE Eco-Social Living Labs, particularly regarding the integration of nature-based solutions (NBS) with social, cultural, and governance processes. **Rather than treating NBS as technical interventions, the cases show that their effectiveness increases when they are co-produced through participatory experimentation, civic learning, and creative practices.** This approach aligns with the New European Bauhaus (NEB) principles of sustainability, inclusivity, and beauty (local meaning) developed simultaneously through process-based design.

The INNATURE project addresses these gaps by exploring different local Eco-Social Living Lab approaches that integrate ecological experimentation with social participation. **By connecting multiple demonstration sites and encouraging translocal learning, INNATURE aims to advance the methodological development of Living Labs while strengthening their capacity to support sustainable and inclusive ecological transitions.**

Four key insights support this practice:

1. **Agency** must be actively cultivated through participatory and pedagogical methods that build civic capacity and enable communities to understand and influence planning processes.
2. **Continuity** is essential for sustaining knowledge and relationships beyond project cycles, often supported through civic infrastructures such as urban rooms or eco-civic hubs that act as long-term community anchors.
3. **Resourcing** requires moving beyond short-term project funding towards hybrid models that combine universities, civic institutions, and local resources.
4. **Accommodating uncertainty** through flexible, iterative, and "loose-fit" planning allows living labs to adapt to changing social, political, and environmental conditions.

The cases also demonstrate transferable co-creation methods — such as co-design, co-mapping, storytelling, and prototyping — while highlighting challenges including limited stakeholder power, translation of concepts into local contexts, time constraints in co-creation processes, and land-ownership issues that may affect long-term sustainability.

3. Methodology

The methodology we adopted for recording and critically reflecting on the Living Lab approaches comprised a systematic mapping of existing Living Lab approaches, a collective sense-making process through an online workshop and a subsequent synthesis and interpretation of emerging insights in the form of this report, which aims to provide a methodological foundation for the development of the Eco-Social Living Lab approaches within the INNATURE project.

The mapping phase, which we explain in detail below, involved a collaborative review of Living Lab research and practice, focusing on topics and typologies, methods and methodologies, and impact and policy, drawing on a pool of 71 cases, initiatives and academic sources. Building on this mapping, an online workshop brought together researchers from across the INNATURE consortium to collectively reflect on emerging insights, including learnings from local experiences and knowledge arising from the INNATURE-specific demo case contexts. The final synthesis drew on materials generated across both phases, allowing tensions, uncertainties, and cross-cutting and demo case-specific lessons to be identified. The findings presented in the following sections, therefore, reflect both collective sense-making and subsequent interpretive analysis. More detail is unfolded below.

3.1 Literature and Case Mapping

To learn from existing Living Lab approaches and processes, the project undertook a systematic analysis of selected living lab research and practice. The first stage involved compiling an initial pool of case studies and key references within the Living Lab field based on: (1) **Topics and typologies** (urban rooms, organic living labs, civic living labs, strategic living labs) (2) **Methods and Methodology** (co-creation, inclusive technologies, education) and (3) **Impact and Policy** (social and ecological inclusion, urban transformation). This included both well-established examples frequently cited in the literature and multi-site projects with demonstration cases across different countries. Particular attention was given to initiatives relevant to Eco-Social Living Labs that engage with nature-based solutions and those that foreground ecological, social, technological, and/or urban dimensions. This initial mapping resulted in a curated collection of approximately 54 relevant cases and academic articles.

In a second stage, the mapping was expanded to include locally grounded examples in the five INNATURE European contexts. Researchers across the INNATURE consortium were invited to contribute three to four cases from their national contexts or professional fields that they considered particularly relevant. These contributions supplemented the initial review and significantly enriched the diversity and situatedness of the dataset, resulting in a consolidated library of 71 cases and literature sources (See Appendix 1. Living Lab Resources).

Academic articles were included either as primary analytical sources or in direct relation to specific case studies. While the mapping did not focus exclusively on

theory, theoretical insights emerged through the analysis of several cases and their innovations, and these are reflected in the subsequent synthesis.

For the in-depth analysis of the shared library of resources, the full set of cases and articles was distributed among five consortium partners - a process followed across the consortium to support collective learning and reflection of learnings. This was an intentional methodological strategy aimed at engaging researchers across the consortium in close, comparative reading and analysis, as was also similarly undertaken in Deliverable D1.1 Learning from NBS and NEB projects.

The review process was structured through a shared analytical framework, implemented via a spreadsheet that guided researchers to extract key characteristics, methods, challenges, and lessons from each Living Lab case (see Fig 2). This framework focused on assessing innovations, methods, and operational approaches, alongside successes, limitations, barriers, and unintended consequences. We asked reviewers to describe the type of labs by choosing between ecological, technological, social, eco-social, social-tech, eco-social-tech and urban living labs. The analysis also identified transferability and scalability potentials of each case by examining the long-term resilience of living labs and the roles of actors and stakeholders in sustaining living lab processes. While researchers involved in WP2 undertook the majority of this detailed analysis, **the findings provide a foundational knowledge base for the entire consortium, particularly supporting the development and implementation of Eco-Social Living Lab approaches across the project's diverse demonstration contexts.**

Organisation to map	Team member name who mapped the resource	Resource Title (just paste in paper referen ce or case study name)	Add online link to main source	Resource type (select from drop-down list - on tab bottom right of this column/ row)	Describe approaches and METHODOLOGY of the living lab? Approx. 100 words.	Reflection on lessons learned and key takeaways for INNATURE? (related to innovations, methods, approaches, successes, barriers, unintended consequences, when Living Lab was involved etc) Approx. 50 words	List or describe Living Lab stakeholders included	What kind of Living Lab? (eco/social / technology focus -use drop down menu)	Write any other reflections, e.g.notes on transferability, scalability, which stakeholders to be included	List submitted images/figures (name the file: INNATURE_[City/Country abreviation]_[YYYYMMDD]_[3wordsTitle]_[Version/Authorinitials]. Eg: Brz_251102_PrototypeEcoCircuits_v1_CP. See DMP section 5.1. Make sure to upload high res. 300 dpi jpegs) + image credits. Ensure copyright compliance. Location of image: Initially on secure local institutional drives; and when the database is submitted to be stored on the shared TTAMS drive as per DPM in each respective WP channel. WP2.1 folder here: https://drive.google.com/drive/folders/1DmnhWhLo71nTlOwxIZdwgwlGoxdWMCRv?usp=drive_link
Topics & typologies: Civic Living Labs										
Romania	Silviu Medesan	R-Urban Bagneux	http://r-urban.net/en/	case study website	- ULL exploring the possibilities of enhancing the capacity of urban resilience by introducing a network of resident-run facilities to create complementarities between economy, housing, urban agriculture, culture: Agricole, Ecohub, Recyclab -the ULL is promoting a balanced lifestyle between consume and production - The hub is based on local needs and following local commons of the residents.	-the hubs in Paris are located in different neighbourhoods where the municipality is politically favourable to the R-Urban strategy (mostly left wing) so, politics are important in each inhiature location and has to be taken in consideration -the location is state owned and lend to the citizen-led association through a partnership -the funding is through EU grants, regional and municipal funds -R-Urban Bagneux is a good example on how the municipality collaborates with citizen in a neighbourhood eco-social LL	-neighbourhood residents, local NGOs, environment associations, local experts (gardeners, cookers, ecologists), other citizen	eco-social	- prototypes from R-Urban can be adapted to different inhiature locations: green walls and roofs, water phyto-filtration -R-urban strategy is present in Brezo Terra hub there is need to empower locals to active year long	21_Brz_260107_RecyclabUrbanBagneux_v1_AAA. Image description: Recyclab Bagneux unit in Paris Dounce: https://fondation-terresolidaire.org/wp-content/uploads/2022/05/IMG_8988-scaled.jpg
Romania	Silviu Medesan	Terra	https://terra.org/	case study website	- TERRA is a network of researchers and activists working at the intersection of ecology, architecture, artistic practices, education and research. - It works as a LL because it works with real-world, place-based experimental environment, is co-producing knowledge with different stakeholders (residents, researchers, students, experts) - It experiments with agroecological techniques, forestry, the creation of eco-prototypes -the approach of the LL is engaging with the 'alive' (Bruno Latour)	-Terra has annually actions like The Scihool of Planetary Gardeners with themes resolving around the rural culture of Brezoi and students in landscape architecture, artists, architects learn in-situ about NBS -the designing and construction of the hub was a participative process involving members of the network, local craftsmen and local construction companies, working with local materials (wood, stone) and local knowledge	municipality of Brezoi, architects, artists, educators, researchers, curators, activists, urbanists, economic geographers	eco-social	-the LL involving mostly academic stakeholders and the municipality can be a model replicable in other contexts	22_Brz_260107_TerraBrezoiHub_v1_AAA. Image description: The Terra Brezoi Hub in the natural landscape (source: https://www.anuira.ro/projects/2024/292/)
Sheffield	Esra Can	Caritas District Work (Caritas Stadtteilarbeit)	https://www.caritas-stadtteilarbeit.at	case study website	- Caritas Stadtteilarbeit promotes community empowerment, co-creation and solidarity action in the neighbourhoods, districts and communities of Vienna and Lower Austria through a variety of projects. Their work is transcular: they focus on codesigning infrastructures for democracy at the district scale (with debate platforms for collective decision-making), supporting community initiatives and activities at the neighbourhood scale (such as urban gardening, community cooking, speculative gaming, citizen science, etc.) and enhancing community spaces in housing projects. Activities include community events, intercultural exchange, participatory design of shared spaces, support in community initiatives and facilitation of social participation and civic engagement. The work is guided by local needs, empowerment and co-creation, with facilitation of discussions, negotiation and skills development to address social disadvantage, climate-friendly mobility and sustainable living	Caritas Stadtteilarbeit has a diverse portfolio of practices ranging from community cooking and intercultural kitchen events to neighbourhood labs, health, sustainability and energy justice initiatives that operate across scales from hyper-local street corners to EU-level partnerships. They incorporate an interdisciplinary team offering an adaptive, needs-oriented approach and robust multi-stakeholder networks (municipal, academic, cultural and EU partners) enable meaningful responses to social and ecological needs. Sustained resourcing and scaling across districts are ongoing challenges.	- Residents and local community members across ages, cultural backgrounds and income levels - Caritas Stadtteilarbeit interdisciplinary facilitation team (staff and volunteers) - Local decision-makers (municipal authorities, planners) - Neighbourhood organisations and civic groups - Housing developers, social services and public health partners - Migration and diversity-focused groups - Environmental and sustainability networks in neighbourhood initiatives	urban Living lab	They emphasise that institutional backing and multi-actor partnerships are key for networking and facilitation of intercultural engagement. For INNATURE involving local councils and urban ecology researchers could expand impact and long-term sustainability. Also, nature-based projects such as ERnteLAA show that placing ecological practices within everyday residential life can strengthen both social bonds and environmental care. They employ resident empowerment and adaptive facilitation, makes it highly transferable to other housing developments seeking to embed nature in community practices.	1.INNATURE_UKSHEF_260104_CaritasStadtteilarbeit_v1_EC.jpg – Image credit_ Community Cooking, photo by Marijana Kosovic Caritas Stadtteilarbeit, Vienna - 2. INNATURE_UKSHEF_260104_CaritasStadtteilarbeit_v1_EC.jpg – Image credit_ ERnteLAA Urban Gardening project, Caritas Stadtteilarbeit
Tampere	Jonna Lukka	Open Lab Ebbinge	https://www.facebook.com/OpenLabEbbinge/ and https://www.landforlive.com/doi/full/10.1080/09654313.2019.1579303#d1e946	research paper	The implementation of temporary uses in an urban redevelopment area by the initiative of local business-owners and artists who were worried about the vitality and safety of the abandoned site. Start ups, artist spaces and event spaces occupied the shipping containers brought to the area as temporary spaces. Eventually the site housed many cultural events and festivals.	Successes: The initiator stakeholders shared similar values, goals and personal dynamics, which helped to form a strong common vision and actualize the Lab. -Unintended: The communication didn't function between the newly involved and the stakeholders that knew each other beforehand. This led to tensions between managers and implementors. knowledge pooling and sharing only necessary information. Reflections:	Local business owners and artists as initiators. For example: the president of the local store-owner association, local entrepreneurs, several artists and architects, an independent planner as well as government-based planners, an overall manager, specific financial and event managers, a secretary). Also the municipality, a number of managers, and the implementors of projects in the spaces in collaboration with the	urban Living lab	At first the living lab was intended to work for five years (2010-2015) but it was extended until 2017 with the collaboration of the municipality. Eventually real estate market recovery cancelled the temporary use in 2017. Transferability: This type of land use seems difficult to incorporate in contemporary housing development since the living lab was cancelled. Scalability relies on the negotiation skills of the stakeholders with the municipality and how well the site is suitable for larger events, and also the type of the bigger events, festivals don't suit for every	
Copenhagen	Marina B. Jensen	Experimental Garden Feijenord Urban lab	https://urbact.eu/sites/default/files/2025-07/resilient_europe_rotterdam_action_plan_final.pdf and https://www.uu.nl/sites/default/files/wp6-rotterdam-report-final_low.pdf	case study or project report	The City of Rotterdam Integrated Action Plan for Urban Resilience was developed under the URBACT III RESILIENT EUROPE project (2015–2018). It aimed at translating Rotterdam's 2016 Resilience Strategy into actionable, district-level measures. The plan was funded through the European Regional Development Fund (ERDF), with contributions from the Municipality of Rotterdam. It involved close collaboration between city departments, district stakeholders, and researchers. While the plan was published as an official URBACT output, it has not been formally adopted as a statutory local ordinance. Rather, it serves as a strategic and operational guidance document linked to Rotterdam resilience strategy. The districts Feijenoord and Afrikaanderwijk served as pilot areas or "living labs" where urban resilience measures were tested, including: urban greening for heat mitigation and water retention to reduce flood risks. Local residents,	The succesful collaboration between researchers and city officers, headed by the city is interesting, with distinct planning documents and research papers as output. Also the focus on two specific districts (Feijenoord and Afrikaanderwijk) is interesting.		urban Living lab		

Figure 2. WP2 / T2.1 Extract of the Living Lab Approaches Mapping dataset. A full list of the 71 resources is shared in Appendix A, and the full mapping spreadsheet is shared as an Open Access data set on the Zenodo INNATURE Community Website.

3.2 Consortium Synthesis Workshop

All researchers involved in the mapping exercise were invited to participate in a three-hour online synthesis workshop, organised using a shared digital whiteboard platform (Miro) as a collaborative workspace. The initial mapping study provided the analytical foundation for this collective synthesis. The workshop was structured around a critical reflection format and organised across three thematic boards, each corresponding to key analytical dimensions of the mapping exercise (see Fig. 3).

The first theme, *Living Lab Approaches*, focused on collectively reflecting on lessons learned and key takeaways for the INNATURE project. Participants examined innovations, methods, and operational approaches, as well as successes, barriers, and unintended consequences. Using digital post-it notes, researchers mapped tensions, uncertainties, and innovative responses across a matrix of urban, ecological, social, and technological Living Lab approaches, including their intersections.

Figure 3. Digital whiteboards were used as platforms for workshopping. They served for thematic grouping (Living Lab Mapping, Potential for Transferability to INNATURE, and Scalability and Long-term Resilience), and enrichment of discussions, acting as foundations to synthesis.

The second theme, *Potential for Transferability in INNATURE*, explored the relevance of the analysed case studies for the five INNATURE demonstration cases: Pollinator Meadows (Tampere), Forest Classrooms (Brezoi), Green Street Delta (Antwerp), Rain Commons (Copenhagen), and Landscape Connector (Sheffield). Post-it notes categorised as limitations, uncertainties, and potentials were used to situate insights in relation to each demo case.

The third theme, *Scaling and Long-Term Resilience*, enabled collective reflection on the meanings and implications of scaling within the INNATURE Eco-Social Living Labs. Participants mapped limitations, uncertainties, and potentials across multiple spatial scales, including global, regional, European, city, country, neighbourhood, and trans-local levels.

The workshop concluded with a 50-minute collective discussion, during which participants reflected on key highlights, shared personal reflections, and exchanged experiences from practice that emerged through engagement with the thematic boards. These reflections were documented on the shared whiteboard within a dedicated discussion section, forming part of the workshop record and informing the subsequent synthesis.

3.3 Synthesis

Preliminary conclusions and lessons learned began to emerge through the collective discussions held during the synthesis workshop. These initial insights were subsequently consolidated and further developed by drawing on the full set of materials generated across the mapping and workshop phases, including the analytical spreadsheets, the whiteboard contributions, and the thematic clustering of notes and reflections.

The synthesis involved reviewing, grouping, and interpreting the collected insights across cases and contexts. Particular attention was given to cross-cutting themes relevant to Eco-Social Living Lab approaches, including methodological innovations, governance arrangements, participation dynamics, and conditions for transferability, scalability, and long-term resilience. The findings presented in the following sections therefore reflect both the collective sense-making achieved during the workshop and the subsequent interpretive work undertaken to translate these discussions into a coherent analytical framework for INNATURE Eco-Social Living Labs.

4. Grounding Our Approach

To ground our approach, we conducted a collective literature review to map the state of the art in current debates and practices around Living Labs. This process enabled us to identify key conceptual, methodological, and governance gaps, and to situate the emergence of the Eco-Social Living Lab paradigm as a response to these challenges.

4.1 State of the Art

A Living Lab is a real-world environment where research attends to innovation—of services or products — testing and co-developing with everyday participants in a collaborative setting. The first notion of the term ‘living laboratory’ has been traced to the field of operations research in the early 1990s (Bajgier et al. 1991; Mitchell 2003) and further moved into business innovation (Nesti 2018), expanding into Europe in the early 2000s (Ståhlbröst et al. 2024). The method was recognised by the European Union (EU) as innovative, inclusive, and experimental governance and implementation frameworks that support innovation (Lupp et al. 2021) and was institutionalised in the form of the European Network of Living Labs (ENoLL) in 2006,

an international federation of Living Labs in Europe and worldwide that offers validation and certification.

Over the last two decades, the Living Labs methodology has been strongly supported by EU policy as a way to 'integrate research and innovation processes in real-life communities and settings' and to encourage collaboration between a range of stakeholders towards innovation. Moreover, Living Labs have emerged across Europe as a central approach for research addressing ecological transitions. They enable connections between researchers and citizens through collective action, supporting the identification of shared needs, the co-development of collaborative responses and the dissemination of methods for broader application (Puerari et al. 2014). Living Labs are also understood as mechanisms for strengthening citizens' capacity to participate in processes of change and for enhancing civic resilience (Rizzo et al. 2021; Petrescu et al. 2022).

Today, numerous funding programmes encourage the involvement of various stakeholders in testing ideas and collaboration mechanisms in LL settings (Bulkeley et al. 2019). The frames for such Living Labs are not defined through academic research projects only. A Living Lab can be initiated by collectives of practitioners looking for alternatives, civic organisations aware of the importance of collaboration or by the local public administration where the need for mediation is recognised. Moreover, the EU ambition through the Horizon 2020 Research and Innovation Programme (Climate Neutral and Smart Cities Mission) is placing high expectations on pilot cities to demonstrate results in cooperation with academia, local communities and the private sector in helix collaborations for innovation.

The scales and timeframes of Living Labs and their associated networks are varied (see Figure 4 and Table 1). For example, local small-scale labs may focus on a small number of people or a small site or issue. Multi-city or international labs may involve larger numbers of actors with timeframes ranging from months to many years. Over its lifetime, the networks might be existing or new, expanding or contracting.

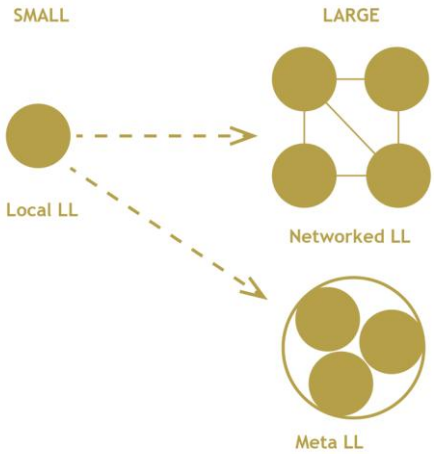

Figure 4. Living Lab Sizes and Coalitions

Table 1. Living Lab Typologies

Topics	· Social · Ecological · Technological · Techno-social · Eco-social · Eco-tech · Eco-socio-tech · Urban: - Urban Living Labs (ULLs) - Urban Rooms (Voytenko et al. 2016; Franz 2015 ; Aquilé et al. 2021; Petrescu et al. 2022; Akbil & Butterworth 2025)
Methods	· Co-creation · (Participatory) Ethnography · Co-design · Civic education · Inclusive technologies · On-site & Hands on Experimentation (Dell'Era 2014; Menny 2018; Binder & Brandt 2008; Belfield & Petrescu 2024)
Governance	· Civic · Strategic · Organic · Hybrid - Organic Civic (Bulkeley et al. 2019; Lupp et al. 2021; Belfield & Petrescu 2024)
Scale	· Small : - Local - Neighbourhood · Large : - City - Regional - Multi-cities - International - Meta - Networked - Platforms (Scholl et al. 2022; Petrescu et al. 2022; Antaki et al. 2025).

There is a diverse range of urban-oriented Living Lab typologies (see also and Table 1): (1) **Urban Living Labs (ULLs)**, playing a role in neighbourhood regeneration (Petrescu et al. 2022); **(2) meta-labs**, which are working at different scales, as an extension to ULL approaches (Scholl et al. 2022); and **(3) urban rooms**, which are a form of locally based ULLs, embedded in neighbourhoods (Akbil & Butterworth 2025). Bulkeley proposed to categorise ULLs according to three types: **strategic, civic, and organic**. These are specifically related to their scope, stakeholder types, funding and governance model. Most prevalent types were 'Strategic' — with top-down governance, often initiated and funded through the state. Second were 'Civic' Living Lab models — with more locally oriented major institutional partners, such as universities as, project leads.

Least common were 'Organic' Living Labs, which are initiated and self-funded by civic associations and nonprofit groups (Bulkeley et al. 2019, 323). They can also be hybrid combinations, e.g., civic-organic (Belfield & Petrescu 2024) - see Table 1).

In terms of topics and methodology, Living Labs can be categorised as social, ecological, technological, urban and a combination of these: techno-social, eco-social, eco-tech, eco-socio-tech, etc. (see Table 1).

Some of these are also NBS-centred Living Labs (e.g., Ignition Living Lab) (Voytenko et al. 2016). The above categorisation has also been used in our mapping of Living Labs approaches. Living Labs often relate to commoning processes and real-world knowledge practices, sometimes becoming commons themselves (Petrescu et al 2022; Belfield & Petrescu 2024). They can also play an important role in strengthening cultural values, including arts, cultural and natural heritage, and the cultural dimensions of diversity in post-migration societies, as well as recognising non-human cultures. By embedding creative practices and perspectives from the arts and humanities, Living Labs can support agendas that align with the principles of the New European Bauhaus (NEB).

In fact, Living Labs are themselves a particular type of methodology (Dell'Era 2014). They can adopt different approaches and methods, often participatory and co-creation methods (Menny 2018), participatory ethnography linked to co-design (Binder & Brandt 2008), or co-design on its own (Belfield & Petrescu 2024) (see Table 1).

Important discussions are held today in relation to their impact particularly in policy. The focus on bottom-up and top-down collaboration, in particular involving governments and municipalities in Living Labs, gained traction, evolving from the European Network of Living Labs (ENoLL) idea of Living Labs through quadruple helix actors (i.e., government, industry, academia and civil society) (Nguyen & Marques 2022). Research into the relationship between municipalities and citizens, top-down and bottom-up, has continued to intensify over the last decade, with a particular focus on the roles stakeholders play (Antaki et al. 2025). Research has been done in assessing the impact (and types) of Living Labs in urban design (Aquilé et al. 2021) and in sustainability and low-carbon approaches (Voytenko et al. 2026). An important aspect is the scale; Living Labs can vary from a very local scale (neighbourhood to city) to meta-labs, which create networks across different locations (Scholl et al. 2022) (see Table 1).

4.2 Research Gaps

The literature review presents a number of gaps that can be addressed through the INNATURE project:

- Living Labs frequently serve as sites for spatial, material, and ecological experimentation. Yet, research on Eco-social Living Labs — particularly as sites of such experimentation with a strong social dimension — remains limited. **The INNATURE project, therefore, offers a significant opportunity to advance the state of the art in this field.**
- Knowledge produced within Living Labs tends to remain hyper-contextualised (Scholl et al. 2022). **INNATURE will offer the possibility of sharing methodologies across different labs, facilitating translocal learning and horizontal and vertical scaling.**
- The understanding of how Living Labs can transform capacity — through learning, development of agency, behaviour or value change — is partial. **The INNATURE project can provide examples in this regard.**
- Many Living Labs involve collaboration among multiple actors, including governing bodies, which raises questions about top-down power dynamics in the implementation of systemic change. **The INNATURE project will design, implement and test different collaborative bottom-up approaches and provide new knowledge and examples.**
- A deeper understanding of eco-civic governance and multi-actor coordination with an emphasis on the agency of unrepresented groups, is needed. **Our project will go beyond consultation to co-creation, prioritising the agency of underrepresented groups, including non-humans; helping to create deeper understanding.**
- There is a gap in understanding the sustainability, continuity, and scaling of Living Labs; short-term funding often clashes with the slow-working demands of Living Labs, rendering them transient pilots rather than enduring infrastructures. **The INNATURE project will test different governance and maintenance pathways for long-term sustainability.**
- There is also a gap in understanding the integration of ecological indicators (biodiversity, ecosystem services, material footprints) with social and governance metrics within a single framework. Although there are examples of Living Lab research on NBS and climate adaptation, multi-species or more-than-human perspectives are not consistently theorised. **Our Eco-Social Living Labs attempt to bridge this gap.**

5. Living Lab Topics and Typologies

This section offers a comprehensive synthesis of the Living Lab approaches by exploring the topics and typologies through (1) methods and innovations, (2) governance models and stakeholder constellations, and (3) successes, barriers and unintended consequences, including both obstructive and generative ones, that were prominent in our synthesis. We observed that Living Labs adapt and transform as the problems or needs they are responding to, the types of actions, involved people, and scales change. While we initially read the selected case studies under the categories of social, technological, ecological and urban labs, we found that they often moved between these categories as they responded to and were shaped by local values and dynamics. The comprehensive reading of these in this section highlights lessons to support the co-creation of the INNATURE Eco-Social Living Labs.

5.1 Methods and Innovations

With INNATURE Eco-Social Living Labs, we aim to employ a wide range of participatory and experimental methods that prioritise learning-by-doing and iteration, in ways that make possible meaningful engagement with a variety of stakeholders and communities, including the more-than-human, around the shared concerns that shaped the demo cases. **Our synthesis reveals that the most generative and impactful methods Living Labs employ that could inform INNATURE Eco-Social Living Labs are those that combine ecological and social dimensions as mutually constitutive rather than treating them as sequential concerns**. R-Urban Hubs (R-Urban Poplar, London & R-Urban Bagneux, Paris) exemplify this most explicitly: composting systems, Anaerobic Digestion units and repair workshops are activated through skills-sharing programmes, workshops and civic engagement processes (see Figure 5). **The social methodology is what gives the ecological prototype its resilience and local relevance.** This interdependence is echoed at different scales throughout the other cases: e.g., in Dortmund-Huckarde Living Lab, green infrastructure interventions such as community gardens and pollinator habitats achieved citizen engagement when their ecological threshold was accessible, while more technically complex NBS (e.g., green corridors requiring regulatory approval) became more exclusive. Civic Square Birmingham takes this further by framing the neighbourhood itself as the unit of eco-social transition, with its Neighbourhood Doughnut, Trade School and Public Square working together as interlinked demonstrators that locate ecological knowledge of carbon, energy, biodiversity within the everyday social fabric of a specific place. **What binds these cases is a shared methodological insight: ecological innovations are most resilient when they are co-produced with communities, responding to local needs, and held within social relationships of care, learning and shared governance**.

Figure 5. R-Urban Poplar Eco-Civic Living Lab in London, UK. Photo: Andrew Belfield.

This section presents **four main methodological threads** identified across the analysed cases that operationalise creative and responsive methods to bring together ecological and social dimensions: **participation and co-creation methods**; **civic pedagogies and educational approaches**; **inclusive technologies and digital tools**; and **on-site ecological experimentation**. Key **takeaways** for the INNATURE project across these threads are **summarised** in Table 2 to Table 5.

Table 2. Methods and Innovation: Participation and Co-creation

Participation & Co-creation	
Situated Methods	**Key Takeaways for INNATURE**
Non-environmental entry points such as bicycle repair, sports, and creative workshops draw residents into a shared space where urban greening becomes incidentally visible, fostering ecological literacy through proximity (Garage Grande).	- Co-creation in living labs can be most generative when it is oriented toward building shared frames of reference and relational capacity from open and living processes. - Locally embedded resilience models where social methods and ecological function mutually reinforce one another is a methodology that necessitates an incrementally growing programme - Common territorial agendas could be a key output of co-creation involving local stakeholders. - Residents respond more constructively when climate adaptation solutions are visualised and co-designed alongside them, rather than presented as finished technical proposals. - Bridging academic inquiry with practice enhances legitimacy, but requires clear structures for stakeholder roles to avoid tokenistic involvement. - Weaving nature-based interventions into existing community infrastructures of trust, conviviality and mutual support could be a tactic for organic participation.
Combining interdisciplinary research with participatory workshops and stakeholder exchange for generating collective understanding and mapping possibilities gathers municipal and civil-society actors to explore, rather than resolve, how urban agriculture might be scaled (Urban Sustainability Lab).	
Participatory methods can be integrated with ecological and technical innovation: bottom-up, place-based workshops and skill-sharing events could be embedded within circular economy hubs, with composting and anaerobic digestion providing material infrastructure for engagement (R-Urban Poplar & Bagneux) (See Fig.5 & Fig.10).	
Diverse partnerships, at varying scales and time spans could continue to inform each other across interconnected demonstrators. For example, Doughnut Economics framework as a co-design tool enabled participants to connect local actions to planetary boundaries in accessible ways (Civic Square Birmingham)	
Workshops, community mapping, and collaborative analysis of ecosystem services involving rural stakeholders builds shared long-term sustainability visions for their landscape, producing governance instruments as well as spatial or material outcomes (TerraViva Living Lab).	
integration of Sustainable Urban Drainage Systems (SUDS) with participatory co-creation generated tangible local ownership and practical community action on climate challenges (Waterrijk Waterschei).	
Co-design can function as a science-policy interface by carefully structuring participation for meaningful involvement of researchers, policymakers, and residents in reframing problems and issues collectively (Kenniswerkplaats Liveable Neighbourhoods).	
Place-based solutions with diverse practices ranging from community gardening, cooking and intercultural kitchen events to neighbourhood labs, health, sustainability and energy justice initiatives demonstrates how embedding ecological practices within everyday life can strengthen both social and environmental care (Caritas Stadtteilarbeit).	
Key exemplary sources / projects:	
Garage Grande, Urban Sustainability Lab, R-Urban Poplar, Civic Square Birmingham, TerraViva Living Lab, Waterrijk Waterschei, Kenniswerkplaats Liveable Neighbourhoods, Caritas Stadtteilabeit	

Table 3. Methods and Innovation: Civic Pedagogies and Education

Civic Pedagogies & Education	
Situated Methods	**Key Takeaways for INNATURE**
Rapid prototyping and experimentation can help transform ideas into tangible, locally embedded solutions making learning hands-on, dynamic, and connected to real problems (Roadmap for Living Labs in Education / Schools as Living Labs).	- Eco-Social Living Labs are sites of civic learning as well as ecological action - Bridging resilience research with inclusive community science and formal education builds shared ownership of NBS interventions across a wide public. - Extending civic learning beyond event-based participation creates an infrastructure for ongoing ecological engagement. - NBS and biodiversity concepts can be institutionally embedded within higher education through whole-institution, transdisciplinary approaches. - Pedagogical shift towards experiential, cross-disciplinary, and locally relevant learning provides a replicable framework for INNATURE's engagement with local schools. - Relational and transformative dimensions of eco-social learning are activated when learning happens beyond the formal school settings and approaches.
Climate Cart programme delivers accessible, tactile learning experiences on coastal change and resilience for people of all ages, while the Summer Teacher Institute co-develops place-based curriculum with local educators (Stone Living Lab).	
Publicly accessible real-time monitoring sharing data on waves, water levels, and environmental conditions supports continuous public engagement (Stone Living Lab).	
By co-designing nature-inclusive learning practices with students, teachers, and university staff, and by establishing communities of practice, experiential education can become a vehicle for systemic institutional change (Dutch Living Lab / ENABLS).	
Embedding NBS into the culture, curriculum, and daily life of schools through a 'Whole School Approach' that guides holistic ecosystem-level transformation (NBS EduWORLD).	
Engaging youth, educators, researchers, artists, and land users in eco-social learning by designing and running outdoor education programmes helps address disconnection from nature, gaps in sustainability education, and cultural narratives about human-environment relationships (NatuurCollege).	
Platforms bringing together citizens, utility companies, knowledge institutions, and schools, such as the 'Collaboratorium', in co-design and knowledge-sharing on sustainable cities scales educational programmes across age groups and levels of complexity to build a broad civic constituency for sustainability (Greater Copenhagen Living Lab) (See Figure 6).	
Place-based solutions with diverse practices ranging from community gardening, cooking and intercultural kitchen events to neighbourhood labs, health, sustainability and energy justice initiatives demonstrates how embedding ecological practices such as communal growing within everyday life can strengthen both social and environmental care (Caritas Stadtteilarbeit).	
Key exemplary sources / projects:	
Roadmap for Living Labs in Education, Stone Living Lab, Dutch Living Lab / ENABLS, NBS EduWORLD, NatuurCollege, Greater Copenhagen Living Lab	

Table 4. Methods and Innovation: Inclusive Tools and Technologies

Inclusive Tools and Technologies	
Situated Methods	**Key Takeaways for INNATURE**
Well-established technical NBS monitoring systems with a digital interface that track environmental parameters with strong connections to city-wide green strategy and annual climate summits can still lack social co-production if not embedded methodologically. This highlights a critical methodological gap. (IGNITION Living Lab)	- Ethics of participation must be addressed from the outset in technically oriented labs to support civic engagement. - Strategies should be developed to involve non-expert users in technology-focused Living Labs in co-creative rather than instrumental ways. - Fully integrated approaches to technology and participation could operate as nationwide experimentation networks, building the multi-actor networks for validating and scaling up new practices. - Real-world experimentation with sustainable building technologies can bridge academic innovation and urban development when residents are actively integrated into the testing process. - Integrating monitoring of users from the earliest stages supports technical refinement informed by lived experiences. - Open data sharing supports collaborative learning among researchers and residents, enabling evidence-informed environmental stewardship. - Digital tools can extend the reach of ecological citizen science by connecting local NBS interventions to broader ecological monitoring and evidence bases.
AI and digital innovation for health and wellbeing show limited documentation of meaningful user involvemen; i.e., how patients or 'regular' participants contributed to the process (Thess-AHALL Living Lab).	
Co-designing field trials and technology tests, which include sensors, digital platforms, and seed innovations, in direct collaboration and consultation with nation-wide farmers on working farms, set an exemplary case for INNATURE Citizen Science ambitions. By integrating farmers' land and lived experience with scientific inquiry, locally relevant agroecological innovations are produced (ÖMKi On-farm Living Lab).	
Students and residents living in prototype homes are involved in testing comfort, energy use, and behaviour, supporting embodied, co-produced knowledge generation that technical prototyping cannot produce alone (Concept House Heijplaat).	
Open data infrastructure is composed of a publicly accessible real-time dashboard and sensor network. It provides a model for how digital tools can serve community understanding as well as research purposes (Stone Living Lab).	
Nature Counts online recording system feeds directly into the National Biodiversity Network Atlas, enabling distributed public participation in biodiversity monitoring at regional and national scale (Sheffield Living Don Project) (See Figure 7).	
In Urban Rooms activation of the civil infrastructure with hands-on participation technologies is central. Translating these tools to digital technologies, such as web platforms, expands participation and supports the circulation of knowledge (Live Works Sheffield, Cambridge Urban Room, Croydon Urban Room) (See Figure 9).	
Key exemplary sources / projects:	
IGNITION Living Lab, Thess-AHALL Living Lab, ÖMKi On-farm Living Lab, Concept House Heijplaat, Stone Living Lab, Sheffield Living Don Project, Live Works Sheffield Urban Room, Cambridge Urban Room, Croydon Urban Room	

Table 5. Methods and Innovation: On-site Experimentation and Ecological Methods

On-Site Experimentation and Ecological Methods	
Situated Methods	**Key Takeaways for INNATURE**
Implementing NBS in a deprived neighbourhood (including community urban gardening, aquaponics, green roofs, vertical gardens, and pollinator biodiversity corridors) through a methodology that embedded citizen co-ownership at every stage reduced vandalism, increased maintenance capacity, and transformed installations from municipal interventions into community assets (Living Lab Turin, ProGIreg).	- The social process of NBS co-creation must be designed alongside the ecological intervention to embed citizen co-ownership at every stage. - Where multiple NBS typologies and stakeholder groups need to be coordinated simultaneously, structured approaches to community engagement are needed. - On-site ecological experimentation can be deepened through the integration of artistic and cultural practices. - Inclusive, interpretive engagement, and arts-led methods can deepen community connections to NBS. - Scaling local material sourcing and integrating community skills and knowledge are both important design considerations for INNATURE's physical NBS installations.
A citizen involvement planner matrix that mapped participation across different NBS, such as community gardens, aquaponics, pollinators, landfill greening, and green corridors helped plan diverse NBS as green infrastructure and urban farming practices (Living Lab Huckarde, ProGIreg).	
School of Planetary Gardeners brought together landscape architecture students, artists, and architects to learn in-situ about NBS, while the participatory construction of its hub exemplifies how design and building can themselves be forms of civic engagement (TERRRA, Forest School CSM) (See Figure 7 and Figure 11).	
Engaging with eco-prototypes, a Miyawaki forest, and vernacular food production structures illustrates how traditional rural ecological knowledge can be brought into contemporary experimental practice (TERRRA).	
By combining research, curatorial narratives, guided walks, workshops, and performance, participant engagement could move beyond viewing green infrastructure as technical provision towards understanding it as a site of social, political, and ecological history (Tamed Nature).	
A deliberately mixed-use approach combining greening and environmental projects with sports, bicycle repair, and other community activities in a repurposed former garage created an active, accessible civic space where ecological engagement emerged alongside other everyday uses rather than being isolated as a specialist activity (Garage Grande).	
Architectural practice functions as ecological experimentation offering material innovation through regenerative construction by combining traditional crafts, ecological practices, and materials science in the low-carbon renovation of an historic school building, and by sourcing bio- and geo-based materials locally (Hedeskov Living Lab).	
Key exemplary sources / projects:	
Living Lab Turin, Living Lab Huckarde, TERRRA, Tamed Nature, Garage Grande, Hedeskov Living Lab, Forest School CSM	

Figure 6. Energy & Water Greater Copenhagen Living Lab, Denmark. Photo: Energy & Water Greater Copenhagen Living Lab

Figure 7 a & b. CSM MArch Students welcoming Inga Indigenous leaders in Epping Forest, Sep 2022. Photo Andreas Lang

5.2 Governance Models and Stakeholder Constellations

The governance of eco-social living labs is shaped by the interplay of institutional structures, funding contexts, and the relational dynamics between diverse actors, including nature, as proposed in the INNATURE Eco-Social Living Labs (see Figure 8).

Our analysis reveals a rich variety of governance configurations, but identifies three main threads: **the role of universities and research institutions as convenors and mediators**; **the position of local authorities as enablers or constraints**; and **the contributions of civil society, formal and informal networks, and community actors as essential grounding forces**. The most effective Living Labs actively cultivate all three while managing the tensions between them. Each of these threads are further unfolded below.

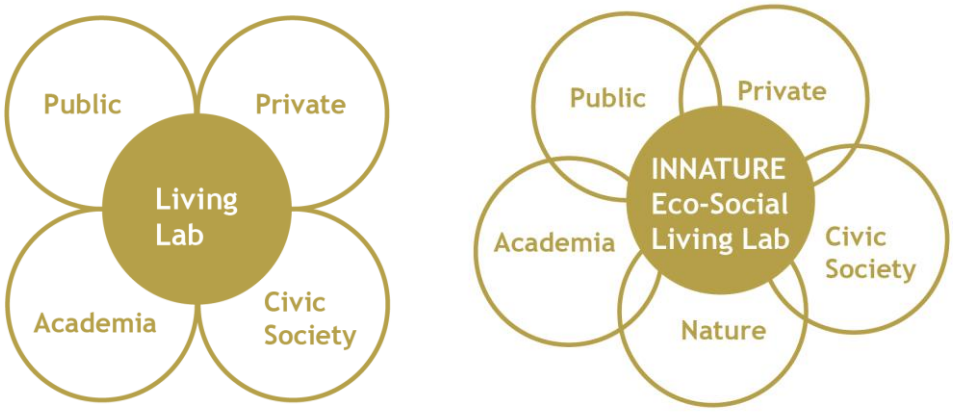

Figure 8. Governance Models and Stakeholder Constellations, INNATURE Project.

5.2.1 Universities and Research Institutions as Convenors

Universities and research institutions play a central and multifaceted governance role across the analysed cases, as particularly observed in Urban Living Labs (ULLs). ULLs governance arrangements bring together universities, local authorities, civil society organisations, cultural institutions, private actors, and citizens. Universities frequently act as convenors and mediators, providing research capacity, pedagogical frameworks, and access to material resources, while also positioning themselves as urban actors embedded in co-production processes (See e.g., Live Works Sheffield Urban Room; UnaLab Eindhoven ULL; PS-U-GO). Local authorities play a key role where ULLs intersect with planning and policy agendas, contributing legitimacy and access to decision-making processes (See e.g., Croydon Urban Room; Hiedanranta Urban Living Lab; Experimental Garden Feijenoord). Many ULLs cases emphasise the importance of maintaining openness and transparency, particularly where ULLs aim to mediate between competing interests or historically marginalised voices (see e.g., Cambridge Urban Room). Civil society groups, artists, youth organisations, faith groups, and informal neighbourhood networks play critical roles in grounding living labs in lived experience and in expanding participation beyond the 'usual' active stakeholders (See e.g., Berlin Pro-Share Lab; Caritas Stadtteilarbeit). Where governance arrangements failed to adapt to newly involved actors or evolving roles, tensions emerged around communication, ownership, and decision-making (e.g., Open Lab Ebbinge).

In the Live Works Urban Room (Sheffield), the hosting university provided not only research capacity and material infrastructure but also a long-term institutional anchor, allowing the lab to accumulate knowledge and relationships over time. Critically, the Live Works case demonstrates that university governance is most effective when the institution positions itself as an embedded urban actor rather than an external evaluator (Live Works Sheffield Urban Room). The Kenniswerkplaats (Rotterdam) operationalises this through a structured science-policy interface, with Erasmus University researchers working alongside municipal practitioners to address complex urban challenges in a format designed to integrate academic inquiry with practice-based decision-making (Kenniswerkplaats Liveable Neighbourhoods). The Stone Living Lab (Boston Harbour) similarly demonstrates how universities can anchor civic science programmes, convening scientists, federal and local government bodies, and community organisations around shared NBS stewardship (Stone Living Lab).

Figure 9. Climate ReAssemblies Project Workshop, Live Works Urban Room in Sheffield, UK. Photo: Climate Reassemblies Project Archive, 2024.

5.2.2 Local Authorities as Enablers and Constraints

Local authorities provide legitimacy, access to decision-making processes, and continuity beyond project funding cycles, but their involvement also comes with complexity. The R-Urban Bagneux case (Paris) illustrates how political context shapes what is possible. R-Urban Hub was established in a neighbourhood where the municipality was politically sympathetic to the R-Urban strategy, highlighting the importance of understanding local political dynamics and building durable relationships with elected and administrative actors across political cycles. The iResilience toolbox (Dortmund) reinforces this by demonstrating that aligning scientific, administrative, and community viewpoints strengthens legitimacy but requires clear role definition, long time horizons, and ongoing reflexive adjustment between institutional and grassroots actors (iResilience).

The Dortmund-Huckarde and Turin Living Labs demonstrate a replicable model for local authority partnership. In both cases, city departments and universities served

as co-coordinators, with civic groups organised thematically around specific NBS interventions. This dual institutional anchor, combining municipal mandate with university research capacity, provided both the legitimacy and the adaptive learning capacity. The Turin case complements this by developing a dedicated stakeholder management structure. Due to the scale of the programme, this was necessary for the resourcing implications of multi-stakeholder governance (see e.g., Living Lab Turin, Living Lab Huckarde ProGIreg).

Figure 10. R-Urban eco-civic hub in Bagneux, France. Photo: Constantin Petcou.

5.2.3 Civil Society, Community Networks and Relational Grounding

Civil society actors, community organisations, artists, and informal neighbourhood networks play a critical role in grounding Living Labs in lived experience and ensuring participation extends beyond 'usual' engaged stakeholders. The Berlin Pro-Share Lab and Caritas Stadtteilarbeit (Vienna) cases illustrate how diverse community actors, ranging from youth organisations to faith groups and intercultural networks, bring relational knowledge and social trust that institutional partners cannot replicate. Their involvement fundamentally shapes what questions the lab asks and what solutions are considered legitimate (see e.g., Berlin Pro-Share Lab; Caritas Stadtteilarbeit).

De Stadsboswachter (Antwerp) demonstrates a particularly effective model for civil society-led mediation between urban residents and nature. By creating a dedicated social role, the 'urban forest ranger' whose task is to meet residents where they are, build trust, and tailor ecological activities to everyday life, the initiative demonstrates how social infrastructure can activate nature engagement. This suggests that investing in people-centred mediation roles within eco-social hubs may be as important as the physical and ecological design of the spaces themselves (De Stadsboswachter).

The Greening Wingrove case (Newcastle), a resident-initiated urban greening project that continued to function after its initial funding period ended, offers a

valuable lesson in governance resilience. It demonstrates how community ownership supports long-term living lab governance. Its stakeholder constellation of local residents, municipality, volunteer agencies, and workers' unions represents a model of distributed accountability (Greening Wingrove).

Zorgvrijstaat (Rotterdam) illustrates the governance potential of community-driven social infrastructure built around mutual aid. Focusing on *samenredzaamheid* (together-standing / self-reliance) and building care networks where residents co-create support and fill gaps left by formal services, the lab demonstrates how shared governance can be grounded in reciprocity and everyday social practice. This demonstrates the value of cultivating similar relational governance cultures for Eco-Social Living Labs (Zorgvrijstaat).

The Mooi Mooier Middelland project (Rotterdam) reinforces this with evidence that resident-led street-greening initiatives can sustain themselves when local ownership is genuinely embedded from the start. The project's focus is on making streets more pleasant and socially attractive through local action and demonstrates that small-scale spatial agency can build the social capital needed for longer-term ecological stewardship (Mooi Mooier Middelland).

Figure 11. TERRRA socio-ecological hub in Brezoi, Romania. Photo: Constantin Petcou.

5.2.4 Governance Tensions as Learning Opportunities

The stated tensions within governance arrangements are also learning opportunities for the INNATURE demo cases. The Open Lab Ebbinge case demonstrates how governance structures that fail to adapt to newly involved actors or evolving roles generated compartmentalisation of stakeholder groups, loss of informal knowledge when key individuals disengage, and unclear communication that damaged the relational foundations of the Living Lab practice. In addition, stakeholders' absence in the decision-making to implement co-created ideas reduced the transformative potential of participation.

LEARNING FROM GOVERNANCE TENSIONS

The INNATURE Eco-Social Living Labs must plan **genuine power-sharing**, and **capacity-building for decision-making** must be part of the Living Lab programme.

A key learning across the analysed cases is INNATURE's need to assess the political landscape and navigate governance arrangements that are locally specific for each demo site, rather than applying a uniform approach across the five demo cases in the partner cities.

5.3 Successes, Barriers and Unintended Consequences

Across the analysed cases, Living Labs generated distinctive forms of values: civic, ecological, social and economic. At the same time, they face structural challenges specific to different types, contexts, and governance models. Table 6 summarises key insights into successes, barriers and unintended consequences (both positive and negative) that we gathered from the Living Labs research.

Table 6. Insights into successes, barriers and unintended consequences in Living Lab research

Successes, Barriers and Unintended Consequences	
Successes	Living Labs make ecological and urban futures **visible, debatable, and collectively negotiable**. • By situating experimentation in everyday spaces, they enable civic learning that is otherwise difficult to achieve through formal consultation alone. • They support co-production of ecological and social knowledge, allowing NBS to be understood in relation to local narratives, capacities, and values. • The R-Urban cases demonstrate integration of ecological infrastructure with community skills-sharing, making the material system legible and meaningful to participants through their engagement in its operation. • TerraViva and R-Urban Bagneux successfully built multi-stakeholder networks and shared territorial visions, generating governance instruments including common agendas, shared frameworks, and collaborative monitoring systems that went beyond their original scope.
Barriers	Recurring barriers include **uneven participation and difficulties sustaining engagement over time**. • Power asymmetries between institutional and grassroots actors present ongoing challenges, as does the long-term resilience of Living Labs after project funding ends. • A critical barrier is ensuring that experimental outcomes influence decision-making rather than remaining symbolic. • Urban Rooms face additional challenges around resourcing, activation, and maintaining relevance beyond academic or project cycles, though some demonstrated adaptive strategies such as inviting community groups to programme spaces outside university term times.
Unintended Consequences	Unintended consequences included **both negative and positive outcomes**: • The Open Lab Ebbinge experienced compartmentalisation of stakeholder groups due to organisational structuring, leading to communication failures, unclear ownership, and loss of informal knowledge when key actors disengaged, demonstrating that governance structures can reproduce the exclusions they are designed to overcome. • The Stapeln Open Maker Space risked becoming an enclosed, like-minded community with limited reach to a wider and more diverse public, **highlighting a challenge for the INNATURE Eco-Social Living Labs aiming to function as genuinely open civic infrastructures.** • Conversely, TerraViva and R-Urban Bagneux generated governance instruments that expanded positively beyond their original scope as an unintended but beneficial outcome.
Key exemplary sources / projects:	
Live Works Sheffield Urban Room, PS-U-GO, UNaLab Tampere, Malmö Innovation Platform, R-Urban Poplar, Cambridge Urban Room, Croydon Urban Room, Hiedanranta ULL, UNaLab Genova ULL, Open Lab Ebbinge, Stapeln Open Maker Space, TerraViva, R-Urban Bagneux	

6. Transferability

Figure 12. Transferability within the INNATURE demo cases in Finland, Belgium, Denmark, Romania and the UK.

A central objective of this overview exercise was to identify key insights and lessons relevant to INNATURE Eco-Social Living Labs, with particular attention to questions of transferability and scalability. This included unpacking the configurations of actors, stakeholders, and governance arrangements that enabled these Living Lab processes to emerge, function, and endure. As complex ecosystems, Living Labs need to create mediation roles and supporting ecologies capable of integrating a diversity of stakeholders and visions (Antaki et al. 2026).

6.1 Redefining Eco-social Living Labs within INNATURE

One key takeaway from this overview exercise was the need to refine our initial definition of Eco-Social Living Labs. In this light, the INNATURE Eco-Social Living Labs are understood first as neighbourhood-centred initiatives, characterised by multi-stakeholder governance and organisational frameworks that range from 'civic' to 'organic', or combine elements of both (Bulkeley et al. 2019; Belfield & Petrescu 2024).

They attend to both the social and environmental dimensions of their contexts, enabling small-scale spatial agency that fosters the social capital necessary for long-term ecological stewardship (e.g., Mooi Mooier Middelland). By being both people- and nature-centred, they support civic learning alongside ecological action (e.g., Live Works Sheffield Urban Room; UbiGo), particularly through the design and implementation of nature-based solutions (e.g., R-Urban). Eco-social Living Labs apply co-creation methods and educational approaches, using inclusive technologies and digital tools and aiming for on-site ecological experimentation.

Moreover, these labs have the potential to scale out — not only across cities and landscapes, but also at the regional and European level — by leveraging the INNATURE framework and adopting 'network' or 'meta' distribution principles (Scholl et al. 2022).

6.2 Potential for Transferability in the INNATURE demo cases

Key lessons derived from the overview exercise were examined during the workshop and further synthesised to inform transferable lessons for each INNATURE demo case (see Table 7).

Table 7. Transferable lessons for INNATURE demo cases

	Transferable Lessons
 **TAMPERE POLLINATOR MEADOWS**	• Small-scale, mobile, and temporary interventions (e.g., Berlin ProShare Lab; Mooi Mooier Middelland). • Involving a diversity of stakeholders—environmental NGOs, climate practitioners, nature stewardship groups, alongside planning and community actors, to deepen eco-social outcomes (e.g., Croydon Urban Room). • Embedding equity and ecological care into civic infrastructure (e.g., Civic Square; Zorgvrijstaat). • Exploring the potential for a city-based Living Lab integrated into municipal green policy (e.g., Dortmund-Huckarde Living Lab).
 **ANTWERP GREEN STREET DELTA**	• Combining objectives within a single intervention to unlock additional resources, e.g., integrating Green Street implementation with rehabilitation programmes for unemployed or mentally ill individuals, as seen in the early phase of Hiedanranta and Lapinlahden Lähde respectively. • Supporting residents in greening public space through shared infrastructure (materials, goods, neighbourly assistance), inspired by Berlin ProShare Lab. • Exploring a social enterprise model (e.g., Green Estate). • Learning from Civic Square's "Trade School" as a learning and capacity-building platform structured around design challenges initiated by expert practitioners to strengthen climate resilience in homes, streets, and neighbourhoods. • Creative communication strategies, such as spray chalk campaigns to raise project awareness (e.g., iResilience).

BREZOI FOREST CLASSROOMS

- This Living Lab could evolve into an "urban room" connected with other Urban Rooms nationally and internationally.
- It can establish an antenna in Brezoi city centre, potentially run by the local high school (e.g., Live Works Sheffield Urban Room).
- Diagrammatic collaborative representations and role-playing tools (e.g., Design:Lab).
- Nature-inclusive learning and transformation via outdoor education integrated in high school programme (e.g., NatuurCollege; eNaBIS Living Lab)
- Hands-on production (e.g., Blue City Lab).

COPENHAGEN RAIN COMMONS

- Seeking institutional backing to secure access to resources and communities (e.g., Caritas Stadtteilarbeit).
- Prioritising resident engagement and adaptive facilitation to embed nature within everyday community practices (e.g., Caritas Stadtteilarbeit).
- Ensuring adaptability and responsiveness to uncertainties in testing and implementation of nature-based technologies (e.g., Living Labs: An Interventionist Ethnographic Approach to Technologies of the Future).
- Living Labs as shared social infrastructures (e.g., Zorgvrijstaat).
- Open-door policy, creative activities for community building, new narratives and broad climate awareness (e.g., Garage Grande).
- Involving artists into Living Lab activities (e.g., NatuurCollege).

SHEFFIELD LANDSCAPE CONNECTOR

- Developing a Living Lab map outlining NBS locations, implementation status, and descriptions (e.g., Dortmund-Huckarde Living Lab).
- Integrating monitoring instruments as a performative component of Living Labs (e.g., Experiments in Reworking Cities).
- Schools as NBS Living Labs can develop open-access action plans to transition towards NBS-focused curricula, management practices, and whole-school environmental strategies (e.g., NBS EduWorld).
- Creating shared spaces centred on inclusive activities bringing together diverse groups, allowing participants to temporarily set aside professional or political divides. Such places can become "melting pots" that contribute to the development of the wider area (e.g., Public Sauna in Hiedanranta).

7. Scalability and Long-term Resilience

Figure 13. NBS solutions and methods ranged from landscape/site to neighbourhood, city, region, country, European level, and globally, as well as cross-cutting trans-scalar approaches.

Scalability and long-term resilience emerged as central concerns across the mapping and workshop discussions. The synthesis workshop invited participants to map limitations, uncertainties, and potentials across multiple spatial scales: i.e., global, regional, European, city, neighbourhood, landscape, and also applying trans-scalar perspectives. What became apparent through these reflections is that scaling Living Lab processes is not simply a matter of expanding their geographic reach or increasing the number of participants. Rather, scaling involves a complex set of translations across governance arrangements, knowledge systems, funding structures, and cultural contexts - including language. The cases analysed and discussed suggest that **the most resilient Living Labs are those that cultivate adaptive capacities at multiple scales simultaneously, maintaining strong local rootedness while developing mechanisms for horizontal exchange and institutional learning**.

These findings speak directly to several of the research gaps identified in this report. The literature review noted that knowledge produced within Living Labs tends to remain hyper-contextualised (Scholl et al. 2022) and that there is a significant gap in understanding the sustainability, continuity and scaling of Living Labs, where short-term funding often clashes with slow working demands. The scalability discussion that follows offers the INNATURE project's initial response to these gaps, drawing on the diversity of governance types — strategic, civic, organic, and their hybrid combinations (Bulkeley et al. 2019; Belfield & Petrescu 2024) — as a lens for understanding how scaling operates differently depending on institutional and stakeholder configurations.

A recurring insight from the workshop was the tension between contextual specificity and generalisability. Living Labs derive their legitimacy and effectiveness from deep engagement with particular places, communities, and conditions. Yet the ambition of projects such as INNATURE, operating across five European demo-cases, necessarily raises questions of what can travel between contexts and what must remain situated, as well as how to re-situate concepts and ideas that travel. The following subsections trace these dynamics across spatial scales.

7.1 Global

At the global scale, the mapping task and workshop revealed the ambition and the limitations of extending Living Lab methodologies beyond their originating contexts. Several cases demonstrated the potential for digital platforms to facilitate worldwide knowledge exchange and participation. The ENABLS Living Lab, for instance, uses open university courses distributed globally through an online platform, making very wide participation possible. Yet, the openness of a platform or any material does not yet necessarily lead to wide participation and interest. This points to a fundamental uncertainty in global scaling: the assumption that open-access resources translate into meaningful engagement across diverse cultural and institutional settings. This echoes a broader pattern identified in the state of the art: while the EU has strongly supported the Living Labs methodology as a way to 'integrate research and innovation processes in real life communities and settings', the mechanisms through which such integration actually travels across contexts remain undertheorised.

The Stone Living Lab offers a different model of global relevance, combining applied coastal resilience research with community engagement, education, and policy innovation. Its publicly accessible real-time monitoring, sharing continuous data on environmental conditions via dashboards and sensor networks, supports collaborative learning that could serve as a model for evidence-informed stewardship in INNATURE's own Eco-Social Living Lab contexts. However, the global relevance of such models depends on the degree to which their pedagogical and participatory methods can be abstracted from their specific socio-ecological conditions without losing their grounding in lived experience.

A key limitation identified at this scale is the difficulty of translating conceptual vocabularies across linguistic and cultural boundaries - the introduction of new conceptual vocabulary produces new social interactions, but key concepts may translate poorly across languages and institutional traditions.

GLOBAL SCALE AMBITIONS

For INNATURE, operating across Finnish, Romanian, Belgian (Flemish), Danish, and British contexts that also include diverse communities, epistemic translation at the global scale serves as a reminder that scaling is not merely a technical or logistical operation but an inherently cultural and political one.

7.2 Regional

We understand the regional scale as an intermediary scale without a clearly defined geographic boundary, where organic and/or strategic networks can connect Living Lab approaches beyond the neighbourhood and the city scales. Several analysed cases suggest that regional networks of Living Labs can function as distributed infrastructures for resilience, allowing situated knowledge to circulate while remaining anchored in local conditions.

For example, the R-Urban model, with its European network of context-specific hubs, demonstrates horizontal scalability through a distributed, community-level approach. This supports the idea that urban resilience might be achieved through a proliferation of locally adapted nodes connected through shared principles and practices.

This distributed model resonates with the meta-lab concept identified in the state of the art (Scholl et al. 2022), which proposes networked labs working across different locations as an extension to ULL approaches, and responds to the research gap around translocal learning and the scaling out and up of hyper-contextualised knowledge.

REGIONAL SCALE AMBITIONS

For INNATURE, the regional scale presents a particular challenge given the diversity of its demonstration case contexts. This suggests that regional scaling strategies for INNATURE should attend carefully to the intermediary structures that bridge local Living Lab activities with regional governance and knowledge systems.

7.3 Europe

The European scale carries particular significance for INNATURE as a Horizon Europe project. Our mapping confirmed that the Living Lab methodology has been strongly supported by EU policy as a way to integrate research and innovation processes in real-life communities and settings, institutionalised notably through the European Network of Living Labs since 2006. INNATURE inherits and extends this tradition. As noted in Section 4.1, the EU ambition (through programmes such as the Climate Neutral and Smart Cities Mission) places high expectations on pilot cities to demonstrate results in cooperation with academia, local communities, and the private sector through helix collaborations for innovation (Nguyen & Marques 2022). The workshop discussion raised important questions about what these European-scale ambitions mean in practice for situated, context-sensitive experimentation — particularly given the identified research gap around the integration of innovative practices into mainstream practices and the limited understanding of how Living Labs can transform capacity through learning, development of agency, or behavioural change (Section 4.2).

The analysed examples and the workshop's discussion suggested that European-scale scaling for INNATURE **should focus on developing robust mechanisms for the translation and adaptation of methods, tools, and governance insights across its consortium.**

A persistent limitation at the European scale, as identified both in the literature and in the workshop, is that the integration of innovative practices into mainstream practices remains limited. Living Labs frequently generate rich local insights and experimental outcomes that nevertheless fail to influence formal planning structures or policy frameworks beyond the project lifetime.

EUROPEAN SCALE AMBITIONS

For the INNATURE project, developing pathways for embedding co-created results into formal planning structures at multiple levels, from municipal land-use plans to policy dialogues (both at EU policy level but also covering the wider European geography) on Nature-Based Solutions and social inclusion are important.

7.4 City

The city scale emerged in both the mapping and workshop as a critical threshold for scaling Living Lab processes. Several cases demonstrate that Living Labs embedded within broader city-level policies achieve greater resilience and longevity than those operating independently.

Bulkeley's typology of Urban Living Labs (ULL) as strategic, civic, or organic offers a useful lens for understanding how city-scale governance shapes scalability. Strategic labs, initiated by city authorities, benefit from institutional resources and policy alignment but may lack grassroots legitimacy (Bulkeley et al. 2019). Civic Labs, driven by community organisations, often achieve deeper participation but face challenges in influencing municipal decision-making (Belfield & Petrescu 2024). The workshop discussion suggested that **the most resilient city-scale Labs are those that negotiate between these dispositions, creating hybrid governance arrangements where citizen engagement is understood as contributing directly to the quality of Living Lab outcomes.**

This finding reinforces the significance of Bulkeley's previously introduced tripartite typology of strategic, civic, and organic ULL (Bulkeley et al. 2019), while also suggesting its limitations: the most effective city-scale Labs are not pure types but hybrids — civic-organic (Belfield & Petrescu 2024), strategic-civic, or configurations that shift over time as the Living Lab's stakeholder constellation evolves.

CITY SCALE AMBITIONS

For INNATURE's five demo cases (in the context of five cities and towns), this points to the need for early engagement with city-level policy actors and the development of shared frameworks that can bridge experimental practice and institutional decision-making.

7.5 Neighbourhood

The neighbourhood scale represents the primary operational scale for most of the Living Labs analysed. **It is at this scale that the participatory processes achieve their greatest depth and immediacy, where relationships between participants, places, and practices are most tangible, and where the lived experience of ecological and social conditions can be most directly tested and 'lived through'.**

Yet the neighbourhood is also the scale at which tensions around scaling become most visible, precisely because the qualities that make neighbourhood-level Living Labs effective, their intimacy, responsiveness, and situatedness, are qualities that resist easy replication.

The workshop participants noted that scaling beyond the neighbourhood remains a significant challenge, as community dynamics, social networks, and spatial conditions differ fundamentally from one locality to another. Existing networks of participants vary widely: some neighbourhoods possess a very communal and caring atmosphere, while others have next to no communality.

The state of the art identified Living Labs as mechanisms for strengthening citizens' capacity to participate in processes of change and for enhancing civic resilience (Rizzo et al. 2021; Petrescu et al. 2022). At the neighbourhood scale, our analysis suggests that this capacity-building function is both most achievable and most fragile: achievable because the intimacy of neighbourhood-level engagement supports the relational trust that underpins civic learning, and fragile because the same scale is most exposed to the disruptions of property markets, political cycles, and funding discontinuities.

We will also need to acknowledge the vulnerability of neighbourhood-scale Living Labs to external economic forces and the structural difficulty of incorporating experimental land use within late-capitalist property regimes, i.e., reduced non-private ownership, increasing ownership by multinational actors with no interest in local livelihoods; looming danger of land and property tokenisation.

NEIGHBOURHOOD SCALE AMBITIONS

INNATURE Eco-Social Living Labs are merely neighbourhood-scaled and should be designed with explicit attention to their relationship with wider governance structures and land-use frameworks, ensuring that their experimental character is protected.

7.6 Landscape

The landscape scale introduces dimensions that are largely absent from urban-focused Living Lab discourse **but are central to INNATURE's eco-social ambitions.** Where neighbourhood and city-scale Labs tend to operate within clearly defined administrative and spatial boundaries, landscape-scale processes must engage with ecological systems and dynamics, land-rooted processes that cross jurisdictional lines. Several cases in the mapping addressed this challenge, though often implicitly rather than as a deliberate scalar strategy.

Landscape-scale Labs remind us that communities which still have connections with forests and rural landscapes have often been marginalised, and that Living Lab processes at this scale must contend with this historical dimension.

LANDSCAPE SCALE AMBITIONS

For INNATURE Eco-Social Living Labs, landscape-scale scalability requires governance models that can accommodate ecological temporalities and spatial complexities that exceed the boundaries of any single neighbourhood or municipal authority as they cannot be limited by abstract boundaries such as ownership schemes.

7.7 Trans-scalar

Perhaps the most significant insight to emerge from the workshop's scaling discussion was the recognition that **the most resilient and impactful Living Labs do not operate at a single scale but work across scales simultaneously, developing what might be called trans-scalar capacities.** This is not simply a matter of multi-level governance, though that is part of it. Rather, trans-scalar practice involves the ability to move between registers of knowledge, engagement, and action, connecting the site-situated and embodied knowledge of neighbourhood-level participation with the institutional and policy dimensions of city, regional, and European governance.

The meta-lab concept offers one framework for achieving this, as it works across different scales as an extension to Urban Living Lab approaches, enabling the circulation of lessons through expert de- and re-contextualisation rather than direct transfer. A key challenge for the trans-scalar ambition of the INNATURE project is the relationship between different scales, from very local scale to meta-labs which are networked labs working across different locations (Scholl et al. 2022) and how knowledge moves between them.

The workshop also highlighted that trans-scalar resilience depends on the cultivation of intermediary roles and practices. Universities, as several cases demonstrated, are well positioned to function as trans-scalar actors, connecting neighbourhood-level engagement with research networks, policy dialogues, and international exchange.

TRANS-SCALAR AMBITIONS

INNATURE's five demo-cases operate at different scales and within different institutional, ecological, and socio-cultural contexts. We should aim to develop approaches that prepare for scalability, emphasising the participation of end users in all phases as a condition for co-creation that can travel across contexts. **The ambition is to scale across: cultivating resilient practices that can inhabit multiple scales while remaining responsive to the particular conditions of each place.**

8. Lessons for INNATURE Eco-Social Living Labs

8.1 NBS & NEB integration

Eco-Social Living Lab practice highlights the importance of embedding nature-based solutions (NBS) within broader social, cultural, and governance processes, rather than treating them as isolated technical interventions. The cases demonstrate that NBS become more robust and meaningful when they are co-produced through situated experimentation, civic learning, and creative engagement, allowing ecological functions to be understood alongside everyday social practices and local narratives. This aligns closely with the New European Bauhaus (NEB) "by design" approach, where sustainability, inclusivity, and aesthetic quality are developed simultaneously through processes. Material and spatial infrastructures such as exhibitions, mapping tools, archives, and artistic practices can act as mediators between ecological knowledge, lived experience, and institutional decision-making, supporting NBS as shared civic projects. These eco-social configurations enable NBS to function as sites of care, learning, and imagination, capable of adapting to uncertainty while fostering long-term stewardship and collective responsibility. Four key insights help supporting such practice: **agency, continuity, resourcing, and accommodating uncertainty** – each of these insights are further unfolded below.

8.1.1 Agency: negotiating power, pedagogy, and civic capacity

Agency within Living Labs is a major focus and approached as something that must be actively cultivated and negotiated. Many cases revealed tensions between local governing bodies and grassroots initiatives, particularly where institutional priorities risk overshadowing local knowledge or slowing transformative action. Cases such as Hiedanranta ULL, Malmö Innovation Platform, and Open Lab Ebbinge illustrate how governance arrangements that fail to redistribute decision-making authority reproduce power asymmetries. By using participatory and pedagogical methods to build civic capacity and critical engagement, Living Labs make such tensions visible and therefore negotiable. Several Living Labs explicitly operationalise civic pedagogies, training participants to understand planning processes, power structures, and their own capacity to act within them. The Stone Living Lab's Climate Cart programme and Summer Teacher Institute exemplify this, embedding climate literacy in hands-on, place-based learning that enables participants to become environmental stewards rather than passive beneficiaries (Stone Living Lab). The NBS EduWORLD Whole School Approach also demonstrates how this logic can be institutionalised, transforming schools into Living Labs where ecological and civic agency are co-developed through everyday curricula and culture (NBS EduWORLD).

Actively Cultivating Agency

INNATURE Eco-Social Living Labs will actively support agency through iterative engagement, skill-building, and transparent communication of impact, aiming for becoming sites where civic imagination and institutional learning could co-evolve.

8.1.2 Continuity: sustaining action, knowledge, and relationships

Across the analysed Living Labs, continuity emerged as a critical challenge, particularly in relation to maintaining momentum once initial project phases or funding cycles conclude. The risk of actions ceasing and loss of know-how is especially pronounced when key individuals or institutions leave the project action, taking with them tacit knowledge, networks, and energy. **Several cases demonstrate that continuity depends on the cultivation of enduring relationships, shared ownership, and repeated engagement practices.**

Having physical and/or relational presence, such as the Urban Rooms (e.g., Live Works; Cambridge Room; Croydon Urban Room) or the eco-civic hubs (e.g., R-Urban Bagneux, R-Urban Poplar, Terrra, Open Lab Ebbinge), are one way to respond to this challenge by functioning as civic infrastructures rather than time-bound interventions. Continuity, here, is framed as the capacity to sustain learning and care across changing conditions, participants and practices.

Continuity beyond project cycles

The use of permanent or regularly reactivated spaces allows knowledge to accumulate and remain accessible, acting as a form of collective memory that mitigates loss between project cycles. In the INNATURE Eco-Social Living Labs continuity will be supported through reflective practices that record and maintain the continuity of know-how, while allowing deliberate recognition of emerging actors and ideas over time.

8.1.3 Resourcing: beyond project funding

Resourcing emerged as a cross-cutting issue, particularly in relation to the short-term, project-based funding models. Many Living Labs face a structural tension where the ending of funding often disrupts the continuity of actions which is fundamental to build trust, partnerships, and locally embedded practices. In response, several cases demonstrate the value of hybrid and creative resourcing models that draw on universities, civic institutions, and locally available material and social resources. University involvement plays a significant role in extending the life of Living Labs beyond discrete projects, through teaching, applied research, student engagement, and access to institutional infrastructures. This enables forms of resourcing that are less onerous and carbon-intensive and more adaptive, grounded in local knowledge and existing capacities.

Moving beyond project resourcing

INNATURE Living Labs will consider alternative governance arrangements that allow them to persist beyond formal project frameworks, for example through shared stewardship, community programming, or the establishment of new legal or organisational entities.

8.1.4 Accommodating uncertainty: flexibility, contingency, and loose-fit planning

Living Labs are inherently exposed to uncertainty, arising from political change, shifting stakeholder constellations, environmental conditions, and the unpredictability of collective learning processes. Rather than treating uncertainty as a failure condition, our reflections on analysed cases highlighted that effective Living Labs embrace 'loose-fit' planning, adaptive methods, and need/context-responsive experimentation (and delivery) as core strengths. The KLIMAP project's *routekaart* framework proposed a structure sufficient enough to guide iterative co-creation but open enough to accommodate changing conditions, which provides one model for loose-fit planning in practice (KLIMAP). The TerraViva Living Lab demonstrated how context-sensitive experimentation across multiple villages, each with different social and ecological conditions, can generate locally grounded solutions (TerraViva Living Lab). The strategy of Urban Rooms cases 'planned underplanning', which deliberately creates space for community groups to appropriate and programme the lab independently, transformed what could have been a vulnerability (dependence on academic calendars) into a governance asset (distributed civic activation) (Live Works/Urban Room Sheffield). Similarly, the R-Urban and Civic Square cases demonstrated that Living Labs which accommodate uncertainty and resist fixing outcomes too early, allowing for failure, pause, and iterative revision, build stronger adaptive capacity over time. (e.g., R-Urban Bagneux; R-Urban Poplar; Civic Square)

Accommodating uncertainty

Accommodating uncertainty and ambiguity is a key concern for the INNATURE Eco-Social Living Labs. Enabling flexibility in on-site experimentation, iterative workshops, and the willingness to revise agendas and methods in response to emerging conditions will allow for failure, pause, and translation, creating conditions for learning that are robust precisely because they are contingent.

8.2 Co-creative methods, multi-stakeholder governance and legitimacy of local knowledge

The Living Labs analysed provided examples of co-creation methods, such as co-design (e.g., R-Urban Poplar; ManorHouse PACT; ÖMKI), co-mapping (e.g., Berlin ProSHARe Lab), ethnography (e.g., Kenniswerkplaats), storytelling (e.g., Blue City Lab), community of practices forming (e.g., Dutch LL) toolkits (e.g., Urban Room Sheffield; I-Resilience), prototyping (e.g., Dortmund-Huckarde Living Lab; R-Urban Poplar; Ignition; Concept House Heijplaat) and integrated pedagogy (e.g., NatuurCollege; eNaBIS Living Lab), that are, in principle, transferable to all INNATURE demo cases. They also demonstrated broader governance principles, including maintaining an open-source ethos (e.g., Civic Square); facilitating resident empowerment (e.g., Caritas Stadtteilarbeit); building connections between the Living Lab and citywide policy (e.g., Dortmund-Huckarde Living Lab); and applying inclusion-oriented, incremental, and innovative models to strengthen local connections and eco-civic resilience (e.g., R-Urban Poplar).

These examples further acknowledge that Living Labs can function as 'legitimising spaces' for managing and deploying bottom-up spatial knowledge within the city. This involves enabling the sustained presence of engaged professionals embedded in the community (e.g. through community centres or eco-civic hubs), fostering long-term processes that build community ownership, and creating critical spaces capable of influencing wider urban transformation processes (Petrescu et al. 2022).

Finally, directly involving local policymakers, councils, and landowners in Living Lab activities is essential to ensure the long-term sustainability envisioned by INNATURE (Petrescu et al. 2022; Belfield & Petrescu 2024; see also e.g., R-Urban).

8.3 Scaling, Resilience and Adaptive Futures

The scalability analysis revealed that the most resilient Living Labs develop trans-scalar capacities — the ability to move between different registers of knowledge, engagement, and action, connecting neighbourhood-level participation with city, regional, and European governance. **The challenge for INNATURE is not to find a single scalable model but to cultivate adaptive, process-oriented frameworks that can inhabit multiple scales while remaining responsive to the particular conditions of each place.** This requires attention to intermediary structures: for example, universities as trans-scalar actors connecting local engagement with research networks and policy dialogues; meta-lab approaches that enable the circulation of lessons through contextual re-interpretation rather than direct replication; and toolkits and platforms — such as the Urban Rooms Toolkit — that support contextual adaptation rather than standardised procedures.

The workshop also identified a fundamental challenge at the European scale: the integration of innovative practices into mainstream planning and policy remains limited. **For the INNATURE project, this underlines the importance of developing explicit pathways for embedding co-created results into formal planning structures at multiple levels, from municipal land-use plans to European policy dialogues on nature-based solutions.**

8.4 Potential challenges for the INNATURE Eco-Social Living Labs

The insights explored above in relation to NBS & NEB integration, transferability and scaling do not resolve neatly into best practice. They remain live tensions, and the cases analysed revealed a number of structural challenges, as summarised below, that the INNATURE Living Labs will need to actively navigate rather than solve in advance:

- **Transformative potential:** The transformative potential of participation is hindered when stakeholders lack real decision-making power and implementation capacity (Menny, Voytenko Palgan, & McCormick 2018).

- **Translation:** INNATURE Living Labs are embedded in specific local ecosystems, where the translation of concepts into accessible and locally meaningful language for citizens can be challenging (Karvonen & van Heur 2014).

- **Time:** Co-creation requires time. Rushed processes may result in participants' voices being overruled by experts, leaving opinions and ideas unexpressed. Living Lab teams must therefore ensure that all voices are genuinely heard (e.g., UNALAB Tampere).

- **Co-creation factors:** Multiple factors can influence the co-creation of NBS in Living Labs, including the scale of the area being mapped, the age of stakeholders, the perceived self-evidence of NBS, land ownership structures, municipal openness, local cultures of participation, and the visual qualities of NBS (Soini at al. 2023). Failing to address these factors may create obstacles to establishing and sustaining a Living Lab.

- **Ownership:** Temporary land ownership and short-term land-use arrangements can pose significant barriers to longevity if their implications are not carefully considered (e.g., R-Urban Poplar).

9. Conclusion

This report aimed to learn from existing Living Lab research and practices to inform the development of INNATURE Eco-Social Living Labs. Having mapped 71 cases and academic sources, synthesised findings across a transnational research consortium, and reflected collectively on their implications, we present insights that frame and enable eco-social practice in Living Lab contexts.

Our first key finding is that nature-based solutions work best when they are socially co-produced. Living Labs that treated ecological and social dimensions as mutually constitutive, consistently demonstrated greater resilience, deeper community ownership, and more meaningful governance impact.

This finding reframes what it means to develop an Eco-Social Living Lab. It is not enough to design a good ecological prototype and invite community engagement around it. **The social methodology, the way agency is cultivated, continuity is sustained, resourcing is structured, and uncertainty is accommodated is itself the ecological methodology.**

Four cross-cutting insights emerge from this:

- the need to **actively cultivate agency** through civic pedagogy and genuine power-sharing.
- the importance of **continuity beyond project cycles,** through physical and relational civic infrastructures.
- the necessity of **moving beyond short-term project resourcing** toward hybrid, institutionally embedded models.
- and the value of **accommodating uncertainty** through loose-fit, adaptive, and iterative planning.

In addition, we add the analytical frames of transferability, which requires attending to context, governance, and the legitimacy of local knowledge, and trans-scalar resilience, which requires building capacity that can move between neighbourhood, city, regional, and European registers without losing its local grounding.

We also learned about the live structural tensions or conditions that INNATURE Eco-Social Living Labs have to work with, such as the gap between participatory aspirations and decision-making power; translating concepts across linguistic and cultural ecosystems; the time and care that must be crafted as a resource in co-creation; the constellation of contextual factors that shape whether co-creation could become a precedent; and the vulnerabilities created by temporary land arrangements and precarious ownership.

9.1 Towards an INNATURE Eco-Social Living Lab Framework

This deliverable functions as the analytical and reflective foundation for the next stages of work within the development of the INNATURE Eco-Social Living Labs (WP 2 / Task 2.2 & 2.3) which focus on gathering community needs and expectations and developing a shared framework for Living Lab approaches across the five demonstration cases (D2.2). It points toward the need for **adaptive, process-oriented frameworks** that can hold methodological rigour and contextual responsiveness together, across five very different demo cases. **The framework to be developed next should provide the structural guidance, and be open enough to accommodate the particularity of each context, so that they will be planned as loose-fit, with capacity to revise, adapt and accommodate contingencies.**

At the time of writing this report, the INNATURE Eco-Social Living Labs are still under development and not yet fully established. As they continue to evolve, they hold the potential to offer a compelling model for rethinking how nature-based solutions (NBS), in alignment with the New European Bauhaus (NEB) “by design” approach, are conceived, implemented, and sustained. In doing so, they can position NBS not merely as environmental interventions, but as catalysts for civic transformation, collective learning, and the development of more just and resilient socio-ecological futures.

This D2.1 report is an attempt to ensure that this process is as informed, as reflective, and as collectively owned as possible within the INNATURE research ecosystem.

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Horizon 2020 Research and Innovation Programme (Climate Neutral and Smart Cities Mission) https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/climate-neutral-and-smart-cities_en
European Network of Living Labs (ENoLL) https://enoll.org/

11. Appendix

11.1 Living Lab Mapping Resource Database List

11.1.1 Living Lab Case Studies

Resource Title	link to main source	Resource type
Croydon Urban Room	https://www.croydonurbanroom.com ; https://www.croydon.gov.uk/sites/default/files/2022-01/urban-room-overview.pdf ; http://urbanroomstoolkit.org/wp-content/uploads/2022/10/URT_Stories_06-Croydon-UR_FINAL.pdf	case study & project report
Cambridge Room	https://www.cambridgeroom.org	case study website
Berlin ProShare Lab	https://stadtteilen.org/proshare/ https://jpi-urbaneurope.eu/wp-content/uploads/2023/08/d.3.2.-ProSHARE_Final-Report_Lab-Berlin_HTW-Berlin_WP3.pdf	case study & project report
R-Urban Poplar	https://r-urban-poplar.net	case study website
Urban Sustainability Living Lab	https://urbanlab.univie.ac.at/en/urban-studies-working-group-vienna/	case study & project report
Civic Square, Birmingham	https://civicsquare.cc/	case study website
Stapeln Open Maker Space	https://www.stpln.se/	case study website
Manor House PACT: Prepare adapt Connect Thrive	https://www.tnlcommunityfund.org.uk/media/insights/documents/Manor-House-PACT-Year-2-Impact-Report.pdf?mtime=20191107152544&focal=none	case study & project report
Greening Wingrow	https://greeningwingrove.org.uk/	case study website
Garage Grande, Vienna	https://garagegrande.at/	case study website
R-Urban Bagneux	http://r-urban.net/en/	case study website
Terrra	https://terrra.org/	case study website
Caritas District Work (Caritas Stadtteilarbeit)	https://www.caritas-stadtteilarbeit.at	case study website
New Light on Alby Hill, SuburbanLab	https://www.ivl.se/english/ivl/press/news/2016-09-19-safer-neighbourhoods-with-resident-driven-refurbishments.html and https://jpi-urbaneurope.eu/wp-content/uploads/2017/06/Project-posters-2017-SubUrbanLab.pdf	case study & project report
Smart District Gnigl	https://www.energy-innovation-austria.at/article/smart-city-salzburg-2/?lang=en	case study & project report

Experimental Garden Feijenoord Urban lab	https://urbact.eu/sites/default/files/2025-07/resilient_europe_rotterdam_action_plan_final.pdf and https://www.uu.nl/sites/default/files/wp6-rotterdam-report-final_low.pdf	case study & project report
Muswell Hill Low Carbon Zone	https://mhsgroup.org/about/projects/muswell-hill-low-carbon-zone/	case study website
VIsion Step I Energy Innovation	https://www.energy-innovation-austria.at/article/villach-vision-step-i/?lang=en	case study website
ÖMKi On-farm Living Lab	https://enoll.org/member/omki-on-farm-living-lab/ and https://biokutatas.hu/en/	case study website
LiCalab – Living and Care lab	https://enoll.org/member/licalab-living-and-care-lab/ and https://enoll.org/story/co-creating-the-future-of-care-the-licalab-story/ , projects: https://vitalise-project.eu/older-adults-homes/, https://enoll.org/project/vitalise/	case study & project report
IGNITION LIVING LAB @Salford	https://hub.salford.ac.uk/ignition-living-lab/living-lab/ and https://gmgreencity.com/learning-from-the-living-lab-five-key-benefits/	case study website
Malmo innovation platform	https://www.vinnova.se/en/p/innovation-platform-city/ and https://portal.research.lu.se/en/projects/malm%C3%B6-innovation-platform/publications/	case study & project report
Norrby Innovation Platform	https://www.vinnova.se/en/p/innovation-platform-at-norrby/	case study website
Future by Lund	https://www.futurebylund.se/en	case study website
Urban Living Lab & UbiGo	https://portal.research.lu.se/en/publications/urban-living-labs-governing-urban-sustainability-transitions/ https://www.youtube.com/watch?v=tRSDnBNeI0M	case study video & paper
Blue City Lab	https://bluecity.nl/en/blue-city-lab	case study website
TerraViva Living Lab	https://circularbioeconomyalliance.org/category/living-labs/	case study website
Kenniswerkplaats Liveable neighbourhoods	https://kenniswerkplaats-leefbarewijken.nl/over-de-kwp/	case study website
Zorgvrijstaat	https://www.zorgvrijstaat.nl/over-ons/	case study website
Mooi, Mooier Middelland	https://mooimooiermiddelland.nl/	case study website
Stapeln Open Maker space	https://www.stpln.se/	case study website
PCSS Future Lab	https://futurelabs.psnc.pl/ and story:https://enoll.org/story/co-creating-impactful-change-the-pcss-future-lab-story/	case study website
Thessaloniki Action for Health & Wellbeing Living Lab - Thessahall	https://www.facebook.com/thessahall/ and https://enoll.org/member/thessaloniki-action-for-health-wellbeing-living-lab/ and Story: https://enoll.org/story/bridging-innovation-and-wellbeing-the-thess-ahall-living-lab-story/	case study website & online project story

iResilience - toolbox for living labs for climate resilient neighbourhood development	https://www.dortmund.de/dortmund/projekte/rathaus/verwaltung/amt-fuer-angelegenheiten-des-oberbuergermeisters-und-des-rates/downloads/buero-fuer-internationale-beziehungen/living-labs-for-climate-resilient-neighbourhood-development-a-toolbox-english.pdf	case study website
Concept House Heijplaat	https://www.tudelft.nl/io/onderzoek/research-labs/hcd-studiolab/suslabnwe/concept-house-heijplaat-rotterdam	case study website
'MK: Smart'	https://www.mksmart.org/	case study website
CODALoop	https://jpi-urbaneurope.eu/wp-content/uploads/2017/06/Project-posters-2017-CODALoop.pdf	case study website
Community Energy Living Lab	https://es.catapult.org.uk/tools-and-labs/living-lab/	case study website
Dutch Living Lab (Lively learning)	https://enabls.eu/dutch-living-lab-en/	case study website
eNaBIS Living Lab (Nature Inclusive Education at WUR)	https://www.wur.nl/en/project/enabls-living-lab.htm	case study website
natuurCollege	https://www.natuurcollege.nl/	case study website
NBS EduWORLD (schools as NBS Living Labs)	https://nbseduworld.eu/fileadmin/user_upload/Resources/Academy/NBSEdW_Schools_as_Living_Labs_Action_Plan_template.pdf	case study & project report
Roadmap for Living Labs in Education	https://www.schoolsaslivinglabs.eu/wp-content/uploads/2023/09/SALL_Roadmap_Living_Labs_Education_FINAL.pdf	case study & project report
KLIMAP	https://klimap.nl/	case study website
Dortmund-Huckarde Living Lab	https://progireg.eu/fileadmin/user_upload/Dortmund/221230_ProGIreg-Implemented_Living_Lab_Dortmund.pdf	case study & project report
Living Lab Turin	https://progireg.eu/fileadmin/user_upload/Turin/ProGIreg-Living_Lab-Turin.pdf	case study & project report
The Urban Leisure and Tourism Living Lab (ULTL)	https://www.tourismlabamsterdam.nl/en/ Story: Urban Leisure and Tourism Living Lab: Redefining Tourism Through Place-Based Innovation - ENoLL	case study website & online project story
Stone Living Lab	https://stonelivinglab.org/	case study website
UNaLab - Eindhoven Urban Living Lab (ULL) demonstration areas	https://unalab.eu/en	case study website
UNaLab - Genova Urban Living Lab (ULL) demonstration areas	unalab-nbs-booklet2020-05-20.pdf	case study website
LiveWorks, University of Sheffield & Urban Rooms Network	http://urbanroomstoolkit.org/work/liveworkssheffield/, https://urbanroomsnetwork.org/	case study & project report
The Green Estate Community Interest Company	https://greenestate.org.uk/about/	case study website
Sheffield Living Don	https://www.wildsheffield.com/wildlife/a-living-landscape/the-river-	case study website

	don/?srsltid=AfmBOooEpOQOvReXjNQNGUQzor3QxQwcKSmBVVk0rGJS-Uusrx73m9oJ	
UNaLab - Tampere Urban Living Lab (ULL) demonstration areas	unalab-nbs-booklet2020-05-20.pdf	case study website
ENABLS Living Lab Finland	https://enabls.eu/finnish-living-lab-en/	case study website
ENERGY & WATER - Greater Copenhagen Living Lab	https://energiogvand.dk/da/forside/collaboratorium/	case study website
Hedeskov Living lab	https://www.hedeskov.com/livinglab	case study website
Open Lab Ebbinge	https://www.facebook.com/OpenLabEbbinge/ and https://www.tandfonline.com/doi/full/10.1080/09654313.2019.1579303#d1e948	Project social media story & research paper
The experimental research station for environment, technology, and the society of the future	https://revista22.ro/cultura/statia-de-cercetare-locul-in-care-sunt-testate-limitele	Website blogpost
Forest School CSM	https://padlet.com/AndreasLangCSM/the-forest-school-b0ala9u280asoyp5 https://www.climate-forum.com/forest-school-main/	case study website
Tamed Nature	https://www.vai.be/en/press/tamed-nature	case study & project report
De stadsboswachter	stadszaken.nl/artikel/8422/stadsboswachter-verbindt-stedeling-en-natuur	case study website
Waterrijk Waterschei	www.genk.be/waterrijk-waterschei	case study website
Hiedanranta ULL (Urban Living Lab)	https://journal-buildingscities.org/articles/10.5334/bc.610	research paper
Lapinlahden lähde- centre for culture and well-being in Helsinki	https://journal.fi/yhdyskuntasuunnittelu/article/view/156762/118838 https://lapinlahdenlahde.fi/projekti/kaupunkiluontokeskus/	research paper
Bruun, M. H. (PI) (2018–2023). *Living labs: An interventionist ethnographic approach to technologies of the future*. Independent Research Fund Denmark. Aarhus University.	https://pure.au.dk/portal/en/projects/living-labs-an-interventionist-ethnographic-approach-to-technolog/; https://unipress.dk/udgivelser/b/byen-som-etnografisk-living-lab/	research project

11.1.2 Living Lab Literature

Resource Title	link to main source	Resource type
Charalambous, N., Panayi, C., Mady, C., Augustinčić, T. and Berc, D. (2025). Youth engagement in urban living labs: tools, methods and pedagogies. *Buildings and Cities*, 6(1), 1061–1080.	https://doi.org/10.5334/bc.6433	research paper
Soini, K., Anderson, C. C., Polderman, A., Teresa, C., Sisay, D., Kumar, P., Mannocchi, M., Mickovski, S., Panga, D., F. Pilla, Preuschmann, S., Sahani, J., Tuomenvirta, H. (2023). Context matters: Co-creating nature-based solutions in rural living labs, Land Use Policy, 133: 106839.	https://doi.org/10.1016/j.landusepol.2023.106839.	research paper
Scholl, C., de Kraker, J. & Dijk, M. (2022). Enhancing the contribution of urban living labs to sustainability transformations: Towards a meta-lab approach. *Urban Transformations*, 4, 7.	https://doi.org/10.1186/s42854-022-00038-4	research paper
Petrescu, D., Cermeño, H., Keller, C., Moujan, C., Belfield, A., Koch, F., Goff, D., Schalk, M. & Bernhardt, F (2022) Sharing and space-commoning knowledge through urban living labs across different European cities. Urban Planning, 7 (3), 254-273.	https://doi.org/10.17645/up.v7i3.5402	research paper
Akbil, E. and Butterworth, C. (2025) 'Urban rooms and the expanded ecology of urban living labs', *Buildings and Cities*, 6(1), p. 544–560.	https://journal-buildingscities.org/articles/10.5334/bc.607	research paper
Dell'Era, C. and Landoni, P. (2014). Living lab. *Creativity and Innovation Management*, 23, 137–154.	https://doi.org/10.1111/caim.12061	research paper
Belfield, A. & Petrescu, D. (2024) Co-design, neighbourhood sharing, and commoning through urban living labs. *CoDesign*, 21(2), 171–194.	https://doi.org/10.1080/15710882.2024.2381792	research paper
Bulkeley, H., Marvin, S., et al. (2018). Urban living laboratories: Conducting the experimental city? *European Urban and Regional Studies*, 26(4).	https://doi.org/10.1177/0969776418787222	research paper
Mahmoud, I. H., Morello, E., Ludlow, D. and Salvia, G. (2021). Co-creation pathways to inform shared governance of urban living labs in practice: Lessons from three European projects. *Front. Sustain. Cities*, 3:690458.	https://doi.org/10.3389/frsc.2021.690458	research paper
Menny, M., Voytenko Palgan, Y. and McCormick, K. (2018). Urban living labs and the role of users in co-creation. *GAIA - Ecological Perspectives for Science and Society*, 27(1), 68–77.	https://doi.org/10.14512/gaia.27.s1.14	research paper
Mattelmäki, T. and Sleeswijk Visser, F. (2011). Lost in co-x: Interpretations of co-design and co-creation. *Diversity and Unity: Proceedings of IASDR2011*. Delft, Netherlands.	https://share.google/GilXg31qcfX6iOAkA	research paper

Binder, T. and Brandt, E. (2008). The design lab as platform in participatory design research. *CoDesign*, 4(2), 115–129.	https://doi.org/10.1080/15710880802117113	research paper
Karvonen, A. and van Heur, B. (2014). Urban laboratories: Experiments in reworking cities. *International Journal of Urban and Regional Research*, 38, 379–392.	https://doi.org/10.1111/1468-2427.12075	research paper
Aquilué, I., Caicedo, A., Moreno, J., Estrada, M., Pagès, L. (2021). A methodology for assessing the impact of living labs on urban design: The case of the Furnish Project. *Sustainability*, 13(8), 45–62.	https://doi.org/10.3390/su13084562.	research paper
Voytenko, Y. et al. (2016). Urban living labs for sustainability and low carbon cities in Europe: Towards a research agenda. *Journal of Cleaner Production*, 123, 45–54.	https://doi.org/10.1016/j.jclepro.2015.08.053	research paper

11.1.3 List of Tables

11.1.4 List of Figures

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