REPORT ON LOCAL CASE STUDIES EXPERIENCE WORKSHOPS

Deliverable number: D4.1

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List of abbreviations and acronyms used in this document

Acronym	Definition
AI	**Artificial Intelligence**
BDD	Budapest degrowth doughnut
BKK	Budapest Public Transport Company
BKN	Basic Quality of Nature
BM	Municipality of Budapest
CAP	Common Agricultural Policy
CU-CAWR	Centre for Agroecology, Water and Resilience at Coventry University
CC	Consumer Cooperative
CCC	Coventry City Council
CIL	Contract Innovation Lab
CNC	City Nature Challenge
CSA	Community Supported Agriculture
CU	Coventry University
CUB	Corvinus University of Budapest
CWS	Coventry, Warwickshire and Solihull
ESRI	Environmental Systems Research Institute
ESSRG	Environmental Social Science Research Group
EU	European Union
GBDA	Greenblue veining [GroenBlauwe DoorAdering]
GBIF	Global Biodiversity Information Facility
GF	GreenFormation
HNV	High Nature Value

IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
LASREG	Landschapselementenregister
LEU	Landscape Heritage Utrecht
LH	Learning history
LVVN	The Ministry of Agriculture, Fisheries, Food Security and Nature, Netherlands
MIT	Massachusetts Institute of Technology
MJL	Meet je Landschap
MLU	Martin Luther University Halle-Wittenberg
NHW	the Forts project
NPLG	National Programme for Rural Areas (NL) Nationaal Programma Landelijk Gebied
ŐNPD	Őrség National Park Directorate
RVO	Rijksdienst voor Ondernemend Nederland
SECAP	Budapest's Sustainable Engery and Climate Action Plan
T4.1	Task 4.1
UNEP	United Nations Enviornment Programme
UPLG	Utrecht Rural Area Programme
WBRC	Warwickshire Biological Records Centre
WP4	Work Package 4
WR	Wageningen Research Foundation
WUR	Wageningen University and Research
WWT	Warwickshire Wildlife Trust

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Background: About DAISY

DAISY - DigitAl, technologIcal and Social innovation mixes enabling transformation for biodiversity and equitY - will advance understanding of how specific mixes of interventions including social-technological innovations can be used to induce transformation for biodiversity and equity.

DAISY's main objectives

- To understand which socio-economic, political and behavioural processes, and their interrelationships shape and enable our personal, political and practical ability to respond to the biodiversity crisis and how they impact on transformative change.
- To collect existing tools, processes, interventions and innovations that are conducive to triggering transformative change with the understanding of what enables them to address biodiversity loss and social inequity.
- To create intervention mixes based on existing tools and innovations and apply them in practice to induce transformation in all three spheres (personal, political, practical) to support biodiversity and equity prioritisation in decision- and policymaking.

Our case studies to test innovations

Innovation mixes will be tested and assessed for effectiveness in five seed innovation intensive case studies, within the domains of agri-food, education, energy and urban and regional development.

Turning on transformation

DAISY will have a special emphasis on amplifying innovation through bridging activities, networking events, wide stakeholder engagement and collection, connection and distribution of innovation seeds to switch on transformation.

Executive summary

This deliverable analyses the learning histories of five seed innovation case studies with potential to advance biodiversity and equity objectives through systemic change. The cases span urban citizen science, results-based agri-environmental schemes, commons-based food systems, landscape connectivity monitoring and urban sustainability planning informed by degrowth principles. Together, they provide an empirical basis for examining how socio-economic, political and behavioural processes shape responses to the biodiversity crisis across a range of domains.

A learning history methodology was applied to trace each seed innovation's trajectory, identifying milestones, enabling and hindering factors, and lessons learned. Data collection combined documentary analysis, semi-structured interviews and learning history validation workshops.

The analysis shows that transformation depends on the interaction of institutional arrangements, technology, social practices and learning dynamics. Progress is linked to enabling conditions such as stable resourcing, inclusive governance and adaptive approaches to uncertainty, while recurring challenges include capacity constraints, regulatory rigidity and sustaining engagement. The learning histories also provide insight into emerging capacities – including such as trust networks, collaborative norms, and improved ecological literacy – that provide foundations for systemic change.

These findings will be used to guide foresight and amplification activities during the remainder of the DAISY project, helping to clarify which factors enable systemic change and identifying intervention mixes that combine participatory approaches, adaptive governance and integrated monitoring. Beyond the project, the results contribute to wider debates on sustainability transitions and governance innovation. They offer evidence-based insights for policymakers, practitioners and civil society actors, seeking to design interventions that are context-sensitive, inclusive and capable of iterative adaptation.

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1. Introduction

Alex Franklin & Katharina Dehnen-Schmutz

1.1 Purpose of the Deliverable

This report presents a consolidated account of experiential knowledge gathered through research interviews and learning history (LH) workshops with key actors from DAISY's five seed innovation case studies. It offers:

- A synthesis of case-level experiences, capturing motivations, decision points, and enabling or constraining factors as they unfolded over time.
- An evidence-base to inform subsequent foresight and amplification activities within DAISY and contribute to wider debates on systemic change for biodiversity and equity.
- A comparative resource for identifying cross-cutting patterns and generating policy-relevant insights to guide intervention design and governance innovation.

The report provides a clear and evidence-based understanding of how transformative processes unfold in the context of the five seed innovation cases. The findings, together with the participatory process of collecting the data in the five cases, supports reflection and learning across research, policy and practice. It provides a foundation for subsequent project activities and for broader engagement with sustainability transitions across multiple scales.

1.2. Context and Relevance

This deliverable sits within Work Package 4 (WP4) of the DAISY project, which focuses on identifying and amplifying transformative pathways for biodiversity and equity through innovation mixes. Task 4.1 provides the empirical foundation for this work by capturing the lived experiences of actors engaged in the seed innovation case studies across agri-food, energy, education, and urban and regional development domains. These cases were originally selected as an action-orientated empirical focus for the DAISY project because they exemplify diverse approaches to

systemic change, from digital tools and commons governance to degrowth-inspired models.

The relevance of this deliverable extends beyond the DAISY project itself. By documenting how seed innovations emerge, evolve and interact with enabling or constraining conditions, the report contributes to ongoing local, European and global efforts to address biodiversity loss and social inequity. It aligns with the Horizon Europe emphasis on transformative change and generates knowledge relevant to policy agendas such as the EU Biodiversity Strategy for 2030 and the Nature Restoration Law. The insights presented here will inform foresight exercises, amplification strategies and policy recommendations within DAISY, while offering transferable lessons for practitioners and decision-makers seeking to foster systemic change.

1.3. Scope and Objectives

Seed innovations form a core element of the DAISY conceptual framework for understanding transformative change, providing a lens to examine how early-stage initiatives can influence systemic shifts toward biodiversity-positive futures. The concept of *seed innovations* originates in sustainability science as a way to understand how small-scale, often marginal initiatives, can catalyse systemic change. Seeds are defined as 'innovative initiatives, practices, and ideas that exist in the world today in some form, but are not currently widespread or dominant' (Pereira et al., 2018a: 4 (see also Bennett et al., 2016)). They represent alternative ways of thinking and doing that challenge prevailing structures and values; while often individually limited in scope, they hold potential to grow, interact and influence broader transformations (Bennett et al., 2016; Raudsepp-Hearne et al., 2020). This perspective responds to critiques of conventional scenario approaches that tend to extrapolate existing trends and underestimate the role of social and cultural dynamics in shaping futures.

Seed-based approaches emphasise experimentation and diversity as prerequisites for transformative change. Rather than focusing solely on technological breakthroughs, they foreground social innovations, new practices and governance arrangements that can reconfigure relationships between actors and systems (Westley et al., 2017). In this sense, seeds are not just technical artefacts, but socio-

ecological niches embedded in local contexts, whose significance lies in their capacity to inspire, connect and scale, through networks and coalitions (Moore et al., 2014; Pereira et al., 2018b). Understanding how such seeds emerge, adapt and navigate enabling or constraining conditions is therefore critical for identifying pathways toward sustainability transitions.

The objectives of this report are twofold. First, to reconstruct and analyse the historical trajectories of the selected seed innovations – examining critical junctures, drivers and barriers that have shaped their development and transformative potential to date. Second, to identify patterns and insights that may inform the design of intervention mixes and foresight activities in subsequent tasks of the DAISY project. In doing so, the deliverable contributes to the growing body of work on transformative change for sustainability, which stresses the importance of combining practical, political and personal spheres of transformation (O'Brien, 2018) and leveraging innovation as a catalyst for systemic shifts (Westley et al., 2011). By situating these findings within the overarching DAISY conceptual framework, the report provides a foundation for cross-case learning and policy-relevant strategies aimed at amplifying innovations that support biodiversity and equity.

1.4. Structure of the Document

The report is organised into eight main sections. Following this introduction, Section 2 outlines the overall methodology used to compile the LHs, including the research design, data collection and analytical approach. While Section 2 outlines the common methodological framework, each case study chapter (Sections 3–7) includes its own methods section to document context-specific adaptations. These variations – shaped by factors such as sectoral context, stakeholder composition, and innovation maturity – are reported to ensure transparency and to enrich the comparative value of the findings. Sections 3 - 7 also then present the results and discussion per seed innovation case (with each chapter authored by the local DAISY consortium research team members responsible for investigating that case). Section 8 synthesises the main insights, focusing on their significance for advancing seed innovations and informing subsequent foresight and amplification activities across the remainder of the DAISY project work programme.

1.5. Target Audience

This deliverable is intended for multiple audiences within and beyond the DAISY consortium. Internally, it serves consortium partners – and the collaborating seed innovation case holders - engaged in subsequent project tasks, providing an empirical basis for foresight exercises, amplification strategies and policy-oriented outputs (across DAISY's WPs 3-5). Beyond this, the report is also relevant for a range of researchers and practitioners working on sustainability transitions, biodiversity governance and social innovation, as well as policymakers seeking evidence-informed approaches to systemic change. By bringing forward lessons from both past and present seed innovation trajectories, as supported by the LH methodological approach, it offers a longitudinal temporal perspective that enriches understanding of how transformative potential emerges and develops over time. By presenting emerging experiential insights in a structured and transparent manner, the document aims to support both academic inquiry and practical decision-making in contexts where biodiversity and equity objectives intersect.

2. Methodology

Alex Franklin & Katharina Dehnen-Schmutz

2.1. Approach and Research Design

The research design of Task 4.1 adopts a qualitative, interpretive approach grounded in the LH methodology, originally developed at MIT's (Massachusetts Institute of Technology) Organizational Learning Center (Kleiner & Roth, 1997). This method is particularly suited to capturing the complexity of seed innovation processes because it combines narrative reconstruction with analytical interpretation, enabling both descriptive richness and critical reflection (Douthwaite & Ashby, 2005). In DAISY, LHs are used not only to document past experiences, but also to stimulate dialogue that informs future innovation pathways, consistent with the principle that 'a learning history is as much a process as it is a product' (Kleiner & Roth, 1997: 2).

The LH approach is participatory and transdisciplinary, engaging diverse actors from each seed innovation case study in co-constructing the narrative. This ensures

that multiple perspectives – including both consensus and dissent – are represented, building trust and collective ownership (Douthwaite & Ashby, 2005). The design emphasises iterative engagement and reflexive learning, with data collection and validation structured to encourage dialogue and sensemaking rather than mere documentation (Reissner, 2005). By situating local seed innovation trajectories within broader systemic contexts, the approach generates insights that can inform future foresight activities and strategies for scaling or amplifying seed innovations across diverse settings.

2.2 Data Collection Methods

Data collection centred around background literature reviews, semi-structured interviews with key individuals playing a leading role in the respective seed innovation under study, and an LH workshop with a sub-group of these individuals (the 'case holders'). The overall approach was consistent across all five case studies but implemented separately for each case by the local consortium partner, with a degree of methodological flexibility exercised to account for local conditions and stakeholder dynamics. This ensured contextual sensitivity while maintaining methodological coherence across the project.

Undertaken across a five-month period, the data collection process began with background desk-based research to consolidate publicly available information on each seed innovation, including project documents, media coverage and other online material (where applicable) and relevant scientific and grey literature. This process, in combination with any preexisting knowledge of the cases held by the local research team members, informed the identification of key individuals and their subsequent invitation to participate in a semi-structured research interview. To ensure comprehensive coverage of perspectives and direct experiences across the LH seed innovation timeline for each case, this purposive sampling strategy was also complemented by snowballing to identify any other lead participants proposed by the initial round of interviewees. This approach allowed inclusion of both central actors and those who may thus far have contributed either to a lesser degree and/ or with regards to one particular aspect only, thereby enabling collection of a range of viewpoints and experiences (Douthwaite & Ashby, 2005).

Following the interviews preliminarily data analysis was undertaken to identify key milestones, themes, and turning points for drafting the associated LH timeline. LH workshops were then convened for each case, bringing together seed innovation case holders to discuss the findings emerging from the data, together also with the preliminary analysis of that data by the local research team members. Participants validated the accuracy of the timeline, added missing details and reflected on emerging themes. This iterative process aligns with the LH principle that dialogue and co-construction are essential for meaningful learning (Douthwaite & Ashby, 2005).

All interviews were audio-recorded, and LH workshops were either audio-recorded or documented via fieldnotes, in accordance with participants' informed consent. During the LH workshops additional LH timeline elements were added as they arose during the discussions (via 'post-it' notes). Further detail on all aspects of the data collection process per seed innovation case, including such as total number of individuals interviewed per case, duration of interviews, and also number of LH workshop participants is provided in the individual LH reports that follow (sections 3-7). A summative overview is also provided in Table 01 below:

Table 01: Summative view of data sources per case

Case	No. of Inter-view-ees	Average duration of interview	Interviewee categories	LH workshop participants (case holders + research team)	Data types
Seed Innovation 01 (UK)	6	60 mins	Local Government; Environmental charity; Higher education/ volunteer	8 (4+4)	Desk-based literature review; semi-structured interviews; LH workshop
Seed Innovation 02 (Hungary)	4	60 mins	National Park; Farmers; Government Institutions	7 (3+4)	Desk-based literature review; semi-structured interviews; field

					visit; LH workshop
Seed Innovation 03 (Germany)	9	90 mins	Members (volunteers) or employees of the respective CSA and CC	5 (4+1)	Desk-based literature review; semi-structured interviews; LH workshop
Seed Innovation 04 (The Netherlands)	6	90 mins	Landscape and cultural heritage organisation; Water board; Provincial government; Volunteers; Farmer	8 (6+2)	Desk-based literature review; orientation talks (3), semi-structured interviews; LH workshop.
Seed Innovation 05 (Hungary)	3	60 mins	Municipality of Budapest; Corvinus University of Budapest; Budapest Public Transport Company	4 (3+1)	Desk-based literature review; semi-structured interviews; LH workshop

2.3. Data Sources and Selection Criteria

The LH approach, as applied in Task 4.1, is designed to capture the complexity of the seed innovation processes by including a diversity of perspectives. Rather than aiming for a single, unified account, the method deliberately seeks out multiple viewpoints – acknowledging areas of convergence as well as divergence. This pluralistic orientation reflects the principle that learning emerges from exploring different interpretations of events, including moments of success and difficulty, rather than presenting an overly simplified or exclusively positive narrative (Kleiner & Roth, 1997; Douthwaite & Ashby, 2005).

Participant selection was guided by this commitment to diversity of functional roles and perspectives. For each case, individuals were identified based on their involvement in key stages of the seed innovation journey, with attention to ensuring

representation across roles, sectors, and levels of engagement. This approach allowed the LHs to surface contrasting experiences and interpretations, which are essential for understanding the dynamics of transformative change.

At the same time, the process was informed by an appreciative orientation – not as a mechanism to avoid critical reflection, but as a way to create a constructive environment for dialogue. Drawing on principles of Appreciative Inquiry, the workshops encouraged participants to articulate strengths and enabling factors alongside challenges, helping to maintain a forward-looking tone even if disagreements or tensions arose (Zandee & Cooperrider, 2008; Moriggi, 2022). This balance between openness to complexity and an ethos of appreciation aligns with broader calls for participatory research that is both inclusive and ethically grounded (Franklin, 2022).

2.4. Analytical Methods

The analytical process began with a first stage of reviewing and interpreting interview data to prepare for the LH workshops. This involved identifying significant milestones, turning points, and contextual factors shaping each seed innovation's trajectory, as well as surfacing themes such as motivations, enabling and hindering conditions, and learning moments. Draft timelines were constructed as analytic scaffolds, incorporating descriptive accounts of events, selected quotations to retain authentic voices, and researcher reflections to highlight underlying dynamics, in line with the LH principle of combining narrative and commentary (Kleiner & Roth, 1997). These preliminary analyses provided the basis for dialogue during the workshops and were essential for ensuring that participants could engage critically with the emerging narrative (Douthwaite & Ashby, 2005).

The second stage of analysis followed the workshops and focused on refining and synthesising the LHs for reporting. Inputs from the workshops – including the validated timelines, added details and thematic clarifications – were integrated with the initial analysis to produce a coherent narrative that balanced chronological detail with interpretive depth. This iterative process ensured that the final LHs reflected both consensus and divergence, preserving the multi-voiced character and reflexivity that are central to the methodology (Reissner, 2005). Further detail on

case-specific adaptations and analytic procedures is provided within the individual case reports (sections 3-7).

This two-stage approach operationalises the core principles of LHs by combining empirical rigour with participatory sense-making. It enables the generation of situated insights while safeguarding narrative plurality and reflexivity, thereby supporting the broader aim of learning from experience to inform future innovation pathways (Kleiner & Roth, 1997; Douthwaite & Ashby, 2005).

2.5. Reflexivity and Research Ethics

The research design acknowledges the interpretive nature of LHs and the positionality of the researchers involved. In several cases, members of the local research teams had prior engagement with the seed innovation processes under study, either through earlier projects, through professional networks, or through their own volunteer work. This proximity provided valuable contextual understanding but also introduced potential for bias. To mitigate this, reflexive practices were embedded throughout the process, including explicit discussion of researcher roles during team meetings and iterative validation of interpretations with participants during the LH workshops. These steps aimed to ensure that the narratives reflected multiple perspectives rather than privileging any single viewpoint.

Ethical considerations were integral to all stages of the research. Participation was voluntary, and informed consent was obtained prior to interviews and workshops. All sessions were audio-recorded only with consent, and participants were assured of individual anonymity in the reporting of findings. Workshops included a sign-in process and clear communication about the purpose of the research, data handling procedures and participants' rights. Quotations included in the LHs were anonymised and made available to participants during the validation stage as part of the timeline review, providing an opportunity for clarification and ensuring respect for contributors' intentions. Data collected during interviews and workshops were anonymised and stored securely in accordance with DAISY's Data Management Protocol (Deliverable 6.1) and GDPR requirements.

2.6. Limitations

While the LH methodology offers rich insights into the dynamics of seed innovation processes, a few limitations should be acknowledged. Firstly, the reliance on retrospective accounts can lead to recall bias, particularly for events that occurred several years prior to the interviews. Although timelines and LH workshops were used to support collective sense-making and improve accuracy, it is possible that some details were omitted or interpreted differently by participants.

Secondly, practical constraints such as time and resource availability influenced the depth of engagement in some cases. For example, the number of interviews and workshops varied across cases, and not all stakeholders could be included. Thirdly, while quotations were anonymised and made available during validation workshops, participants were not asked to review every quotation individually. This means that some excerpts may not have been scrutinised in detail, even though care was taken to ensure respectful and accurate representation.

Finally, the LH approach, which is designed to trace trajectories through key moments, did not resonate equally with all respondents. Some participants preferred to frame their experiences as ongoing processes rather than discrete turning points, which occasionally made timeline construction more interpretive. This variation reflects the complexity of innovation pathways and underscores the importance of viewing the findings as situated accounts rather than definitive chronologies.

These limitations do not undermine the value of the LHs but highlight the importance of interpreting the findings as situated accounts that complement, rather than replace, other forms of evidence.

3. Seed Innovation 01: Coventry-Warwickshire-Solihull City Nature Challenge

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3.1. Case Introduction and Context

The first DAISY seed innovation case study is the UK based Coventry-Warwickshire-Solihull (CWS) chapter of the City Nature Challenge (CNC) (CWS-CNC). A global citizen science initiative, CNCs are aimed at stimulating people to record observations of biodiversity in their local areas, using a digital platform, i.e. the iNaturalist app. Since its inception in 2016, the CNC has grown into an international movement involving hundreds of cities worldwide (City Nature Challenge, n.d.). In 2025 alone, for example, 102,945 participants across 669 cities in 62 countries contributed more than 3.3 million observations, documenting 73,765 species, including over 3,338 rare, endangered, or threatened species (iNaturalist, 2025). Over its first decade, the CNC has generated nearly 13 million observations of 113,320 species by more than 363,000 participants globally (iNaturalist, 2025).

The CWS-CNC chapter of the CNC began in 2021 as a single city-scale event – the Coventry CNC. Following a merger with the neighbouring Warwickshire and Solihull CNC, in 2025 it was run as a combined CWS-CNC. In addition to the organisational involvement of three local authorities, the CWS-CNC also benefits from core involvement by Warwickshire Wildlife Trust (WWT), together with other local environmental charities and two local university partners. The combining of the two CNC areas reflects a shared ambition among the organisers to increase public awareness of the critical importance and state of biodiversity, and to integrate biodiversity data into local planning. It also reflects a recognition of the benefits of pooling available resources in order to achieve this ambition. Looking ahead, the CWS-CNC is expected to remain at its current geographical scale, with lead responsibility rotating in 2026 from Coventry City Council (CCC) to Warwickshire County Council.

Operating at the intersection of technological innovation, social engagement and ecological objectives, the CWS-CNC – and the overall concept of CNCs more broadly – is particularly relevant for in-depth study as a DAISY seed innovation. The case allows for exploration of the potential for digital tools to democratise biodiversity recording and foster public participation; it also illustrates the tensions and trade-offs which can be inherent in such approaches – including, for example, between inclusivity and scientific rigor, between short-term engagement and long-term impact. Furthermore, the CWS area presents a striking ecological contrast that shapes the dynamics of CWS-CNC participation. Coventry, for instance, is among the most greenspace-limited cities in England, with much of its green space dominated by amenity grassland and fragmented habitats; Warwickshire encompasses biodiversity-rich rural landscapes, including ancient woodlands, species-rich grasslands, wetlands, and extensive hedgerow networks. This spatial diversity creates both opportunities and challenges for citizen science engagement, influencing patterns of observation, accessibility and outreach strategies across urban and rural contexts.

The dynamics of the CWS-CNC also provide insight into a much broader phenomenon: across the world citizen science has emerged as a powerful approach for addressing ecological and societal challenges, particularly in contexts where professional monitoring alone cannot achieve the spatial or temporal coverage required (Palma et al., 2024). Over the past two decades, biodiversity-focused citizen science initiatives have proliferated globally, driven by concerns over accelerating habitat loss and species decline and enabled by advances in digital technologies and open science frameworks (Bonney et al., 2009; Newman et al., 2012; Kobori et al., 2016). These initiatives not only generate large-scale datasets, but also foster public engagement with science, enhance ecological literacy, and create opportunities for communities to participate in conservation-oriented decision-making (Jordan et al., 2011; Couvet & Prevot, 2015). Importantly, participation in such projects can nurture pro-environmental attitudes and strengthen human–nature relationships, especially when activities are situated in participants' own local environments (McKinley et al., 2017; Aivelo & Huovelin, 2020).

Within this expanding field, bioblitz-style events have gained prominence as short, intensive biodiversity surveys that combine scientific goals with public engagement. Traditionally organised in natural areas, bioblitzes have recently migrated into urban settings, where they offer unique opportunities to document biodiversity in fragmented landscapes and private spaces that are often inaccessible to professional scientists (Spear et al., 2017; Kishimoto & Kobori, 2021). Urban bioblitzes, such as the CNC, exemplify this trend, leveraging global coordination and digital platforms (e.g. iNaturalist, eBird, ObsIdentify, Pl@ntNet) to crowdsource biodiversity observations across hundreds of cities simultaneously (Palma et al., 2024). This model not only contributes to filling knowledge gaps – particularly for understudied taxa such as insects and fungi – but also provides local governments with cost-effective tools for evidence-based planning and community engagement (Palma et al., 2024). By situating biodiversity monitoring within everyday urban spaces, CNC-type initiatives align closely with contemporary calls for integrating ecological and social dimensions in urban sustainability strategies (McPhearson et al., 2016; Mata et al., 2019).

Despite these benefits, though, the literature highlights persistent challenges and trade-offs across the various forms of citizen science design, including tensions between data quality and inclusivity, biases in species reporting, and the need for deliberate strategies to sustain participation beyond episodic events (such as CNCs) (Bonney et al., 2015; Brown & Williams, 2018). Addressing these issues requires attention not only to technical protocols, but also to the social architecture of projects – including such as feedback mechanisms, recognition systems and pathways for deeper involvement – that can transform short-term engagement into long-term stewardship (Jordan et al., 2012; Kobori et al., 2016). Against this backdrop, the CWS-CNC case offers a valuable lens for examining how a globally standardised citizen science initiative, anchored in digital platforms and participatory practices, is adapted to local governance, ecological and socio-cultural contexts. It also provides an insight into how its dual aims of public engagement and biodiversity data collection are negotiated in practice, alongside opportunities for digital and social innovation.

The following sections present the learning history (LH) for the CWS-CNC, reconstructing its trajectory from initial adoption to its current configuration.

Existing literature on the CNC, bioblitzes and citizen science more broadly, highlights their potential to democratise ecological knowledge, foster pro-environmental behaviours and contribute to data-driven conservation strategies. However, as the interviews and timeline analysis from the CWS-CNC reaffirms, the LH also underscores persistent tensions between scientific rigor and public participation, challenges of inclusivity and structural constraints within local governance. The analysis, which is centred around empirical data from interviews and a LH workshop with organisers and participants, offers insights into motivations, enabling and hindering factors, and lessons learned. It also outlines forward-looking next steps, including potential amplification pathways and intervention opportunities for this seed innovation which can be supported via the DAISY project.

3.2. Methodology

The LH for the CWS-CNC was developed using a qualitative research approach designed to reconstruct the trajectory of this seed innovation and present the perspectives of those most closely involved in its evolution. The process was fully aligned with the overall task-level methodology, combining in-depth interviews with a LH workshop, and ensuring that the resulting narrative reflected both individual experiences and collective sense-making.

Data collection began with five semi-structured interviews, involving six interviewees. These included the lead organisers for Coventry CNC, the lead organisers for Warwickshire and Solihull CNC, and an individual who, after being involved for two years as a participant observer, transitioned in 2025 to also hosting an event within the CWS-CNC. Each interview lasted approximately one hour and was guided by a semi-structured interview schedule (adjusted as applicable, depending on whether the respondent's involvement was primarily as a CWS-CNC organiser or participant). The interviews were digitally recorded and transcribed. Key themes guiding the semi-structured format of the interviews included: the origins and motivations for hosting a CNC, the timeline of significant milestones, enabling and hindering factors, learning moments, collaboration dynamics and future aspirations. In accordance with the LH methodology the guiding schedule also invited reflection on assumptions that had shifted over time, moments of breakthrough or crisis, and the perceived balance between the CWS-

CNC's social and ecological objectives. This approach provided space for respondents to articulate both practical considerations, such as event design and resource constraints, and broader reflections on the overall role of CNCs and digital apps in fostering biodiversity engagement.

Following the interviews, in depth analysis of the interview transcripts was undertaken to draft a chronological LH timeline and accompanying narrative thematic synthesis. This process was supported by reference to scientific literature and to material published online – including especially from the iNaturalist and CNC websites (including, e.g. number of participants, observations, species at CWS, UK and Global scales; timeline of iNaturalist and CNC establishment). The analysis was primarily inductive and involved a dual process of developing the LH timeline to capture both key milestones, personal experiences and reflections, and to identify cross-cutting issues that shaped the CWS-CNC's trajectory.

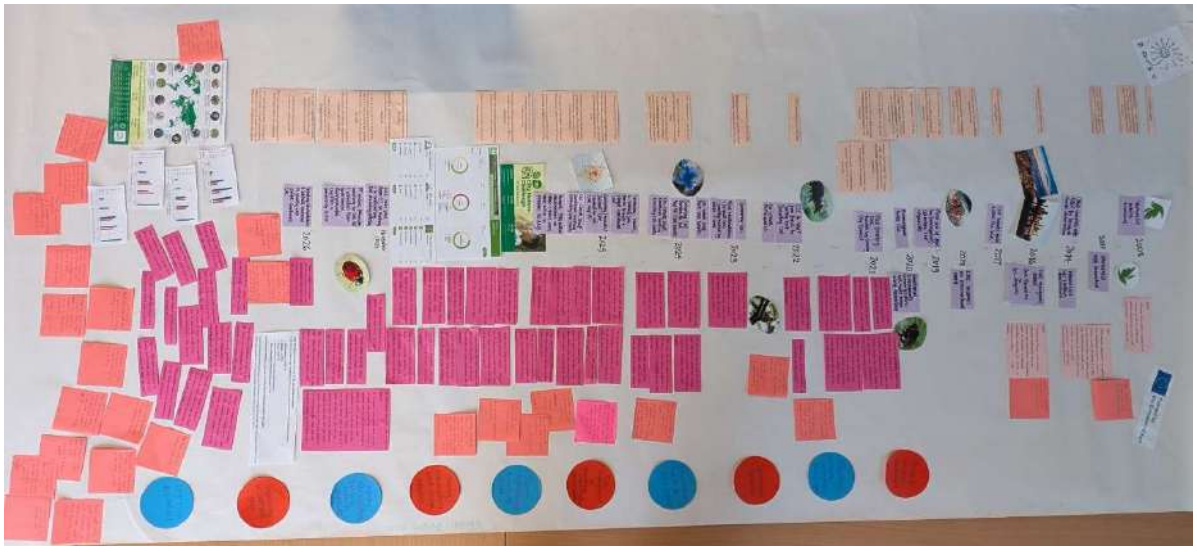

Figure 01: CWS-CNC Seed Innovation Workshop Learning History

With the draft LH prepared, a half-day LH workshop was then convened with four of the original interviewees (the 'case holders') and four members of the CU research team (two of whom also had direct experience in previous CNC events). The workshop opened with the CU research team giving a brief introduction to the purpose of the workshop and encouraging the case holders to begin exploring the draft LH – an approximately 2-metre-long colourful paper version of which had been placed in the centre of the table around which all the participants were sitting (see Figure 01).

The CU research team next presented a synthesis of the results arising from the interviews, with supporting cross-reference to wider background literature where applicable. The remainder of the workshop was then dedicated to discussion, centred around the draft LH timeline. Having explained the layout and content design of the timeline, and how the presented results had been translated to it, the case holders were then invited to validate the accuracy of the analysis, add any missing or additional details directly to the draft LH (via post-it notes) and share further reflections. This iterative process allowed for further discussion and critical reflection on some core cross-cutting themes, including the tension between outreach and data quality, the influence of digital tools, tensions between the global CNC governance scaffold and the local running of the CWS-CNC, and the challenges of sustaining engagement beyond the annual event. All additional points were captured and added to the LH in real time (primarily by a member of the research team who acted as a scribe).

Following the workshop, the research team reviewed their written notes, the additional post-it notes added to the LH and a transcribed audio recording of the discussion. These inputs were used to refine the timeline and complete this accompanying narrative report. The final version of the learning history timeline is provided in Annex 1. As significant contextual background it begins with the 2008 launch of iNaturalist, but then focuses primarily on the CNC and its local evolution from 2021 onwards. Building on this chronological reconstruction of the CWS-CNC LH, the next section of this report presents a narrative synthesis of this same timeline.

3.3. Synthesis of the CWS-CNC Innovation Process to Date

The trajectory of the CWS-CNC is best understood within the broader evolution of its enabling platform, iNaturalist, and the global CNC movement. This timeline reflects a layered process of innovation, beginning with the development of digital tools for biodiversity engagement and culminating in a global citizen science initiative that continues to adapt to local contexts. Accordingly, the CWS-CNC LH narrative begins in **2008**, long before the establishment of the CWS-CNC, with the public release of iNaturalist. According to the iNaturalist site (iNaturalist, 2025),

originally launched as a website, iNaturalist was created by graduate students at University of California, Berkeley. Conceived as a way to connect people with nature through technology, iNaturalist introduced a novel social-network approach to biodiversity observation. The subsequent release of the iNaturalist mobile app in **2011** marked a further turning point, making species recording accessible to anyone with a smartphone and laying the groundwork for mass participation. During the subsequent decade, iNaturalist underwent significant expansion, incorporating interoperability with global biodiversity infrastructures such as the Global Biodiversity Information Facility (GBIF), attracting an international cohort of users and accumulating millions of verified observations; it is a leading platform for citizen science and biodiversity data sharing (Palma et al., 2024; Mesaglio & Callaghan, 2021; Kobori et al., 2016).

Building on this technological foundation, the CNC was inaugurated in **2016** as a friendly competition between San Francisco and Los Angeles, by staff at the California Academy of Sciences and the Natural History Museum of Los Angeles (City Nature Challenge, n.d.). Run that first year as an eight-day event, the CNC subsequently adopted its now-standard four-day format in **2017** and expanded across the United States of America (City Nature Challenge, n.d.). By **2018**, CNC had evolved from a North American initiative into a global event, with cities across multiple continents joining the challenge. That year also marked the UK's first participation, with Bristol, London, and Plymouth among the initial cities to take part. At that time, however, awareness of iNaturalist in the UK remained limited, and participation was modest.

The Coventry CNC entered this global landscape in **2021**, marking the city's first involvement in the initiative. Organised by just a handful of individuals at Coventry City Council, the event aimed to engage local communities with biodiversity and contribute to global citizen science efforts. However, its debut was constrained by COVID-19 restrictions and low familiarity (across the UK) with iNaturalist, resulting in what organisers later described as a challenging start. LH workshop reflections reinforced this point, describing the first year as a steep learning curve with organisers learning as they went along. These early challenges shaped subsequent adaptations, including more structured outreach and event design; despite the hurdles, the experience provided a foundation for growth.

In **2022**, Coventry strengthened its approach, including by partnering with WWT – reflecting a shift toward collaborative delivery. This partnership paved the way for further local uptake in **2023**, when Warwickshire County Council and Solihull Metropolitan Borough hosted an adjoining (separately run) CNC event. By **2025**, these efforts converged into a single combined CWS- CNC, which ranked among the UK's top ten CNC events based on the observation recordings of that year. This regionalisation eased some resource pressures and enhanced coordination. However, challenges around timing, inclusivity and data quality persisted.

Throughout its local five-year evolution, hosting of the CWS-CNC has continued to adapt in response to the local organisers' experience and participant feedback, together also with ongoing background guidance and support from the global CNC co-ordinators. Looking ahead, the event is currently planned to remain as a combined CWS-CNC initiative, with preparations already underway for its next running in April **2026.** Notably, the **2026** CNC is scheduled for dates that fall outside the Easter school holiday period in England (in contrast to the timing of recent years). Organisers have expressed optimism that this timing could unlock new engagement opportunities, including with a wider range of participants.

In summary, to date, the CWS-CNC LH timeline – and that of the global CNC more broadly - reflects a process of cumulative and adaptive innovation: beginning with the technological foundations established by iNaturalist in 2008, progressing through the emergence of CNC as a globally networked citizen science initiative since 2017, and the decision by the organisers of the CWS-CNC to join that movement (in 2021 and 2023). In the case of CWS-CNC, it evolved from a single city to a combined local authority scale initiative (2025), and continues to grow with respect to both public engagement, and volume and range of observations (see Figures 02-04 below). As explored in the thematic sections that follow, each milestone in this trajectory demonstrates both functional progress and persistent systemic tensions – particularly those linked to balancing public engagement objectives with the need for data robustness and inclusivity. The remainder of this report focuses specifically on these dynamics within the CWS-CNC case.

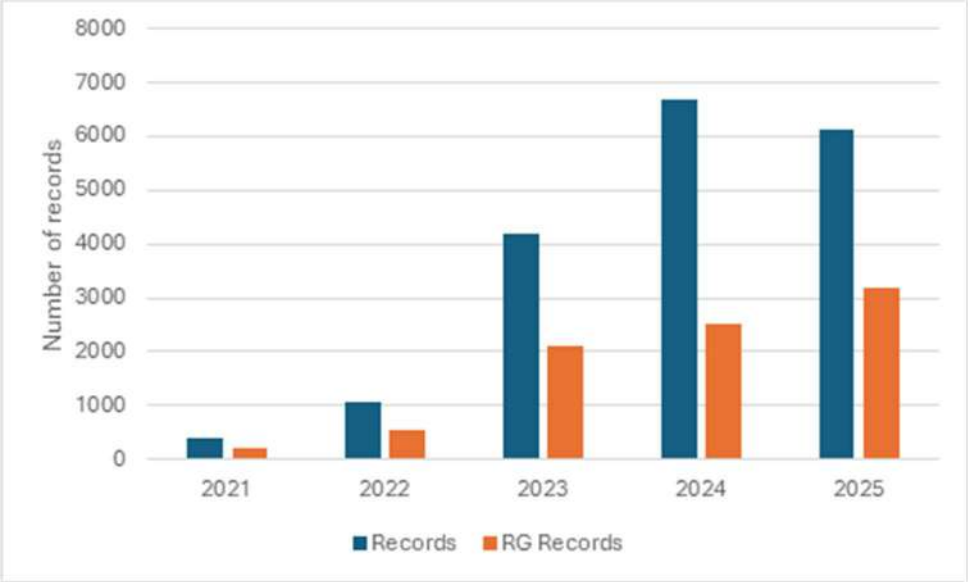

Figure 02: Number of records (observations) made at City Nature Challenge events in Coventry/Warwickshire/Solihull. Years 2021/2022 are records for Coventry only, years 2023/2024 the combined total from two events run separately in Coventry and Warwickshire/Solihull, and 2025 for the combined single Coventry/Warwickshire/Solihull event. RG Records = records that achieved iNaturalist research grade.

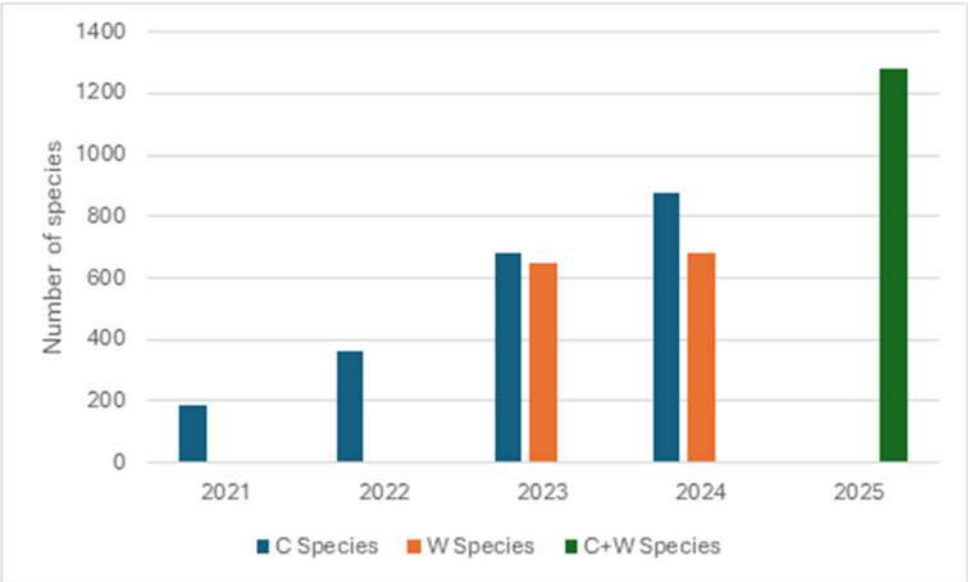

Figure 03: Number of species observed in the City Nature Challenge events at Coventry (C Species), Warwickshire/Solihull (W Species) and the combined event in 2025 (C+W Species).

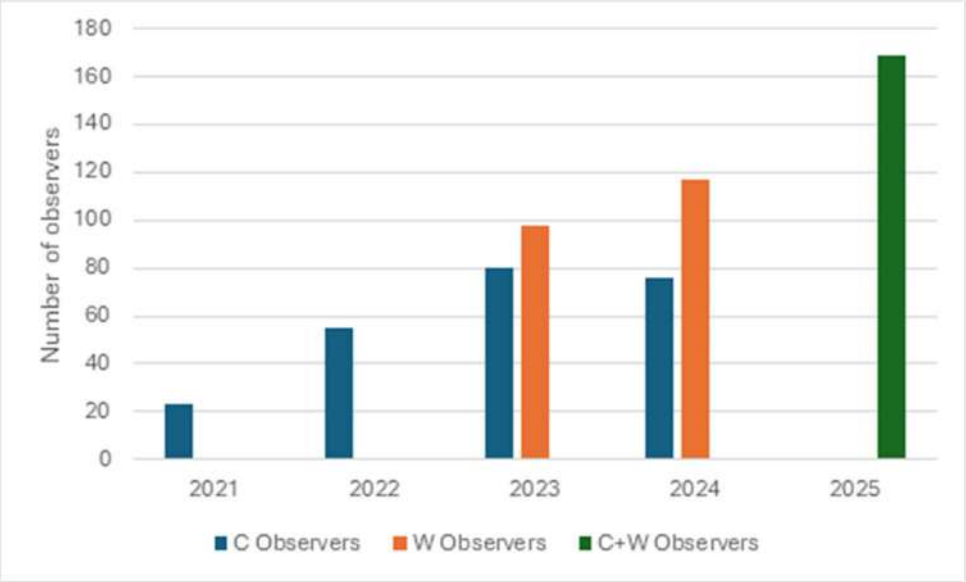

Figure 04: Number of observers participating in the City Nature Challenges in Coventry (C), Warwickshire/Solihull (W) and the combined Coventry/Warwickshire/Solihull (C+W) event.

3.4. Analysis

3.4.1. Motivation

The motivations driving the CWS-CNC remain closely aligned with those of the global CNC initiative, centring on the need to engage the public with biodiversity more visible in everyday spaces and encourage people to notice and value the wildlife around them. Organisers consistently highlighted this dual purpose: increasing public awareness while generating records that could contribute to conservation efforts. As one respondent explained, *City Nature Challenge is about making people notice what's around them, it's about awareness as much as it is about data' (Interview-CNC_03)*. This emphasis on awareness raising aligns with broader evidence that citizen science initiatives foster ecological literacy and pro-environmental attitudes, particularly when activities are situated in local environments and places with which the participants are already somehow personally connected (McKinley et al., 2017; Aivelo & Huovelin, 2020). It also, however, reflects a tension that runs throughout the CWS-CNC story – the challenge of combining inclusive engagement with the production of scientifically useful data.

For local government especially, the CWS-CNC also represents a rare opportunity to counteract structural limitations in ecology work. With local authority ecology teams across the UK having experienced significant declines in staffing numbers over the past decade, case holders view the CWS-CNC as a chance to interact directly with the public and raise the profile of biodiversity within urban planning. As one organiser noted, *'City Nature Challenge is our one opportunity where we consciously, as a council, try to turn that around and go out to open spaces'* (Interview-CNC_01). This sense of opportunity extends to aspirations for longer-term impact, including the integration of CNC data into local planning and biodiversity strategies: *'Our ambition now is to use CNC data to influence biodiversity planning directly'* (Interview-CNC_05). It also reflects a wider belief in CNC's potential as a catalyst for change, even under structural constraints (LH Workshop notes).

In addition to these more functional, capacity-based reasons for hosting the CWS-CNC, motivations for involvement – both on the part of the organisers and also the public participants – encompass a range of more social and emotive dimensions. During the research interviews CWS-CNC was presented by all respondents as being a simple, enjoyable way for local residents to spend time outdoors and connect with nature. As one participant reflected, *'It was just nice to get out for an hour and have a little look around the gardens and stuff'* (Interview-CNC_06). Alongside, many emphasised the learning experience it promotes, including the chance to share knowledge within families and communities. Such intergenerational engagement was cited by respondents as reinforcing the emotional significance of using iNaturalist to participate in the CNC. One respondent, for example, shared that, based on their own experience with the app, its educational value had instilled a sense of pride in seeing how much their son had learnt: *'We were coming out of school not too long ago when one of the little one's friends said, oh, it's a spider. And my little one said, it's only an old weaver. It won't hurt you.'* (Interview-CNC_06). During the LH workshop case holders accordingly further discussed the aspiration for the CWS-CNC to act as a gateway to longer-term engagement, fostering sustained biodiversity awareness beyond the event itself. Such motivations echo findings that citizen science participation often stems from a mix

of altruistic, recreational and social drivers, with enjoyment and learning acting as key enablers of sustained involvement (Bonney et al., 2015; Jordan et al., 2011).

Alongside these more substantive drivers, competition emerged as another notable motivational factor. For the organisers, the fact that Birmingham had been participating since 2020 provided an early stimulus for Coventry's involvement in 2021 and later for the transition to a combined CWS-CNC in 2025: '*We realised that if Birmingham was already doing it, Coventry should be part of it too - it felt like we needed to be on that map*' (Interview-CNC_02). Regional rivalry and internal CWS-CNC leaderboard rankings (displayed publicly via the iNaturalist site) were acknowledged as adding an element of excitement for some organisers and participants alike. As one organiser put it, '*It's nice to have a rival through the local town or try and be the best in the UK*' (Interview-CNC_05).

In sum, the motivations for hosting and/ or participating in the CWS-CNC combine functional, social, and emotional drivers. For the organisers they include the imperative to engage communities, the ambition to generate data for conservation, the desire to strengthen partnerships, and the commitment to supporting local residents in connecting with nature. These motivations have remained consistent even as the hosting of the CWS-CNC has evolved, shaping both its successes and its ongoing challenges. Notably, however, across all interviews, a common feature amongst the organisers – but also, perceived by them to be the case for many of the current observer participants - is a pre-existing interest in nature and biodiversity. To understand how (and if) CNCs resonate with individuals lacking this prior interest, further research will be required, both within the context of the CWS-CNC and beyond.

3.4.2. Enabling Factors

Several factors have enabled the CWS-CNC to take root and grow. At the heart of this success is the combining of, on the one hand, in-person participation in local spaces, and on the other hand, the simplicity and accessibility of the iNaturalist app, which has served as the primary digital gateway to participation. Respondents repeatedly highlighted the role of iNaturalist in lowering barriers for beginners and making biodiversity recording approachable: '*The app is free, it's effective... almost everyone has a smartphone that's capable of running iNaturalist*' (Interview-

CNC_05). For many respondents, this simplicity transforms what could otherwise be encountered as an intimidating scientific exercise into an enjoyable activity: *'It 'It* [iNaturalist] *doesn't take up that much space. It's really easy and simple to use*' (Interview-CNC_06). An additional factor worth noting is the app's AI-powered species identification, which likely played a crucial role in its success. This feature, introduced early by iNaturalist, gave it a competitive advantage over other platforms and further reduced barriers for participation. Collective LH workshop reflections reinforced this view, highlighting also the importance of the app's visual appeal and interactive features in sustaining engagement. Their comments echo broader scientific findings that digital platforms and design features play a pivotal role in lowering participation barriers and enabling large-scale biodiversity monitoring (Kobori et al., 2016; Newman et al., 2012).

Another enabling factor has been the relative flexibility of in-person event formats, which within the CWS-CNC continue to evolve iteratively over time. CNCs are always run in a way which encourages a range of different forms of participation – from individuals and families making observations independently in their own spaces, through to more structured opportunities for collective participation in locally organised events. In the case of CWS-CNC, during the last couple of years the organised events have transitioned from general walks and pop-up 'nature' activities, towards specialist-led sessions, targeted species-group events and also the hosting of subsequent 'identification parties'. This adaptation is not only practical but strategic, coupled with organisers learning more about what works best for attracting participants: *'We did a really popular joint botany and fungi walk one year... that got loads of people coming'* (Interview-CNC_05). The targeted events created opportunities for deeper learning and foster a sense of community among participants. They also point to attempts, on the part of organisers, to enhance the reliability and usefulness of the data generated. Similar adaptive strategies have been noted in bioblitz literature, where tailoring activities to local contexts enhances engagement and data quality (Kishimoto & Kobori, 2021; Spear et al., 2017).

Partnerships have also played a pivotal role in the history and sustainability of the CWS-CNC to date. Collaboration between Coventry City Council and Warwickshire Wildlife Trust in 2022 (within the Coventry CNC) constituted an early milestone,

enabling the pooling of resources and expertise, but also institutional identities. This alliance then expanded further, via the amalgamation in 2025 of the (neighbouring) Coventry CNC and Warwickshire-Solihull CNC areas, to form the current CWS-CNC. Such collaboration not only eases logistical burdens but also helps to amplify the initiative's visibility and legitimacy. They are also regarded as vital for building trust and legitimacy. The core involvement of the Warwickshire Wildlife Trust, for instance, is considered important by case holders for broadening appeal and ensuring the CWS-CNC is not perceived as solely council-led. Beyond the specific case of the CWS-CNC this also aligns with the significance attributed to partnerships more generally, as being critical for sustaining citizen science initiatives, providing resources, credibility and pathways for integrating outputs into biodiversity governance across multiple scales (Palma et al., 2024; Couvet & Prevot, 2015).

The social dimension of CWS-CNC has been another powerful enabler. For many participants, the event offers dedicated opportunities to connect with nature and with others, reinforcing its appeal beyond mere data collection. This structured interaction contrasts with the virtual nature of app-based biodiversity recording, where engagement often occurs through online identifications and comment threads. Physical CNC events introduce a local, face-to-face dynamic that enables real-time discussion, shared observation and collaborative interpretation of species via in-person discussion.

Wider research consistently highlights that social interaction and emotional connection are central to participation, reinforcing motivations beyond data collection (Jordan et al., 2011; Bonney et al., 2015). The fact that the CNC combines both virtual and physical social interaction appears fundamental to its success both locally and globally. Furthermore, in the case of the CWS-CNC, family-based participation was frequently highlighted by respondents as deepening engagement, with shared experiences often sparking curiosity and enthusiasm among younger members: '*I've ended up introducing my children to it* [iNaturalist] *who are both really keen on it now as well*' (Interview-CNC_06). These experiences often translated into sustained interest, as participants began incorporating biodiversity observation into their daily individual and family routines.

Beyond the above social enablers, behavioural mechanisms embedded in CNC and its supporting platform, iNaturalist, also play a critical role in sustaining engagement. Gamification features such as progress indicators leverage reward-based learning to reinforce participation and encourage persistence (Bowser et al., 2013; Shi & Cristea, 2016; Sajan & Sapkopta, 2025). The annual running of the CNC amplifies its significance as a time-bound and non-routine task (Knottnerus, 2010; Marselle & Golding, 2023). Participants derive further motivation both individually and collectively by benchmarking against peers and neighbouring CNCs, as well as from the symbolic appeal of contributing to a globally synchronised event (Crowley et al., 2020). As one CWS-CNC organiser recounted, for example: 'We've joined forces with Warwickshire... everybody else wanted to do that because we're trying to compete with Birmingham [neighbouring city]' (Interview-CNC_01). Alongside, the once-a-year scheduling of the event (in accordance with the global CNC governance scaffold) makes the task of hosting a CNC more manageable for organisers, while also enabling reputational benefits associated with hosting a globally recognised initiative (Crowley et al., 2020; Marselle & Golding, 2023). Together, these behavioural design elements complement technological accessibility and partnership networks, creating a psychologically compelling framework for engagement (Veríssimo et al., 2025; Marselle & Golding, 2023).

Discussion during the LH workshop further underscored the symbolic appeal of global participation, indicating that the CNC's international structure and branding foster a sense of connection beyond local boundaries. This global framing helps to amplify motivation and reinforce the event's overall significance. Alongside, the competitive element – though not without its drawbacks (see below) – further spurs participation. Rankings and informal rivalries between cities and individuals inject a sense of achievement: '*There is no prize. It's just bragging rights and ego.*' (Interview-CNC_02). For some, this has become a personal challenge: '*Come the second year, I wanted to try and make sure I'd done more observations than the previous year... I think I beat my record by about 300*' (Interview-CNC_05). While organisers remain cautious about overemphasising competition, its role in motivating engagement cannot be overlooked. Taken together, these enabling factors – accessible technology, adaptive event design, strong partnerships, social and emotional appeal, and the motivational spark of competition – have allowed

CNC to flourish in the CWS region. They have provided the foundation for growth and created pathways for deeper engagement, even as the initiative continues to grapple with structural and cultural constraints.

3.4.3. Hindering Factors

Despite its achievements, the CWS-CNC has also faced a series of challenges that have shaped its development and continue to constrain its transformative potential. These hindering factors span structural, cultural and practical dimensions, often intersecting in ways that deepen their impact.

The first of these are the ongoing resource constraints within local government, collaborating environmental charities, and also increasingly on the part of the local universities. These challenges were variously referenced and returned to, during both individual interviews and the collective LH workshop discussion. This structural limitation has made it difficult to scale the CWS-CNC via additional organised events and other forms of public outreach. It also impacts on the ability of the organisers to sustain public engagement beyond the annual event. As one organiser explained, the lack of capacity also affects event communications, with organisers struggling to secure timely publicity: '*We try to, but we are very heavily constrained by our own communications team...*' (Interview-CNC_01). These constraints force organisers to justify every investment of time and effort: '*We have to justify quite carefully where we're putting all of this effort*' (Interview-CNC_03). Similar challenges have been documented in other citizen science initiatives, where limited institutional capacity constrains outreach and long-term engagement (Kobori et al., 2016; Couvet & Prevot, 2015). Also noted in this context by the CWS-CNC organisers is the fact that the running of a CNC can be relatively demanding on the organisational side, with planning for each annual CNC weekend beginning some six months prior to its running.

Another frequently cited obstacle, with regards to the overall governance of the CNC series, is its timing. The globally scheduled CNC weekend, always occurring in late April, consistently clashes with the UK academic calendar (ie. Easter holidays for schools and universities alike). It is also heavily shaped by seasonal weather conditions. Both factors have variously contributed to the CWS-CNC thus far attracting only limited engagement from schools and universities; in some years

they have also significantly affected overall public turnout. As one organiser put it simply: *'It's not the ideal time of the year to have a City Nature Challenge in Coventry... it's invariably pretty cold and wet'* (Interview-CNC_01). Another recalled more extreme conditions: *'The first year we had snow. The second year... torrential rain for the whole day'* (Interview-CNC_03). Frustration, on the part of the CWS-CNC case holders with regards to the globally fixed schedule was further voiced during the LH workshop discussion.

Alongside the above timing issues, the LH workshop discussion also highlighted the significance of the global scaffolding for the local organisers: providing on the one hand clear guidance and support structures to manage CNC requirements, but on the other hand, also for some generating a workload and bureaucracy that at times overly stretched their capacity and created unnecessary restrictions on flexibility: 'what you end up doing is having to find your way through it, what's important and what you really need, and kind of filter the rest of the noise' (LH Workshop notes). Technological and cultural barriers compound these structural challenges. Whilst case holders consistently praised iNaturalist for its accessibility, concerns were also raised from an ecological data collection perspective about how the platform is used by some observers. In practice, reliance on rapid photo uploads and automated identifications were cited as introducing constraints to data quality (for some species especially) and challenges to validation. Emerging technologies such as AI, while designed to streamline identification, were noted during the LH workshop as having notable limitations. These shortcomings sometimes lead to misidentifications, which in turn raise scepticism among local expert recorders regarding the validity of CNC-derived data. This reinforces the continued importance of rigorous human validation, even as AI often succeeds in correctly identifying species and lowering barriers for participation.

Although relevant also to the everyday societal use of citizen science apps such as iNaturalist, the above issues were viewed by case holders as being potentially more pronounced in such time-bounded competitive contexts of CNCs. As one respondent reflected (with regards to 'lay' user generated identifications solely based on AI suggestions from the iNaturalist app):*'Misidentifications are so numerous as to render all of the information completely worthless'* (Interview-CNC_01). Similarly, another respondent commented: *'It's not scientifically robust.*

It's just random people with a camera' (Interview-CNC_02). These perceptions help to explain the presence of frictions with local expert recorders and often failed attempts to interest them to participate or run events. As the first of the above respondents also noted, *'Experts in Warwickshire tend to look down on City Nature Challenge and iNaturalist... that's a struggle'* (Interview-CNC_01). This apparent cultural divide between 'serious hobbyists' and casual participants further complicates local efforts to improve data quality and integrate CNC outputs into formal biodiversity planning. LH workshop reflections on this tension added further nuance, with case holders observing push back from the specialists who do not feel able or confident to verify many observations – particularly those lacking in granularity or overall image quality: *'some specialists panic, they don't want to get it wrong'* (LH Workshop Participant). Concerns about data reliability and tensions between expert and novice contributors are, though, by no means unique to the CWS-CNC. Rather, they are widely recognised in citizen science literature, particularly in projects relying on opportunistic data collection (Bonney et al., 2015; Brown & Williams, 2018).

Inclusivity also remains a significant hindering factor and unresolved challenge. Despite organisers' aspirations to engage diverse communities, outreach to underrepresented groups via the CWS-CNC remains inconsistent and generally limited. The fact that school engagement is commonly constrained by timing is felt by the case holders to further compound this challenge. Also, while digital access is generally good in the region, it is not universal; limitations such as poor connectivity and lower-quality phone cameras can affect both the accuracy of submitted images and the motivational boost that high-quality photos often provide to participants. Overall, this tension between breadth and depth of engagement has limited the CWS-CNC organisers' ability to reach beyond a core audience of nature enthusiasts. As with other above noted issues, though, this situation is by no means limited to the CWS-CNC case. Studies consistently show that biodiversity-focused citizen science tends to attract participants who are already nature-oriented, with persistent underrepresentation of minority and underserved communities (Pandya, 2012; McPhearson et al., 2016).

Finally, the competitive dimension – while motivating for some – is also recognised by the case holders as introducing risks that may compromise CWS-CNC's

educational and scientific objectives. If leaderboard rankings become too dominant, participant behaviour can shift away from the core goal of documenting wild biodiversity toward narrower, human-centric objectives, including for example documenting houseplants: '*There was a bit of competition… people were taking photographs of plums and spider plants in their house*' (Interview-CNC_01). This behaviour shows how the framing of participation can impact a range of outcomes, including data integrity. It reflects a broader tension between quantity and quality of records – a tension that organisers acknowledge but struggle to resolve: '*We can either focus on it being a chance for outreach or we can focus on it being a chance for recording. It doesn't seem to work as both*' (Interview-CNC_03). The LH workshop discussions included further vivid examples of how an overemphasis on competition can distort behaviour away from the intended biodiversity goals of the event. Such experiences underscore the need for strategies that balance gamification with scientific rigor (Palma et al., 2024).

In sum, the hindering factors facing CWS-CNC are interconnected: structural resource limitations, timing misalignments, technological and cultural divides, inclusivity gaps and potential distortions (with variable significance of at the level of individual participants) linked to competitive framing. These challenges do not diminish the initiative's achievements thus far, but they do underscore the nuanced trade-offs involved in sustaining and amplifying the combined biodiversity and societal impacts of a CNC-type citizen science model within local governance structures and global frameworks. Addressing them will require strategies that build on CWS-CNC's existing strengths – including its accessibility, highly committed organisers, collaborative cross-institutional partnerships, and social appeal – while extending these qualities to reach wider and more diverse participation.

3.4.4. Learning Overview

The LH methodology has generated a range of insights on how to amplify and sustain the social and ecological impacts of the CWS-CNC. These insights encompass event design, partnership building, place-based engagement, technological adaptation, behavioural incentives, and the broader challenge of balancing outreach with scientific rigor. The learning shared by the case holders is shaped not only by the time-bounded bioblitz format and global governance

framework of the CNC series, but also by the distinctive characteristics of the CWS region in which they have been running the CNC – ranging as it does from highly urban, greenspace-limited city environments to biodiversity-rich rural landscapes of farmland, woodland, grassland, and wetland. The demographic profile of residents – which is equally wide ranging and inclusive of marked differences in daily exposure to nature and baseline biodiversity awareness – is also influential in shaping how their experience and learning has thus far unfolded.

Firstly, balancing CWS-CNC's dual ambitions of increasing both public engagement and biodiversity observations requires a pragmatic approach to trade-offs, rather than assuming both can be fully achieved within a short event window. The case holders are aware of this, viewing the CWS-CNC as a catalyst for ongoing participation rather than a standalone solution. This perspective underscores the need for multiple strategies to stimulate year-round engagement with nature and, in turn, expand public involvement in biodiversity recording – driving efforts to identify new ways to enhance the event's reach and impact in future years. As one organiser reflected: '*I would not want City Nature Challenge to be… 'I've done wildlife this year, tick.*'' (Interview-CNC_01). This ambition is also reflected in their interest in participating in the DAISY research process.

Secondly, practical lessons emerge around event design. Early reliance on generic walks has been replaced by structured formats, informed by feedback and observation. This evolution is not only about attracting higher numbers of participants, it is as much about creating meaningful experiences – with this in turn connecting to the above noted aim that the CNC weekend provides a foundation for ongoing nature engagement. Such learning also underscores the importance of tailoring activities to local contexts and recognising seasonal constraints when planning individual events with the CWS-CNC. Despite these efforts, though, it is notable that overall participation in the CWS-CNC is still, nevertheless, relatively modest – in 2025, for instance, the event attracted contributions from 169 registered observers.

A third key lesson concerns the role of technology in shaping participation and data workflows. iNaturalist has been highly effective in reducing barriers for public involvement, but its use within CNCs also highlights some practical dependencies and cultural tensions. Observations submitted via iNaturalist need to be verified to

research grade in order to be integrated into GBIF. For this CNC organisers rely on the voluntary – citizen science – involvement of specialist recorders. Over the years, at both individual and global CNC scales, increased attention has been given to the value of well organised local 'ID parties' to support this process. However, the CWS-CNC case holders (like many other CNC organisers) are still learning how best to navigate the divide between such expert recorders – whose taxonomic and species identification expertise is critical for achieving research-grade data – and members of the general public attracted to participate in the CNC bioblitz, regardless of their pre-existing level of knowledge. Such tensions between specialists and casual contributors are recurring themes in citizen science initiatives, particularly in projects relying on opportunistic data collection (Palma et al., 2024; Bonney et al., 2015). As one CWS-CNC case holder recalled, for example: '*He [an expert recorder] was getting very frustrated… 'how do people expect me to identify this when they haven't taken photos of the right part of the plant?*' (Interview-CNC_05).

The fourth lesson drawn from the LH analysis of the CWS-CNC is the value of cross-sectoral partnerships and their capacity to mitigate institutional resource constraints. Collaboration between Coventry City Council and Warwickshire Wildlife Trust since the 2022 running of the event, followed by the merger with the neighbouring Warwickshire County Council and Solihull Metropolitan Borough Council CNC in time for the 2025 event, exemplifies this potential. Equally significant is the nature of the global CNC governance scaffold which balances the maintenance of a shared sense of (international) identity with the need for the number, type and scale of activities to be run within each individual CNC to remain entirely at the discretion of the local organisers. Such an approach enables local organisers to tailor events to their ecological, social and logistical contexts. This in turn, in the case of the CWS-CNC, creates a safe space for individuals to gradually transition from CNC participant to organiser of local events – a progression motivated for some by a simple desire to enable others to share the same positive experience: '*Running my own event* [within the CWS-CNC] *was really nice… We didn't have loads of people turn up, but it was Easter holidays.*' (Interview-CNC_06).

The above quotation illustrates how enjoyment and autonomy, even in the face of modest turnout, can foster commitment and leadership within citizen science

initiatives. More broadly, as a fifth aspect of the lessons learnt from the CWS-CNC case, this underscores the importance of attending to emotional and social dimensions in the design and running of CNC events. As was discussed during the LH workshop, for many participants the weekend is not just about recording species but about doing so in a way which creates a sense of connection – to nature, but also to participating family members, to other participants and to the local environment more broadly. Stories of children identifying species and parents expressing pride illustrate the transformative potential of these experiences: *'It was just really nice to see how much he knew and how keen he was to be there and be part of it'* (Interview-CNC_06). Such moments and memories of enjoyment and discovery are integral to CWS-CNC's success. They are central to sustaining participation and fostering pro-environmental attitudes (Jordan et al., 2011; McKinley et al., 2017). They remind organisers that the ultimate goal extends beyond counting species to mainstreaming a culture of care for biodiversity both locally and globally.

Another core area of insight concerns the behavioural architecture of CNCs. Both individually and collectively CNCs offer important lessons for the design, delivery, and amplification of biodiversity-focused public engagement initiatives. Particularly notable is the way in which they combine digital technology and online social networking with in-person, place-based participation. The integration of gamification within iNaturalist illustrates how reward systems can enhance sustained engagement by activating both intrinsic motivations (e.g., curiosity, learning) and extrinsic drivers (e.g., status, competition) (Sajan & Sapkopta, 2005; Browser et al., 2013; Shi & Cristea, 2016). Alongside, the event's temporal framing – annual, globally synchronised, and locally contextualised – helps to generate anticipation and symbolic significance, reinforcing participation as a socially meaningful act (Knottnerus, 2010). Meanwhile, the hybrid structure of CNC, combining asynchronous digital interaction with synchronous local events, enables layered social reinforcement: online networks provide continuous feedback and recognition, while in-person gatherings cultivate collective identity and shared purpose – both identified within the field of behavioural science as critical for long-term commitment (Crowley et al., 2020). Finally, the benchmarking dynamic integral to CNCs – across cities, regions, nations, and also annually across time –

functions as a normative influence, encouraging competition that amplifies engagement without requiring material incentives (Knottnerus, 2010). LH workshop discussions reaffirmed the motivational power of gamification and global framing, noting that features such as leaderboards and live feeds were conducive to sustaining engagement and creating excitement across the weekend, including in a way which helps to make the experience of participating more memorable. These insights underscore the value of embedding behavioural design principles into citizen science initiatives, but also of doing so in a manner which supports ethical and inclusive engagement strategies (Marselle & Golding, 2023; Veríssimo et al., 2025).

3.5. Conclusion and Next Steps

The CNC exemplifies how a globally standardised citizen science initiative can be adapted to individual city and regional contexts while navigating complex social, ecological and institutional dynamics. Its evolution globally, and in the specific context of the CWS-CNC, demonstrates both the potential and the constraints of scaling biodiversity engagement through a model that combines digital technology with place-based participation. Ultimately, it is the interplay of social connection, ecological literacy and emotional engagement with nature which underpin its transformative potential.

Enabling factors such as accessible technology, flexible event design, and strong cross-sectoral partnerships have been critical to sustaining the CWS-CNC to date. At the same time, persistent challenges – including resource limitations, timing misalignments, cultural divides between experts and casual participants, and risks linked to competitive framing – underscore the need for continued attention to adaptive strategies. Added to these operational hurdles are significant equity-related concerns: widely documented gaps in diversity and access within citizen science initiatives more broadly highlight a further, significant challenge for the CWS-CNC. Addressing this will require deliberate strategies and dedicated resources to engage underserved communities and overcome structural inequities (Pandya, 2012; McPhearson et al., 2016).

Behavioural design elements have emerged as particularly influential within the overall design of the CNC. Gamification within iNaturalist, the symbolic appeal of

participating in a globally synchronised event, and the benchmarking dynamic across cities and nations collectively reinforce engagement without material incentives (Bowser et al., 2013; Sajan & Sapkopta, 2025). These mechanisms, coupled with the social learning fostered through in-person events, illustrate how CNC operates not only as a data-gathering exercise, but as a catalyst for building communities of practice and cultivating a culture of citizen science participation and ecological stewardship (Palma et al., 2024).

Looking ahead, the challenge is to consolidate current achievements while addressing persistent structural and cultural barriers. This includes sustaining engagement beyond the annual event, improving inclusivity, strengthening data validation processes, and embedding the CWS-CNC within broader biodiversity governance frameworks at multiple scales. Achieving these objectives could enable CNC to evolve from an episodic initiative into a strategic mechanism for systemic change—informing policy, influencing public behaviours, and supporting collective action for biodiversity. This trajectory aligns with broader evidence and support for citizen science as a governance tool capable of bridging public engagement with policy and conservation outcomes (Couvet & Prevot, 2015; Kobori et al., 2016).

Next Steps

By 2025, within the UK 26 urban areas had participated in the annual CNC challenge, with over 154,000 observations, made by more than 3,800 observers, recording over 5,100 species (iNaturalist, 2025). The steady year-on-year national growth that these figures represent underscores the opportunity for the CWS-CNC to build on existing momentum, using it to broaden its demographic reach and also geographic and species coverage within its boundaries. Whilst the CWS-CNC has already established a strong foundation as a successful citizen science initiative, its future trajectory and transformative potential will be dependent on addressing structural constraints – ranging from local capacity and governance fragmentation to systemic barriers that limit inclusive engagement and data integration. These aspects, as evidenced via the LH analysis, align closely with DAISY's amplification objectives, ensuring that lessons from CWS-CNC inform strategies for sustained engagement and systemic change.

In particular, there is a clear need to sustain engagement beyond the annual event. While the CNC series has succeeded in generating enthusiasm during its four-day window, the CWS-CNC case holder expressed universal concern that interest often fades once the challenge ends. Future strategies could include year-round observation campaigns, seasonal mini-events, and integration with current initiatives such as Coventry's involvement in the UK Nature Towns and Cities project. The need for such integration aligns with evidence from citizen science programmes more widely, which suggests that ongoing, distributed activities are critical for sustaining participation beyond episodic events (Jordan et al., 2012). DAISY consortium members can contribute to supporting these avenues of amplification by co-developing resources for mini-events and integrating CNC outputs into broader transformation pathways. During the LH workshop locally aligned campaigns such as Creature Count and 30 Days Wild were suggested by case holders as potentially useful points of reference for developing more integrative engagement strategies, providing tested models for maintaining momentum and broadening appeal.

Whilst CNC timing adjustments are outside of the control of local organisers, the 2026 dates of the event – which fall outside the Easter holiday period – provide a potential window of opportunity for amplifying school participation and, in turn, also broadening demographic reach. The latter is especially notable, particularly given the wider context of persistent underrepresentation of minority groups – a challenge that remains all-too-common in citizen science. It underscores the need for targeted outreach and culturally responsive engagement (Pandya, 2012). For this to be achieved during the 2026 CNC weekend, early planning will be essential, including collaboration with local educators to design curriculum-linked activities and teacher training modules. Additional ideas explored during the LH workshop included the incorporation of creative approaches to diversify participation – such as exhibitions, live-streamed events, and QR-coded promotional materials. The value of partnering with faith-based groups was also highlighted as a way to extend reach and enhance inclusion.

With regard to data quality and technological integration, future steps are needed to strengthen validation processes, foster collaboration with expert recorders, and potentially enhance interoperability between iNaturalist and other digital recording

platforms (though the latter will likely fall beyond the scope of the CWS-CNC case holders). During the LH workshop, discussion returned to whether online training sessions and post-event identification workshops could be two ways of further enhancing data reliability. Also considered was the value of providing post-event feedback to participants—both to highlight how their records contributed to biodiversity action, for example by informing conservation priorities or shaping local habitat management, and to help sustain motivation.

Finally, in the longer term, the impact of CWS-CNC can be strengthened by embedding its outputs into local decision-making processes. A key opportunity lies in integrating iNaturalist data into local planning to inform green infrastructure development. This approach not only supports ecological objectives but also helps ensure that the social benefits of pro-biodiversity action are distributed more equitably, particularly to underrepresented communities. Similar integration efforts elsewhere have been shown to increase the policy relevance of citizen science outputs, especially when combined with robust validation protocols (Palma et al., 2024; Bonney et al., 2015). By pursuing this approach, CWS-CNC would function not only as a citizen science initiative but also as a catalyst for transformative action on biodiversity and equity across practical, political, and personal spheres. Achieving this will require targeted outreach strategies to engage underrepresented communities, build capacity for participation, and address barriers such as limited digital access. This includes collaboration with community organisations and provision of digital access support where necessary – steps that complement the other, above-stated, next steps recommendations on sustaining engagement, diversifying participation and improving data quality, ensuring that all proposed measures work together toward systemic change.

4. Seed Innovation 02: Inclusive Biodiversity Monitoring: Emerging Socio-Technological Innovation from a Hungarian Results-Based Payment Scheme.

Eszter Kelemen, Boldizsár Megyesi, Karmen Czett, Gergő Berta

4.1. Case Introduction and Context

4.1.1 Results-Based Payments as Seed Innovation

The second DAISY case study focuses on results-based agri-environmental payments and their uptake: an innovation which combines both social (i.e., social learning and the revitalisation of local, traditional knowledge), and technological elements (i.e., easy-to-use monitoring approach, high-tech tools such as mobile apps or remote sensing for self-monitoring) to better incorporate biodiversity into farmers' land use decisions. Results-based agri-environment payments aim to address the information asymmetry inherent in action-based payments and to provide farmers with more targeted incentives to produce environmental public goods (Matzdorf et al., 2008). In results-based programmes, payments are directly linked to the farmer's performance in the areas of biodiversity conservation, climate protection or animal welfare. Support is not provided for compliance with centrally defined requirements, but for achieving environmental objectives set together by the farmer and the paying authority. This form of support provides greater freedom, but also greater responsibility for the farmer in choosing farming methods, than traditional action-based payments. This encourages innovation in local land use, enables the utilisation of local, traditional knowledge and continuous learning, and increases the cost-effectiveness of producing environmental public goods (i.e., it helps achieve a unit of environmental improvement in the most cost-effective way possible) (Bartkowski et al., 2021). Despite the first results-based schemes being launched almost twenty years ago, they are still not widespread: no application exists in Hungary, and only a few pilots were tested in Central and Eastern Europe. Thus, co-creating and implementing a results-based payment system in Hungary

could create new avenues for voluntary conservation and restoration in agricultural landscapes in this region. Moreover, using a collaborative approach to create this policy instrument in a highly centralised political system (as the one in Hungary), can also be considered as an institutional innovation.

The first results-based programmes appeared in the 1990s in the UK and Switzerland, to preserve the biodiversity of grasslands (mainly meadows). Early experiments in Sweden and the Netherlands aimed at the conservation of protected animal species of particular importance (e.g. large carnivores or birds) (EU CAP Network, 2024). These initial programmes were established with a diverse financial background (usually based on national or regional development and nature conservation funds) and operated on a pilot basis. The first results-based payments from the CAP Pillar 2 were made in the 2007-2013 programming period, among others in Ireland and Germany (EU CAP Network, 2024). In the 2023-27 CAP programming period there are already 14 results-based programmes being financed from CAP funds across nine EU Member States (Austria, Finland, France, Ireland, Poland, Germany, Portugal, Spain and Slovenia), and several other countries are experimenting with results-based solutions to promote water resource protection and carbon sequestration (EU CAP Network, 2024). Still, no results-based programmes were developed and tested in Hungary until 2020.

The seed innovation we analyse in this case study is the co-creation of a results-based payment scheme for the Őrség region, Western Hungary within the frame of a Horizon Europe project, Contracts2.0 (grant agreement number: 818190, 2019-2023). This innovative payment scheme was co-designed by various local, regional and national actors, and welcomed by the national government, and although it has not been implemented yet, several ideas emerged on how such approaches could be put into practice over the longer run, either in the local context, or at the national scale in other areas (i.e., water management). The learning history will shed light on the major milestones of co-designing the scheme but will also account for the challenges faced and the potential reasons for not taking it up in its original form.

4.1.2. The Context of this Seed Innovation Case Study

Őrség is a unique area of Hungary, where biodiversity is outstanding, and traditional farming, sustainable tourism, and nature conservation (enacted through the Őrség

National Park Directorate, shortly ŐNPD) coexist (Szépligeti, 2016). Grassland habitats cover barely 10% of the protected area in Őrség, yet they are home to 34% of protected plant species and 19% of protected animal species, including the largest population of the ant butterfly in Europe (Tóth et al., 2019). For a long time, grassland-based animal husbandry was one of the main sources of livelihood in the Őrség, and although the number of farmers has now decreased, farming is still predominantly carried out by family farms. In the last decade, local food products related to grasslands have also become increasingly popular. Local farmers' markets are opening, where high-quality cheeses and other dairy products can be purchased. The species-rich grasslands of the Őrség region provide a number of other ecosystem services besides fodder production, from shaping local identity, through scientific information and environmental education, to increasing the tourist attractiveness of the region. The long-term maintenance of the grasslands is therefore desirable not only from a conservation point of view, but also from a social perspective.

The grassland habitats of Őrség are currently threatened by several factors: the abandonment of cultivation and the subsequent afforestation of the grasslands, the drying out of the grasslands due to climate change, the homogenisation of habitats resulting from large-scale, intensive farming, and the spread of invasive alien plant species (Balázs, 2017). Recognising these threatening factors, an agri-environmental management target programme was launched in 2002 – the Őrség Sensitive Natural Area, later High Nature Value (HNV) area – which provides compensation to farmers in the framework of action-based contracts in order to preserve the grasslands and encourage nature-friendly farming. Over the course of the programme's more than 20 years, the initial enthusiasm was replaced by a gradual dropout of farmers – by 2023, the programme was running with only 11 farmers on 252 hectares (excluding the areas managed by the ŐNPD) (Podmaniczky and Szentirmai, 2023). This is approximately 8% of the privately owned grassland areas in the region, so there is currently no sufficient incentive for nature-friendly farming on a significant portion of the grasslands included in management. One of the most important reasons behind the decline in the popularity of the HNV is small family farmers feeling the amount of support is not proportionate to the increased administrative burden and the sanctions resulting

from failure to comply with them. Another important reason is that farmers consider the regulations to be too rigid, increasingly difficult to implement under the changing climate conditions, and even resulting in suboptimal biodiversity outcomes (e.g. the fixed time period of mowing does not meet the changing nesting habits of some butterfly species) (Podmaniczky and Szentirmai, 2023). Based on all this, Őrség seemed to be an excellent experimental area for developing and testing innovative payment schemes in the frame of the Contracts2.0 project.

4.2. Methodology

This section synthesises the methodology for empirical data collection for the results-based agri-environment payment scheme, as part of Task 4.1 of the DAISY project.

First, to understand the background of the case study, we carried out a literature review on results-based schemes and did a secondary analysis of project documentations from the Contracts2.0 project during the spring and summer of 2025. Second, in the summer of 2025 semi-structured interviews (n=4) were organised with local farmers in the Őrség region who participated in the Contracts2.0 project, during a 3-day field visit. Interviews were carried out in-person (sometimes combined with a short walk around the farm), recorded and transcribed. The average length of the interviews was 1-1.5 hour. Interview topics included: brief personal introduction and context, motivations to take part in a results-based payment pilot, recalling the main steps of the innovation process, major lessons learned, patterns of collaboration and communication, difficulties faced, the potential to use digital tools, future expectations. Additional observations and field notes were prepared when visiting the local farmers' market. Finally, this field visit also included a testing of the field monitoring system, which was designed in a low-tech, easy-to-use way to enable farmers to actively engage in monitoring activities. Researchers received the printed monitoring template, designated the transect, then walked through the transect and assessed the abundance of easily recognisable indicator species (both positive and negative indicators) with the help of ŐNPD colleagues (Figure 05).

Figure 05: Testing the field monitoring system of the Őrség results-based scheme

Third, in September and October 2025 expert interviews (n=4) were carried out with case holders (2 people from the ŐNPD, 1 person from the State Treasury, and 1 person from the Ministry of Agriculture), all of whom had been involved in the co-design of the pilot result-based scheme and were still working on potential future implementations. The interviews were conducted in-person, recorded and transcribed. Their average length was 1 hour. Interview questions included: brief personal introduction and context, motivations to take part in a result-based payment pilot, recalling the main steps of the innovation process and the potential reasons for missing the uptake, major lessons learned, patterns of collaboration and communication, difficulties faced and windows of opportunities to implement a result-based scheme, the potential to use digital tools, future expectations.

Fourth, in October 2025 a cross-project field visit was organised to meet with ŐNPD representatives (case holders), external researchers who participated in the Contracts2.0 project, and local farmers (fig.2). This field trip allowed us to share lessons learned between the Contracts2.0 (818190), and the DAISY projects, and to brainstorm about relevant research questions to be investigated during DAISY. A third EU-funded research project, the Mosaic (101081238) project, also participated

in this field visit. Mosaic focuses on sustainable land use change, and its Hungarian case study, situated in Central-Hungary, fosters the application of diverse incentives to encourage water retention in arid areas. Collaborations with the Mosaic project can provide opportunities for amplification (i.e., applying results-based approaches in water management incentives).

Figure 06: Daisy cross-project field visit in October 2025 – meeting an old female farmer at one of the last family farms of Őrség.

Fifth, a 1-hour long online learning history workshop was held on the 11 November 2025 with the participation of three case-holders, two of them representing the Őrség National Park Directorate, and one of them the Hungarian State Treasury. As a preparation, a Miro board was created based on the desk research and the interviews conducted, which included a detailed timeline of the innovation process and the major milestones identified by the interviewees. This Miro board was revised and complemented during the workshop, where participants added

contextual enablers and barriers, as well as key learning points Figure 07). The workshop was recorded and transcribed for further analysis.

Figure 07: Screenshot of the Miro board filled (in Hungarian) during the learning history workshop. The English translation of the content is included in Annex 2.

A deductive analytical approach was used to qualitatively analyse the interviews. First, recorded interviews were transcribed and cleaned of confidential data, then those segments were highlighted which contained information either on past processes or future expectations. Within these segments, researchers identified major milestones, enabling and limiting contextual factors, and successes or failures stemming from the innovation process. These interim results of the analysis were discussed, refined, and validated during the learning history workshop. The next section gives an overview of the learning history, while Section 4.4 goes into the detailed analysis of motivations, enablers and barriers, and key learning points.

Before discussing the results of this work, it is important to acknowledge the positionality of the researchers. Two researchers from our team (E.K. and B.M.) were actively involved in the Contracts2.0 project - conducting research, organising meetings, fostering participation, and reaching out to policymakers. This inner perspective provided us with a deeper understanding of the innovation process, but at the same time made it more difficult to objectively evaluate its outcomes. The other two researchers (G.B. and K.C.) became involved with this case only during DAISY. This relative distance from the case was perceived as an added value, both during the interviews and when the timeline was created, offering a more critical approach and an increased openness towards how DAISY can build on (and foster the amplification) of the result-based pilot originating in Contracts2.0. Therefore,

researchers' reflection on the learning history (first column of the table in Annex 2) builds on the reflections on G.B. and K.C.

4.3. Synthesis of the Learning History

The learning history can be divided into an antecedent phase (before the Contracts2.0), followed by five main phases of the innovation process during the Contracts2.0 project, and the follow-up phase including emerging new ideas and opportunities for amplification to pursue during DAISY. All phases are described below in detail, while the detailed timeline (including participant quotes and researchers' reflections) can be found in the appendix.

The pre-project phase goes back to a long history of collaboration between the nature conservation department of the Agricultural Ministry (former Ministry for the Environment and Water) and the Hungarian State Treasury, who designed and administered the action-based payment system for high-nature value areas in Hungary. HNV payments have been available in the Őrség region since 2002, and while they were quite popular at the beginning, farmers' motivations to join this scheme dropped dramatically over the years. Realising that farmers dropping out of the payment scheme contributes to the loss of biodiversity, the Őrség National Park Directorate (ŐNPD) started to look for opportunities to create a closer collaboration with local farmers and reform the payment system. This need aligned with the interest of researchers at ESSRG, and resulted in the joint submission of a research proposal in 2018, where ESSRG (research partner) and ŐNPD (practitioner partner) were both participating (Contracts2.0).

The innovation process – the co-design of novel agri-environmental schemes in Őrség - started in 2019 when the submitted project proposal secured funding through the EU Horizon Europe Programme. The project applied a participatory approach: at the local level, the research and the practitioner partners worked together with small-scale farmers, producers, NGOs, municipalities and tourism service providers in a local Contract Innovation Lab (CIL), while at the national level, the research partner organised regular meetings with key policy stakeholders in a Policy Lab. The first step was to establish these two living labs, and then to create a shared objective for the newly emerging agri-environmental scheme. To this end, a visioning and scenario planning process was organised, allowing highly diverse

stakeholders to take an active part. An important added value at this stage was the realisation that stakeholders with different backgrounds – and often conflicting interests – do share very similar values and aspirations for the future of the region. This future vision unified local actors and provided a legitimate basis for further and more detailed planning.

The second phase included a series of expert workshops which narrowed down the aim of the payment scheme and identified targeted habitats and potential indicators to monitor the status of biodiversity. These expert workshops were accompanied by a series of workshops with local stakeholders to create a shared vision of the landscape (i.e., the 'Dream Landscape Workshop) and to cross-validate expert and local knowledge on how the preferred landscape elements can be maintained. These workshops enabled the emergence of shared values (i.e., the ecological and socio-cultural significance of meadows aligned) and allowed for creative thinking on how the result-based approach could be integrated with local value chain initiatives (e.g. local product branding, local markets or basket schemes). It is important to note that these workshops happened during the Covid pandemic, making face-to-face meetings risky and often impossible. Shifting to the online working environment was a challenge for local stakeholders, but at the same time had some positive consequences as well. For instance, ŐNPD colleagues met with some of the farmers, helped them install Zoom or Miro on their computers, helped them join the meetings, or even participated together from the home of the farmer. This very unusual way of connecting nature conservationists and farmers contributed to building trust and respect towards each other.

The third phase included further workshops with local stakeholders to tailor the scheme to their needs and expectations (e.g. regarding the length of the contract or the desired way of monitoring it). These workshops were then followed by testing the selected self-monitoring approach and indicator list, using printed aides (i.e., species list with photos) and easy-to-fill templates. Testing was carried out altogether on 16 fields, including plots of privately owned land and also sites managed by the national park. During field visits ŐNPD colleagues worked closely with farmers, doing the monitoring together and discussing the observations. This self-monitoring approach was compared with monitoring data collected by botanist experts to validate its reliability – as a result, only those indicators were kept in the

system which could be easily and reliably monitored by non-scientific experts. A joint workshop and field trip to Austria was also organised, where result-based schemes are already up and running. At this event not only local stakeholders were present, but members of the national Policy Lab also travelled to Őrség and met directly with local farmers.

The fourth phase had a strong research and analytical focus: final indicators were selected by ŐNPD, monetary values were rendered to them, and payments were calculated by an agricultural economist expert. During this phase, local stakeholders continued to meet but discussions focused more on future applications and business opportunities (e.g. creating stronger collaborations between local farmers and tourism service providers).

In the fifth phase, the project results were synthesised, and the project was brought to a close, and a detailed report on how the result-based scheme could be implemented in the Őrség was published (Podmaniczky and Szentirmai, 2023). This phase included several international meetings (such as project consortium level meetings and thematic conferences) where members of the local Contract Innovation Lab and the national Policy Lab could join, and a closing conference in Őrség where the result-based payment scheme was introduced to a wide ranging audience (including farmers, other national parks in Hungary, regional and national policymakers, and the press). This closing conference was co-organised by ŐNPD and some of the local farmers, which indicates that throughout the project years a long-term collaboration developed (such collaborations are still typical).

The sixth phase, which we could also consider as a post-project phase for policy uptake, included a field visit to test the results-based monitoring approach on different grasslands. Members of the national Policy Lab, and some additional policy actors participated in this field trip and did the monitoring together with ŐNPD professionals. After gaining some 'real-life' experience with the approach, participants discussed potential ways of policy uptake and decided upon organising a conference at the Hungarian Ministry of Agriculture, to gain support and approval for setting aside budget for a regional pilot to test the approach in Őrség. It took six months (and intensive lobbying) to finally realise this conference at the Ministry of Agriculture (December 2023). The event was perceived by the organisers to have been successful, with over 30 participants and detailed presentations and in-depth

discussions of the result-based scheme. Promises were made to take up this work within the Ministry and contact project partners for further support when designing the pilot. However, no follow-up was made on their behalf.

The potential reasons for not yet launching a regional pilot are manifold. Some case-holders highlighted during the interviews and the learning history workshop that only very short time remained in the given financial period to officially launch a new payment scheme, so the lack of uptake might be due to wrong timing (i.e., the policy window was too short so that the seed innovation could not be fed into the system quickly enough to avoid risks with an abrupt implementation) (Rose et al. 2020). Others suggested that the result-based approach was entirely new in the Hungarian legal system, with lots of uncertainties on how it could be managed financially; therefore, it may have seemed less risky to remain with the original action-based approach. Finally, some hints could be found in the interviews relating to the lack of trust by government agencies in farmers' motivations and monitoring skills, and also to a potential change in political priorities. This last point seems also to be reinforced by the fact that some of the members of the national Policy Lab, who were strong supporters of the result-based scheme (and in general of stronger environmental ambitions in Hungarian agricultural policy), left their official policy positions.

Although the results-based scheme developed for Őrség has not yet been put in place, DAISY interviews proved a willingness to continue working on this innovation further on behalf of the National Park Directorate and some of the policy actors, and local farmers also showed openness to follow-up this idea. One promising option is to implement the results-based approach in other policy contexts. In the autumn of 2025, a new collaborative call was published by the Hungarian Ministry of Agriculture inviting farmers to form sustainable water management communities and launch water retention interventions at the landscape level. Although this call is not related to biodiversity conservation or restoration, neither it builds directly on the results-based programme developed in Őrség, it includes elements of the results-based approach (e.g., establishing landscape-level shared objectives and monitoring the results instead of predefined actions). This newly launched call demonstrates that in related policy fields (where results might be easier to monitor than in the case of biodiversity), implementing a results-based approach might face

less resistance. Another option – pursued by the Hungarian State Treasury – is to combine the results-based monitoring system with existing technological solutions (i.e., satellite images) to increase the reliability of monitoring data. While this requires considerable technological development, testing farmers' openness to use more advanced monitoring systems (e.g. mobile apps) could provide valuable information on whether such a combined (technology-supported by still farmer-observations based) monitoring option would be feasible. Finally, ŐNPD also would like to progress with the results-based scheme, but instead of directly embedding it into current CAP subsidies, it tries to find external (conservation-oriented) funding, such a LIFE projects or cross-regional collaborations.

4.4. Analysis

4.4.1. Motivation

Different actors had different motivations at the beginning to join the innovation process. For the ŐNPD, a crucial motivating factor was to build collaborative relationships with local farmers and strengthen their existing links with relevant scientific and policy actors, since learning and experimenting together could improve the local acceptance of the National Park. Another crucial motivation was to find new ways of encouraging farmers to undertake biodiversity-positive farming – as without such incentives, conserving biodiversity in the mosaic landscapes of Őrség seemed impossible. Local farmers were not very strongly motivated at the beginning, but their motivation grew as they realised that their knowledge and opinion was valued. For them, speaking about the challenges they face, elevating these issues to policymakers, and working on a better suited (and less complicated) subsidy scheme was important, as any progress in these areas could positively influence their wellbeing.

For national level policy actors (especially for the Ministry of Agriculture), the main motivation was to improve the subsidy system's acceptance among farmers (as on our interviewees said: *'show another face of the agricultural subsidy system'*) and to search for new possibilities and solutions to current problems (i.e., payments are not sufficiently incentivising for farmers). The State Treasury highlighted that result-based payments were gaining increasing popularity across Europe, and results-orientation has now been strongly embedded in the CAP. This was perceived by

some as exerting pressure on the Hungarian agricultural policy to start developments towards this direction. This innovation project was able to provide a safe testing environment to experiment with this new payment system. Therefore, a key motivation was to gain some experience with this approach by the time when result-based payments must be incorporated in the national CAP plans.

4.4.2. Enabling Factors

This innovation process could not have happened without the EU-funded Contracts2.0 research project which provided stable funding for four years (i.e., one new employee was hired by ŐNPD to keep in touch with farmers, and several meetings, study trips and workshops were organised). The project also made it possible to create a strong participatory setup with the help of social scientists, placing ŐNPD in the centre of local collaborations. Convening stakeholders and experts from very diverse backgrounds and opening up towards transdisciplinary research practices was a crucial success factor. A further enabler was that good examples of result-based schemes already existed across Europe, therefore farmers and policymakers could trust the concept more. The timing of the innovation process was also advantageous as the Contracts 2.0 research project was running when the national CAP strategic plans were still in the negotiation phase (so policymakers could – in theory – build the new strategic plan in a way that could accommodate result-based schemes). Earlier collaboration between key policy actors was another enabling factor, making it easier to find allies and lobby for the implementation (even if at the end this was not successful). Finally, the favourable local reception of the innovation process was partly due to the emerging need for stronger community collaborations at the local scale (i.e., local community tended to be fragmented and lacking opportunities for joint initiatives), but also due to the fact that Őrség is a relatively small region, with a limited number of farmers, most of them facing very similar challenges (so there were not very many diverse perspectives to integrate during the innovation process).

4.4.3. Hindering Factors

Despite the presence of strong enabling factors, including the active and supportive participation throughout the process, and the overall positive reception of the outcome by the Ministry of Agriculture, the results-based scheme has not been

implemented as a pilot. This highlights that several hindering factors have limited the potential of this innovation process, and while some of them could be overcome and even turned into an enabler, other ones strengthened over time.

Among the hindering factors it is important to acknowledge that farming is characterised in this region by several uncertainties. Local (indigenous) farmers are aging and therefore giving up traditional farming, while newcomers are not accepted by the local community and also may not have enough local knowledge to continue the traditional practices without significant guidance. Although there is a revival of local markets and direct selling opportunities, these provide a livelihood only to a small subset of farmers (who can also process their raw material), while the rest sell their produce to wholesalers at low prices. Therefore, local markets in general are not strong enough to provide a stable livelihood for farmers who need to look for selling opportunities or extra income sources. Furthermore, the digital skills of farmers are generally weak (except a few young farmers), which again makes it difficult to engage them in a more technology-oriented innovation. At the same time, the increased use of online meeting tools during the Contracts2.0 project due to the pandemic showed that digital skills can be quickly improved, especially if it is enacted through peer-to-peer learning, instead of written guidelines.

Hindering factors also emerge from the general socio-ecological context of the Őrség region. Animal husbandry is decreasing (due to the aging of farmers, but also due to lack of economic opportunities), which jeopardises the good ecological status of protected grasslands. While the national park directorate cultivates some of the protected areas itself, offers eco-tourism opportunities, and launches restoration projects and awareness raising campaigns, there is still a general lack of trust towards the ŐNPD in the local community: the ŐNPD is often considered a counter-interested actor, making conflictual decisions which go against the economic interest of the local community. This atmosphere does not provide a fertile ground for innovation – but as we will explain in the next subsection, through carefully designed participatory activities this weakness could be turned into one of the major enabling factors.

Hindering factors are also associated with the political context of agri-environmental subsidies in Hungary. As we explained before, results-based

payments represent a new approach in our country, including higher political risks (i.e., a results-based scheme is more complicated to monitor by the authorities, thus it involves higher financial risks of not being able to administer the payments correctly). Furthermore, nature conservationists seem to be sceptical about the tangible positive impact of these subsidies.

Finally, Őrség is a relatively small region with a small number of farmers and with quite specific socio-ecological contexts (not very typical for the rest of Hungary). While we considered this as an enabling factor too, the uniqueness of the area makes it more difficult to transfer the results-based scheme designed for Őrség (i.e. its target habitats, indicators, and payment levels) to other regions. Amplification should be considered more broadly, such as options to implement results-based schemes in other geographical areas but with other priorities (e.g., water management), or options to launch the Őrség results-based scheme not as part of the CAP but as a local-regional initiative.

4.4.4. Learning Overview

Learning appeared at several levels and for multiple actors during and after the innovation process. Here we list the major learning points based on the interviews and the learning history workshop, also indicating who gained the given knowledge or experience.

Table 02: Major learning points and who gained the given knowledge or experience in Seed Innovation 02

Who learned?	What did they learn?
Farmers, policymakers, social scientists, ŐNPD	Factual learning about biodiversity, recognition and observation of protected species and valuable landscape elements through co-creating and testing the result-based monitoring system. Learning about which indicators are more reliable in which context. Comparing scientific and traditional ecological knowledge.
Farmers	Using online tools for discussions and planning, improving skills and confidence in online participation.
ŐNPD	Understanding the importance of inclusion and gaining skills in participatory and collaborative tools – with this in turn contributing to

	turning some of the hindering factors into a strength, e.g. building trust between the National Park Directorate and farmers. This also led to new (long lasting) collaborations.
ŐNPD, local farmers	Getting to know each other and learning new ways of collaboration. At the online workshops during the pandemics both parties opened up their personal sphere to each other. They met as people and not only as professionals, which contributed to increasing respect for each other, building trust, and creating room for long-term collaborations.
Policymakers	Learning new (low-tech, easy-to use) monitoring approaches which could prove that self-monitoring could be trusted. The Hungarian (national level) decisionmakers had concerns that the EU institutions would not accept the seemingly simple self-monitoring methods. The excursion to the case study area, and the field experiments using this monitoring approach proved the policymakers that this kind of monitoring could be effective and could be credible also for the EC institutions.
Social scientists, ŐNPD, local farmers	Improving collaborative skills and the debate culture via in-person meetings. The strong personal presence, frequent gatherings and social time spent together (joint dinners, walks, field trials etc.) inherently contribute to trust-building and collaboration, which are crucial success factors of seed innovations. Actors who are often counter-interested in their everyday work (for example the ÖNPD monitors the farmers activity), could create a joint vision which could become the starting point for the seed innovation.
Social scientists, ŐNPD	Understanding better and acknowledging the inherently complex and non-transparent character of the policy processes, which are also overpoliticised even in professional policy areas. Even with 'ambassadors' in different policy units, and a strong collaboration and willingness to make a change at their side, if the innovation seed does not meet the needs of the highest decision-makers, its adoption is very uncertain.

4.5. Conclusion and Next Steps

The innovation process in Őrség demonstrates both the transformative potential and the inherent fragility of co-designing policy instruments. While the motivations of participating actors differed considerably, the project succeeded in creating a shared space where farmers, policymakers, conservationists and researchers could work towards a common goal: developing more adaptive, biodiversity-positive agri-environmental approaches. Crucially, the process strengthened local relationships, enhanced farmers' sense of agency, and allowed national policymakers to gain first-hand experience with result-based payment concepts at a moment when the CAP reforms called for greater results-orientation.

Several *enabling factors* made these achievements possible, including long-term EU research funding, the presence of social science facilitation, existing European examples of result-based schemes, favourable policy timing, and strong local willingness to engage in community-building efforts. These conditions allowed ŐNPD to become a central convener and helped build trust where it had previously been fragile.

Nevertheless, persistent *hindering factors* ultimately constrained the policy impact of the innovation. Structural challenges in the local farming community, socio-ecological vulnerabilities such as declining animal husbandry, and longstanding mistrust toward the National Park Directorate created a difficult context for sustained innovation. At the national level, political risk aversion, scepticism about the effectiveness of result-based payments, and limited commitment from high-level decision-makers, hindered the adoption of the scheme despite operational-level support. The small scale and unique characteristics of the Őrség region further complicated scaling and broader policy integration.

Even so, the *learning dimension* of the project represents a significant and enduring outcome. Participants deepened their ecological knowledge, improved digital and participatory skills, and built new alliances across institutional and professional boundaries. Perhaps *most importantly, the process demonstrated that trust-building, frequent personal engagement, and recognition of local knowledge are not peripheral but central* to successful policy co-design. At the same time, the

experience revealed the limits of bottom-up innovation when higher-level political priorities are misaligned.

Next Steps

Despite not being taken up yet as a new policy instrument, the Őrség result-based scheme continues to *show strong future potential*. Participants themselves still view it as promising and actively explore ways to relaunch or amplify it, e.g. through combining the currently low-tech monitoring approach with remote sensing or digital monitoring that could enable regional or sectoral amplification. New project ideas are emerging within the ŐNPD, reflecting internal ownership and continued commitment. On the policy side, decision-makers also regard the approach as a viable alternative to mainstream agri-environmental instruments, and elements of the experiment may already have influenced emerging constructs such as the water-premium (as part of the instrument on non-productive agricultural investments of the revised CAP). Together, these dynamics suggest that the initiative endures as a seed innovation: socially anchored, technically improvable, and institutionally recognisable. Thanks to the perseverance of the key actors (case-holders) it is ready to be reactivated when favourable policy windows open (Rose et al., 2020).

Ultimately, the Őrség innovation process illustrates that transformative change in policy is rarely immediate or linear. Even when adoption is not achieved, participatory experimentation, knowledge co-creation, and trust-building can establish the foundations for systemic shifts. By fostering durable relationships and enhancing capacities across multiple actors, such initiatives lay the groundwork for more adaptive, evidence-informed, and biodiversity-positive agri-environmental policies in the future.

5. Seed Innovation 03: Urban-Rural Transformations through Commons Governance in Germany

Richard Voelker, Ilkhom Soliev, Edit Hunyadi, Tatiana Carvalho

5.1. Case Introduction and Context

The third DAISY seed innovation case study explores urban-rural transformation in Germany through commons-based governance. For this case we examine self-organised institutions (Armitage, 2008; Ostrom, 1990) related to food systems that were founded by local community members and operate at the local level: Community Supported Agriculture (CSA) and Consumer Cooperatives (CCs). CSA is characterised as an approach or social movement that is based on a tight connection between farmers and consumers and foremost addresses concerns about quality of food and survival of small-scale farmers within an industrialised food system (Cone & Myhre, 2000; Schmidt et al., 2025). CCs are democratically governed food retailers, owned and operated by consumers as an alternative to traditional capitalist retail systems (Ekberg, 2012).

Both innovations are actors within a food system in which the majority of stakeholders are either exposed to or act as drivers of the consequences of climate change and biodiversity loss, such as declining food security and food equity (IPBES, 2025; IPCC, 2022). In the literature, the widely applied market mechanism of food commodity supply and demand (Gale, 1955; Trostle, 2008) is also used to classify actors in the food sector according to their potential to mitigate drivers and effects of biodiversity loss. These actors are broadly grouped into the supply-side (production, storage, transport, processing, trade) and the demand-side (consumption practices, diets, food waste) (Mbow et al., 2019). Although CSA and CCs share overlapping characteristics, such as CSA supplying food commodities that CCs (partly) consume, they differ in their approaches to tackling food security and inequality. CSA can be understood, in short, as a new model of organising agricultural food production within the industrial food system (Blättel-Mink et al., 2017). Therefore, we classify CSA as a supply-side actor. Conversely, CCs represent

the demand side, as they focus on novel, self-organised, and self-determined consumption practices.

The core principle of a CSA is its collective financing approach: all running costs of production, storage, or transport are distributed among the shareholders (consumers), who provide funding in advance of the actual harvest (in some cases also volunteer labour) and regularly receive from the farmer a bundle of the harvest in return (Zech et al., 2025). This system creates a robust relationship between producers and consumers — farmers gain financial stability and support, while members enjoy reliable access to fresh, local produced food (Volz et al., 2016). Through this mutual commitment, the CSA model encourages shared responsibility and deepens connections within the community, allowing the initiative to remain flexible and responsive in the face of environmental risks, such as caused by climate change and biodiversity loss (Medici et al., 2021). Against this backdrop, CSA is recognised as a social innovation (Bietau et al., 2013; Blättel-Mink et al., 2017; Schartinger et al., 2020) with potential to contribute to sustainable, resilient and democratic food systems (Blättel-Mink et al., 2017; Brown & Miller, 2008a; Hassanein, 2008; Rosman et al., 2024). For example, CSAs are recognised for their positive impact in reducing resource overuse and greenhouse gas emissions through environmentally friendly farming practices. (Haack et al., 2020).

On the demand-side, we looked at CCs (also called 'Solidarity Purchasing Groups' or 'Buying groups'). Such kinds of citizen-consumers (cf. Johnston, 2008; Scammell, 2000) are encouraged to reconsider their relationship with, and role in, the food system which means moving beyond purely economic transactions, i.e. the act of buying commodities and instead emphasising the social, cultural and environmental impact of food (Renting, 2012; Wiskerke, 2009). CCs create spaces for food provision and distribution outside the established food system and conventional marketplaces (Renting, 2012). At different scales, people form groups to access, for example, local, seasonal or organic food by purchasing in bulk and using volunteer labour to distribute the goods among members (Little et al., 2010). CCs underline consumption as an ethical action, that can incorporate ‘right’ and ‘wrong' decisions, and deliberate about what to put on the shelves, how to sell it, and to whom it should be accessible (Zitcer, 2015). That said, CCs have the potential to create a more inclusive system for marginalised people by fostering their participation and

addressing the socio-economic dynamics that perpetuate their marginalisation within the food supply chain (Maestripieri, 2017).

This case study examines social innovation initiatives in Germany. For both CSA and CCs, we selected two case holders each, varying in size, history, organisational structure, level of digitalisation, and opportunities for community participation. By doing so, we aim to illustrate the variety and different scale of social innovations in the food system (Little et al., 2010; Renting, 2012). The rationale for our selection is to encompass both large-scale and small-scale CSAs and CCs, as determined by the number of participating members, which serves as a convenient metric. To limit variables, we chose four cases from central Germany, assuming their climatic (relevant for CSA), structural, and sociodemographic conditions are similar. With this in mind, we selected *KoLa* and *Gemüsehof Naderkau* as CSAs, and *Rübchen* and *Koope* as urban CCs. All four initiatives are located in the eastern part of Germany, clustered around the city of Leipzig (state capital of Saxony, 631.000 residents) in the federal states of Saxony and Saxony-Anhalt. *KoLa* lies northeast of Leipzig, while *Koope* is situated within the Leipzig urban area. *Rübchen i*s based in the nearby city of Halle (Saale), and *Gemüsehof Naderkau* is located in rural Saxony-Anhalt to the north of Leipzig. Taken together, the initiatives form a compact regional constellation radiating outward from Leipzig, with all locations situated within an approximate 60 km radius of the city.

Figure 08: Map of Germany showing the location of Leipzig (region of the investigated case holders). Source: Britannica (2025)

Together, these initiatives represent a diverse spectrum of collaborative food provisioning models in Germany, ranging from long-established cooperative structures to recently founded grassroots projects. *KoLa* is a recently founded CSA that has rapidly expanded its membership base (2000 in 2025) and invested significantly in infrastructure. *Gemüsehof Naderkau* (50 members in 2025), meanwhile, reflects a more incremental, ecologically grounded CSA emerging from personal lifestyle motivations. *Rübchen* (260 members in 2025), with its more than 25-year history, embodies a mature CC shaped by long-term volunteer commitment and the deliberate maintenance of non-commercial principles. In contrast, *Koope* is a relatively young CC founded in 2021, characterised by dynamic early-stage organising, neighbourhood engagement, and diverse member motivations (47 Members in 2025). Examined collectively, these four cases provide a rich empirical basis for analysing how social innovations evolve over time, how they navigate organisational and ecological challenges, and how they contribute to broader processes of socio-ecological transformation.

Although CSA and CCs are often portrayed as beneficial for the environment and equity, scholars also discuss that they can be non-inclusive (Zitcer, 2015) and

ineffective for local economies or in terms of sustainable farming (Forssell & Lankoski, 2015; Tregear, 2011a). For example, one critique is that CCs rely on unpaid labour from members, potentially excluding lower-income people or single parents unable to contribute uncompensated time (Zitcer, 2015). Additionally, some researchers find that farmers often view CSAs as financially unsustainable, leading them to depend on subsidies or additional income sources (Brown & Miller, 2008b; Tregear, 2011b). These mixed assessments point to a research gap regarding whether, and to what extent, social innovations such as CSAs and CCs can effectively contribute to addressing biodiversity loss and food inequality.

5.2. Methodology

To address this gap, this case study first aims to explore the motivations, enabling factors, and barriers seed innovations in Germany have faced from their origins to the present. To do so, we examine the history of the introduced case holders using the learning history (LH) timeline approach. To achieve this, we conducted semi-structured interviews with two or three representatives from each of the four CSA and CC initiatives, which led to a total amount of nine interviewees. The semi-structured interview guide, available in both German and English (as the interviewees are native German speakers), covered several key areas, including 'Introduction and Context', 'Timeline of Events', 'Learning Moments', 'Collaboration and Communication', 'Innovation Dynamics', and 'Ambition and Next Steps'. All interviews were recorded, transcribed (a total of 178 pages), and systematically coded using a category framework comprising 29 sub-categories grouped into eight main categories, which were deductively derived from the interview guide. The outcomes of this process were summarised in a three-column table, where each milestone is accompanied by descriptive accounts, direct quotations, metaphors from case holders, and researchers' reflections. We call this table our first draft of the LH. In an online workshop, we presented each draft to our case holders and asked them to reflect on each milestone and associated accounts and quotations. Through the online workshop, we gained valuable reflections, agreement, disagreement and additional information from the case holder. We took that outcome and enriched our drafted LH which we now call the final LH.

In contrast to the other DAISY case studies, which each focus on a single initiative, our case study includes four case holders. This allows us to reflect the diversity of

social innovation trajectories in the German food sector. At the same time, covering several initiatives limits the depth with which we can describe and analyse the historical development of each individual case. Nonetheless, this report aims to provide meaningful insights into the broader landscape of food-related social innovations and their potential to address biodiversity and equity challenges. Nonetheless, this report aims to contribute to a better understanding of the broader landscape of food-related social innovations in Germany by documenting and reflecting on the learning histories of four distinct initiatives. The remainder of this report is structured as follows: Each initiative is presented in its own section, beginning with a synthesis of its LH. This is followed by an analysis of the initiative's motivations, enabling and hindering factors, and key learnings, enriched with quotes from the respective case holder representatives (in italics). We begin with the case studies of CSA *KoLa* and *Gemüsehof Naderkau*, and then continue with the CCs *Rübchen* and *Koope*. The report concludes with a final summary. Full versions of the LHs are included in the appendix and will also be made available via Zenodo.

5.3. Learning Histories

5.3.1. KoLa

5.3.1.1. Synthesis

KoLa's (CSA) trajectory is characterised by a rapid scaling process and a high degree of organisational mobilisation. One of the founders had previously worked in a smaller solidarity-based farm and realised that this model of a limited CSA could be developed on a larger scale. This early idea was not yet tied to a specific location, legal form, or concrete business structure; rather, it reflected a desire to build a new, modern farm from the ground up and make this form of agriculture accessible to more people. A turning point came in May 2018**,** when a local church community approached the future founders and offered access to suitable agricultural land. This made it possible to seriously explore the concept and triggered a more intensive planning phase: developing the production concept, designing the cooperative structure, estimating investment needs, and building public interest among potential members. This planning period continued until the formal founding of the cooperative on 23 September 2019. In total, the structured preparation and

concept development lasted roughly one and a half years, from the moment land became available in 2018 to the official establishment of *KoLa* in 2019.

A subsequent major milestone occurred in May 2020, when *KoLa*'s first funding campaign—directed at its own cooperative members—initially aimed at raising €200,000 but following massive public outreach and building a strong base of supporters, the campaign ultimately yielded €500,000, enabling large-scale investment in wells, building foundations, and essential farm infrastructure. The initiative formally took over its own agricultural land on 1 August 2020**,** marking a decisive point of transition from planning to operationalisation. Only two months later, on 3 October 2020, *KoLa* celebrated its first anniversary, signalling the establishment of a functioning organisational structure. Another central milestone after this foundational phase was in November 2020, when *KoLa* unexpectedly surpassed internal projections by reaching 1 000 members, demonstrating remarkable public resonance and trust within a very short period.

The winter of 2020/2021 further constituted a critical period, during which construction work faced significant time pressure and adverse weather conditions, emphasising the intensity of *KoLa*'s early operational challenges. In the following years, *KoLa* underwent an intensive phase of consolidation, expansion, and professionalisation. In 2021, the cooperative moved from temporary fields onto the newly established farm site, where key infrastructure (such as the packing hall and cooling facilities) was completed. This transition enabled *KoLa* to stabilise its operations and manage weekly deliveries more effectively. By 2022, the organisation had begun to invest in long-term agricultural systems, including the planting of orchards and vineyards and the construction of a combined fire-protection and biodiversity pond. Internally, the introduction of sociocratic governance structures marked an important step toward improving coordination and decision-making as the team and operational complexity grew. In 2023, *KoLa* confronted severe climate-related setbacks when frost events destroyed nearly all blossoms and young fruit, demonstrating the vulnerability of perennial crops. This experience led to the decision to install a frost-protection irrigation system and to intensify planning for a new large greenhouse to enhance production security. By 2024, *KoLa* had implemented key climate- and energy-related innovations, including the installation of the frost-protection system and the integration of an

electric delivery truck powered by on-site solar energy. These developments, alongside continued progress in greenhouse planning, strengthened *KoLa*'s long-term resilience and aligned practical operations with the cooperative's broader ecological vision.

The overall trajectory is shaped by a strong alignment among stakeholders regarding ecological agriculture and cooperative governance, yet also by the practical necessity of rapid institutionalisation to meet the scale of the endeavour. This synthesis highlights a project defined by accelerated growth, infrastructural consolidation, and collective enthusiasm, which together underpin *KoLa*'s emerging role as a transformative regional food actor.

5.3.1.2. Analysis: Motivation, Enabling and Hindering Factors, and Learnings of KoLa

KoLa (CSA) aims to build a large scale, democratic farming cooperative that will change regional food supply and support ecological transformation. Founders and early members were driven by intertwined ecological, social, and economic concerns: securing land for community-oriented farming, ensuring fair labour structures, and creating a resilient alternative to industrialised agriculture. Enabling factors emerged from a combination of organisational capacity, strong collective mobilisation, and access to financial and social resources. The founding group brought together a broad set of skills, including expertise in agriculture, construction planning, cooperative law, finance, and project management which allowed them to design a complex operation from scratch and to navigate administrative and technical challenges effectively. At the same time, extensive public outreach and early community engagement generated wide social support, leading more than a thousand people to express interest in joining even before operations had begun. This collective mobilisation not only legitimised the initiative but also ensured a strong membership base from the outset. Finally, *KoLa* was able to secure essential financial and social resources: cooperative members provided substantial start-up capital through early loan campaigns, institutional actors such as the local church facilitated access to land, and partnerships with local retailers strengthened distribution channels. Together, these factors created a fertile environment in which the cooperative could move from an ambitious idea to a functioning, large-scale agricultural enterprise.

However, the initiative also displayed heterogeneity in experiences: while some perceived the rapid expansion as empowering and historically significant, others were overwhelmed by the intensity of construction phases, time pressure, and the need to implement formalised governance structures earlier than anticipated. Hindering factors primarily involved a combination of external contingencies and internal organisational pressures. Externally, *KoLa* faced significant uncertainty around water drilling, as the availability and depth of groundwater could not be reliably predicted, creating the risk that essential irrigation infrastructure might fail before the project had fully begun. Regulatory requirements further slowed progress, with permits for construction and agricultural infrastructure demanding extensive documentation and coordination with multiple authorities. Weather-dependent construction challenges—particularly during the harsh winter of 2020/2021—introduced additional delays, as frozen ground and persistent precipitation hampered building work at a moment when the schedule was already tight. Internally, the sheer scale and pace of the project produced tensions within the team: the transition from a grassroots initiative to a large, professionally managed cooperative required rapid institutionalisation, new forms of coordination, and clarified responsibilities: *'At some point, it was no longer such a small project; instead, there were a lot of people involved, many different areas to manage, and a great deal of coordination was required'*. While these steps were necessary for operational stability, they sometimes risked limiting the participatory practices and collective decision-making that had originally motivated many early members. Over the course of this development, *KoLa* acquired significant organisational learning. The group developed a refined understanding of the complexities inherent in cooperative large-scale agriculture *('At the beginning, you underestimate how complex everything becomes once it grows to that size')*, learning how to balance democratic ideals with professionalised management processes *('Sociocracy was an attempt to keep participation while at the same time making decisions more efficient')*, how to distribute responsibility sustainably *('Introducing new governance structures helped to spread responsibility more evenly and take pressure off individuals')*, and how to maintain internal cohesion despite rapid growth *('Because everything grew so fast, it became harder to keep everyone on the same page')*. For example, they learned to balance participatory decision-making with the introduction of professionalised management processes, such as formalised

coordination routines, clearer role definitions, and dedicated responsibility for administrative, financial, and logistical tasks. This shift required acknowledging that certain functions—such as crop planning, financial oversight, labour management, and infrastructure development—could not be handled collectively on an ad hoc basis but needed stable structures and accountable leadership. These insights have shaped *KoLa* into a more resilient actor, capable of navigating both ecological uncertainties and organisational challenges while sustaining its transformative ambition.

5.3.2. Gemüsehof Naderkau

5.3.2.1. Synthesis

The development of *Gemüsehof Naderkau* (CSA) has followed a distinctly gradual and natural progression. The initiative began around 2020, coinciding with the two founders' relocation from Leipzig to a rural setting and the establishment of their first cultivation areas. The development of *Gemüsehof Naderkau* unfolded as a predominantly personal rural project rather than a structured CSA initiative. After relocating from Leipzig and acquiring the farm, the two founders initially focused on establishing their cultivation areas, managing all tasks themselves and operating much like a self-sufficiency garden. Early distribution was informal and relied on their social network, with friends from Leipzig receiving vegetables on an occasional basis—often transported in the founders' car during work trips to the city. At this stage, the initiative had not yet adopted a formal CSA framework. Instead, it evolved organically as routines, infrastructure, and local practices gradually took shape.

The inaugural growing season, initially supported by ten members, represents an early milestone in the transformation from self-sufficiency toward community-supported agriculture. In the following years, infrastructural expansion played a central role: by 2022/2023, the construction of two polytunnels comprising approximately 300 m² enabled more reliable production and an extended harvest period, with additional tunnels planned for the 2024/25 seasons. Organisational structures developed alongside these physical improvements, including the formation of external pickup points: first in Leipzig in 2020, followed by Dessau around 2021/2022 as well as the gradual introduction of community-building

events. From 2022 onward, participation in a research project as practice partner further strengthened the ecological orientation of the initiative, deepening its engagement with biodiversity and ecosystem-based management. The CSAs membership continued to grow throughout these developments, reaching approximately 32 full harvest shares across 47–50 households by 2025, signalling the project's gradual consolidation. The overall timeline thus reflects a shift from an exploratory, lifestyle-driven engagement in agriculture toward a mature CSA model in which ecological education, community formation, and biodiversity stewardship are increasingly institutionalised.

Figure 09:Polytunnel at Gemüsehof Naderkau, October 2025 Credits: Richard Völker

5.3.2.2. Analysis: Motivation, Enabling and Hindering Factors, and Learnings of Gemüsehof Naderkau

The motivations underpinning the *Gemüsehof Naderkau* (CSA) initiative are grounded in a personal and affective relationship to ecological cultivation, rural living, and alternative forms of livelihood. Initially driven by the founders' desire to engage in self-sufficiency and meaningful manual work, the project evolved into a community-supported agriculture scheme as their skills, ecological knowledge, and sense of responsibility toward the land expanded. Enabling factors included strong intrinsic motivation, which was grounded in a long-standing aspiration to establish an ecologically oriented livelihood in a rural setting. Their deliberately incremental, step-by-step developmental approach created space for experiential learning and continuous adjustment during the early years, allowing the initiative to evolve organically rather than through a predefined blueprint: '*We're not doing this on the drawing board, saying 'okay, this goes here and that goes there, and then it's*

finished.' Instead, it's more like: 'okay, we'll do something next year—come on, let's add this as well.' Okay? We add another thing—and it develops over time'. A further enabling factor was the presence of a supportive initial member base, partially drawn from established social networks in Leipzig, which provided trust, stability, and early commitment as the project transitioned from self-sufficiency to a formal CSA structure.

Material enabling factors, included the conversion of a previously unused rural property into a functioning horticultural site, the stepwise construction of polytunnels between 2022 and 2023, and the establishment of multiple distribution points, initially in Leipzig from 2020 onward, and subsequently in surrounding cities, as logistical routines developed. These physical developments were complemented by essential social enabling factors, such as the introduction of transparent weekly communication formats during the early seasons, the maintenance of close personal relationships with members throughout the project's formative phase, and the cultivation of trust through a consistently demonstrated ecological commitment that increasingly shaped both production practices and the project's public identity.

Differences in perspective among participants were subtle but present: some members had different expectations regarding harvest size or seasonal variation, and the rhythms of small-scale ecological production. Varying levels of ecological literacy meant that some members required additional explanations, contextualisation, or informal educational outreach. Hindering factors also emerged from structural constraints, including limited financial reserves, the ongoing necessity to maintain off-farm employment during the establishment phase, and recurring concerns about overextension, particularly the apprehension that enrolling too many households might exceed the farm's productive capacity. The emotional labour embedded in biodiversity stewardship further complicated decision-making, as the founders navigated the tension between cultivating beds intensively and preserving areas intended for ecological regeneration and habitat development.

The founders developed an understanding of their dual identity as producers and educators, through repeated interactions with members, in which varying expectations regarding seasonal rhythms, ecological practices, and crop diversity made it clear that food provision alone could not sustain the initiative. As they

increasingly encountered questions by the shareholders about cultivation methods, biodiversity, and harvest fluctuations, the need for pedagogical engagement became apparent, encouraging them to adopt more intentional forms of environmental communication: *'You have to explain it, of course. And even when it has been explained, it is still not understood. It is, in fact, an educational process'*. Participation in the multi-year research project *'[pane]'* by *TU Berlin* further reinforced this orientation by exposing them to broader discourses on soil health, biodiversity, and community formation, thereby validating the educational dimension of their work and situating their farm within a wider learning network. This evolving awareness reshaped the project in several ways: regular communication formats such as weekly harvest letters became more didactic and reflective; community events were designed not only as social encounters but also as opportunities for ecological learning; and biodiversity management gradually shifted from an intuitive practice to a consciously articulated principle that could be explained, shared, and collectively upheld *('Our goal is to build a healthy ecosystem in our garden and, in this way, keep the plants healthy enough to achieve good yields while remaining sustainable—working in a soil-building way and promoting biodiversity. This has become increasingly important to us in recent years, and we also want to place a growing emphasis on educational work in this area')*. These learnings have deepened the project's capacity to balance ecological responsibility with social cohesion and economic viability: *'It's a real balancing act, because you keep thinking you should be doing more for nature—but then the vegetable bed simply remains unattended'*.

5.3.3. Rübchen

5.3.3.1. Synthesis

The *Rübchen* (CC) timeline spans more than 25 years, making it the most historically established initiative within this sample. Founded in the late 1990s *Rübchen* emerged from a group of approximately a dozen individuals who were motivated by a shared political-ecological commitment to self-managed, community-based food provision. Their aim was to create a non-commercial alternative to the dominant food retail sector, where members could access organic and sustainably sourced products at fair prices while participating directly in decision-making and operational tasks: *'For me, it also has transformative potential*

politically, because it's a store—an organisation that is completely self-organised, functions without hierarchy, and can essentially be a utopian preview [...] of [...] food security'. The founding members were predominantly young adults and students active in Halle's alternative and left-leaning sociocultural scene, and the CC has since consistently attracted a similar demographic profile: people with strong environmental values, interest in collective organisation, and willingness to contribute unpaid labour.

Rübchen's early trajectory involved settling into a small store location in the centre of Halle, which constituted an important foundational milestone. Over the following decades, the initiative expanded to a membership of approximately 260 members (autumn 2025) and, after about five years, moved into facilities with greater capacity, while deliberately resisting pressures to grow beyond a manageable scale. Structural consolidation milestones include the establishment of a member-run governance model, the long-term functioning of a volunteer-based division of labour, and the creation of routines for procurement, accounting, and shop operations. The CC frequently debates issues like organic certification, card payments, and balancing local sourcing with regulatory compliance. Changes in regulations, such as the EU's cash register requirements in 2020, served as external milestones that led *Rübchen* to adjust its operations, even though these changes were not central to the company's core values. Over the course of its development, *Rübchen's* stability has been maintained through a consistent dedication to non-commercial food provision, adherence to political-ecological principles and the fostering of a collaborative environment. This stability derives not only from the formal decision to pass products on at purchase price, but also from the cultural commitment among members to resist market logics or marketing nudges and prioritise collective welfare over economic expansion. *Rübchen's* political-ecological orientation—grounded in values such as short supply chains, support for small organic producers, scepticism toward industrial agriculture, and democratic self-management—acts as a normative anchor that guides decision-making even when external pressures or internal disagreements arise. The collaborative environment is sustained through mandatory member labour, trust-based routines (such as self-weighing, self-checkout, and mutual oversight). In the beginning, knowledge, skills and decision-making processes were concentrated in the hands of only few

members which *Rübchen* has since worked to overcome. Now, the members cultivate an everyday practices of shared ownership and responsibility, reinforcing the cooperative's social cohesion.

This long-term trajectory illustrates how a grassroots food initiative can persist by continuously renegotiating its identity in response to both internal generational dynamics and external structural changes. Internally, shifts in membership composition, such as generational turnover, diverging levels of engagement, and debates over the balance between idealism and pragmatism, require the organisation to revisit foundational principles and reinterpret what 'self-organised, non-commercial food provision' means in practice. This renegotiation occurs whenever internal dynamics or external pressures introduce tensions between foundational principles and everyday operational realities: *'And then we realised that the idea everyone still had in mind about what the [CC] actually is no longer quite matches reality. Buying cheap organic food here isn't really the case anymore. So it has to be more than that*'. Several examples illustrate how these identity work processes unfold. First, recurrent debates about the product range demonstrate how members must continuously redefine their shared understanding of 'good food'. Questions concerning seasonality, the role of highly processed organic products, and the inclusion of non-certified but trusted local producers reveal how ecological ideals encounter practical constraints. These discussions illustrate that food ethics within the cooperative are not static; rather, they require constant reinterpretation in light of members' changing expectations and the regulatory burdens faced by small-scale suppliers. Second, the cooperative's approach to organisational scale has become a central site of identity negotiation. While *Rübchen* was founded on an ethos of openness and collective participation, spatial limitations, logistical challenges, and capacity constraints led the membership to introduce waiting lists and cap the total number of active members: '*At some point we said we don't want to grow any further because it becomes problematic to keep it truly member-run'*. This shift required a rethinking of what it means to be a 'community-run' or 'membership-led' initiative, balancing inclusivity with the need to preserve manageability and uphold the cooperative's participatory structure.

5.3.3.2. Analysis: Motivation, Enabling and Hindering Factors, and Learnings of Rübchen

Rübchen's motivations are historically rooted in the desire to create an alternative to mainstream food retail, long before ecologically grown food commodities were widely available in Germany. The cooperative sought to secure access to ethically sourced food, support small-scale local producers, and provide a community-based counter-model to capitalist market structures: *'There's simply no economic interest. The [CC] has no interest in making high sales and I think so much follows from that'*. Over its more than 25-year development, enabling factors included a stable core of committed volunteers. Early members assumed responsibility quickly and, as the cooperative expanded, tasks accumulated incrementally without formal redistribution. This resulted in a long-standing group of 8–10 highly engaged individuals who embodied much of the initiative's institutional memory. Their commitment was reinforced by a strong normative understanding that the CC's functioning depended on the reliability and integrity of this inner circle.

Furthermore, the gradual accumulation of experiential knowledge, and the establishment of enduring governance routines that allowed the initiative to remain resilient despite member turnover. Over the years, essential organisational skills, i.e., accounting, procurement, and IT maintenance, became embedded in a small core of long-standing volunteers who had taken on increasing responsibilities as the cooperative grew. These members upheld reliable routines for shop operations and coordination, reinforced by a shared understanding that failures in key tasks could disrupt access for the entire membership. Even when central figures left, the cooperative adapted by redistributing roles and creating backups, demonstrating the robustness of its accumulated practical knowledge: *'Except for our store and finance positions, two people are paid and they're not full-time. All daily tasks are done by members—that's something you rarely see at this size'*. Shared values like resistance to growth, independence from commercial influences, and political-ecological dedication remain key cultural foundations, despite members' diverse motivations. However, these differences have at times produced tensions, especially regarding expectations of participation, willingness to adopt new technologies (e.g., card payment), or the balance between tradition and necessary modernisation (i.e., digitalisation).

Hindering factors consistently include the structural constraints of volunteer labour, periodic burnout, regulatory requirements imposed by external institutions (e.g., cash register obligations, food safety or accounting rules), and demographic challenges associated with generational renewal. The reliance on a small number of highly engaged volunteers creates chronic vulnerability, as essential organisational knowledge and day-to-day coordination often accumulate within a limited group whose capacity is finite. This concentration of responsibilities increases the risk of overload and makes the cooperative sensitive to fluctuations in individual availability. External regulatory demands further intensify these pressures, requiring technical and administrative competencies that exceed what many volunteers initially expect and often divert energy away from community-oriented activities. At the same time, generational renewal poses challenges: younger members may hesitate to assume leadership roles, while long-standing volunteers eventually scale down their involvement, producing succession gaps that threaten organisational continuity: *'What has always been an issue is the question of who actually takes on board responsibilities. Who is willing to assume that responsibility? And this is particularly difficult with younger members'*. Together, these factors highlight the structural fragility inherent in volunteer-driven governance and the ongoing work required to maintain a stable and resilient cooperative structure: *'When these [experienced or skilled long-term members] drop out, it becomes clear just how fragile the whole system actually is'*.

Over the years, the cooperative has learned that long-term sustainability requires deliberate governance, clear division of labour, and ongoing reflection on the CC's mission: '*What keeps coming up is the question: What is our product range? What do we want in the store and what are our rules and ideas about what good food is and what bad food is?*' It has also learned that community cohesion cannot be assumed. Instead, it must be actively cultivated through transparent communication, periodic re-articulation of principles, and the creation of spaces that accommodate differing participation levels: '*I would involve many more members—from the start or later—much more in responsibility and decisions and design possibilities*'. Through these processes, *Rübchen* has developed a capacity to adapt without losing its foundational ethos. Its resilience stems from its ability to stabilise core principles while remaining flexible in day-to-day operations, allowing the

cooperative to navigate crises, demographic shifts, and regulatory pressures. This combination of reflective governance, intentional community-building, and value-based continuity enables the CC to persist as a long-standing grassroots initiative rooted in political-ecological commitments.

5.3.4. Koope

5.3.4.1. Synthesis

Koope's (CC) history began around 2021, when several founding members, after participating in an online workshop on CCs, initiated the formation of a new cooperative in response to capacity shortages in existing Leipzig CCs. From the outset, *Koope* positioned itself as a deliberately small-scale, community-driven alternative within Leipzig's broader landscape of self-organised food initiatives. Its founding group (comprising roughly a dozen individuals with backgrounds in grassroots activism, environmental movements, and collective organising) sought to create a cooperative that combined accessible, affordable organic produce with democratic governance and shared responsibility. The initiative targeted members who valued ecological sustainability, solidarity-based economic practices, and low-threshold participation, including families, students, and young professionals attracted by the possibility of co-owning and co-shaping their food system. *Koope's* early concept emphasised simplicity, transparency, and a manageable organisational structure, aiming to avoid the bottlenecks and capacity strains experienced by larger or more established cooperatives in the city.

The early timeline includes several foundational milestones: identifying interested groups via email lists, holding initial planning meetings, forming working groups (e.g., Members, Strategy & Vision, Public Relations, Procurement), and establishing the physical store space. At this early stage the cooperative grew to a membership of roughly 140 people, giving *Koope* a clear organisational scale and enabling working groups to distribute responsibilities across a sizeable and diverse member base. Another milestone was the creation of structured onboarding processes and regular 'open-door' community events (which serve both as low-barrier entry points for prospective members and as informal social infrastructures that strengthen relationships among existing ones), such as neighbourhood cafés, film screenings, or seed-swapping events, designed both to attract new members and to enhance

community integration. The establishment of the *Zukunftswerkstätten* (internal future workshops) initiated by *Koope* around 2023 represents an important organisational milestone that helped articulate long-term visions and deepen strategic coherence. The workshops served as structured participatory spaces in which members could step back from day-to-day operational tasks to discuss broader questions such as the CCs identity, desired growth trajectory, decision-making formats, and relationships with external partners. *Koope* also developed a strong outward orientation early in its timeline, cultivating networks with local producers and neighbouring initiatives. Although still a relatively young project, its timeline reflects rapid institutional establishment, high member engagement, and the deliberate construction of a community-oriented identity. These milestones together show *Koope's* trajectory as a socially embedded, politically informed, and collectively designed alternative food initiative.

5.3.4.2. Analysis: Motivation, Enabling and Hindering Factors, and Learnings of Koope

Koope's motivations combine practical, social and political dimensions:

- The need for an additional CCs in Leipzig due to overcrowding in existing initiatives: 'There wasn't an empty one or no food coop. So we needed one—and that's why we founded it'
- The ambition to create a neighbourhood-oriented space that fosters community and alternative economic practices: 'We're not just a place to get food, but also a place to meet'.
- The desire to make organic food more accessible, particularly for people with limited financial resources: 'I just want inequalities to be reduced. And food is somehow... a good start'.

Enabling factors include the diverse skill sets of founding members, several brought prior experience in self-organised, grassroots projects, others contributed strong communication, coordination or administrative skills, which allowed early responsibilities to be allocated effectively. Early clarification of organisational roles through the creation of working groups (e.g. procurement, member coordination, communication, shop operations) enabled small teams of 2–4 people to build expertise, train newcomers, and autonomously manage their areas: *'I have the*

feeling that because we always had people involved who already had experience with associations, grassroots democratic processes, and group contexts, as well as others with very concrete skills—for example in IT or organisation—we always had the right people at the right time to take care of things'. Strong engagement in both internal governance and external communication further stabilised the emerging structure, with dedicated members coordinating information flows, supporting group decision-making, and maintaining a consistent public-facing presence that helped attract and integrate new members.

The implementation of regular onboarding procedures, the design of open community events, and the establishment of strategic workshops (Zukunftswerkstätten) facilitated rapid organisational consolidation and fostered a shared sense of purpose. For example, *Koope's* onboarding procedures consist of a multi-step process involving (1) initial orientation, (2) participation in an introductory meeting, (3) completion of membership forms, (4) financial commitment, (5) integration into working groups, (6) technical access provisioning, (7) instruction in booking and inventory routines, and (8) ongoing social support. These procedures ensure both organisational coherence and member engagement, reflecting the cooperative's dependence on distributed self-governance and trust-based participation.

There is clear variation in what motivates members: some are drawn by the accessibility and affordability of organic food, others by political ideals aiming for post-capitalist forms of provision, and still others by the wish to build community within an urban setting. While this diversity enriches the initiative, it also generates differing expectations regarding participation, workload, and the degree of openness toward the neighbourhood (some members value outreach and community-facing activities, whereas others perceive these as additional burdens or as straying from the core purpose):' *It is quite clear that not everyone contributes the same level of energy as those who founded the project or who are deeply passionate about it. There are also people who participate simply because they have a [CC] in their neighbourhood and consider the basic idea meaningful, but who do not want to turn this into a new hobby and instead mainly wish to consume'*. Hindering factors include the challenges of volunteer-driven organisational stability, workload distribution, the need to continuously engage and retain members, and

the tension between internal convenience and external openness. Moreover, as a young initiative, *Koope* faces the inherent challenges of defining its long-term identity while simultaneously fulfilling immediate operational tasks: *'We do have this broad vision of where we want to go, but at the same time there are simply many everyday tasks that have to be done in order for the shop to function at all'*. Over time, the group has learned that social innovation in the food sector requires balancing the logistical demands of food procurement with the relational work of building community. As one interviewee explains, this involved deliberately creating outward-facing formats rather than limiting activities to internal coordination: *'[...] Events that aren't just internal, where we open the door and say now there's coffee for the neighbourhood or to get to know each other—we've developed different formats, like seed swaps or a film series'*. *Koope* has developed an understanding that creating a socially accessible CC depends on transparent communication, deliberate public relation, and continual reflection on values and practices. These insights contribute to the initiative's emerging identity as both a food provisioning structure and a local social infrastructure.

5.4. Conclusion and Next Steps

Across the four initiatives examined, a number of converging and diverging patterns illustrate how social innovations in the food sector evolve, consolidate, and adapt over time. Despite their distinct scales, histories, organisational levels and orientations, all cases demonstrate that social innovation is not primarily a product of linear planning but emerges through iterative, practice-based learning processes shaped by ecological, social, and institutional contingencies. The two CSAs, while differing in magnitude and pace, *KoLa* characterised by rapid institutionalisation and infrastructural expansion, *Gemüsehof Naderkau* by gradual transformation, both reveal how ecological stewardship and community engagement become mutually reinforcing over time. In both initiatives, experiential learning concerning environmentally friendly practices and member engagement serves as a key factor influencing the trajectory of organisational development. The Consumer CCs, *Rübchen* and *Koope*, similarly highlight how alternative food provisioning requires the development of new social infrastructures: participatory governance structures, shared responsibility practices, and mechanisms for negotiating internal diversity. While *Rübchen* reflects long-term organisational resilience supported by stable

cultural norms and volunteer commitment, *Koope* illustrates the dynamism and challenges of early-stage social innovation, particularly the need to align varied personal motivations within a coherent organisational framework.

A key contrast between the two urban initiatives concerns their differing capacities to integrate heterogeneous personal motivations. *Rübchen*, with more than two decades of accumulated practice, has been able to accommodate a wide range of member motivations (political, ecological, social, and pragmatic) because these have been gradually institutionalised within stable governance routines and a collectively shared organisational ethos. Over time, this sedimented culture has normalised diversity and established a durable framework that allows members to situate individual expectations within a coherent cooperative identity. *Koope*, by contrast, is still engaged in the formative work of building such stabilising structures. Its organisational culture has not yet had the opportunity to mature to a point where divergent motivations—regarding workload, the degree of neighbourhood openness, or the balance between political aims and practical food access—can be absorbed without tension. These differences suggest that the successful alignment of varied motivations is less an inherent property of the initiative and more a function of organisational maturity, shared history, and the cumulative development of norms that enable diversity to coexist productively.

Taken together, the cases underscore that social innovation in the food domain is intrinsically relational and contingent on the capacity of groups to negotiate values, expectations, and practical demands. Across all four initiatives, the interplay between ecological commitments, social cohesion, and organisational pragmatics is a defining feature of long-term sustainability. While ecological commitments and social cohesion provide normative orientation, it is the quality of these pragmatic arrangements that ultimately determines whether such commitments can be sustained over time. In the CSAs, pragmatic considerations include the alignment of labour capacity with ecological production methods, the management of seasonal variability, and the calibration of membership numbers to avoid overextension. In the Consumer CCs, organisational pragmatics manifest in the balancing of volunteer workloads, maintaining functional governance structures, and adapting to regulatory constraints without undermining core values. Learning occurs not only through problem-solving related to production or procurement, but also through

reflexive engagement with governance, identity, and community formation. The comparison suggests that the transformative potential of such initiatives lies less in their specific organisational models than in their ability to cultivate adaptive governance cultures that embrace complexity, accommodate diverse motivations, and maintain coherence despite external pressures and internal tensions. Ultimately, these cases illustrate how locally embedded food initiatives contribute to broader socio-ecological transformation by fostering practices of cooperation, ecological responsibility, and shared mindset that collectively reconfigure relationships between producers, consumers, and local environments.

Next Steps

Across the four initiatives, near-term plans focus primarily on consolidating and incrementally expanding their existing operations. Both CSAs, *KoLa* and *Gemüsehof Naderkau*, intend to stabilise production capacities while modestly increasing membership in line with ecological and labour constraints. *KoLa* anticipates further professionalisation and infrastructural refinement following its rapid early expansion, whereas *Gemüsehof Naderkau* plans incremental growth toward its preferred harvest-share capacity alongside continued emphasis on biodiversity and community-building activities. The CCs *Rübchen* and *Koope* likewise prioritise sustaining organisational continuity and strengthening internal governance. *Rübchen* aims to maintain its established non-commercial model while managing generational transitions and incremental procedural adjustments. *Koope*, as a younger initiative, plans to refine its internal structures, expand its membership base cautiously, and deepen neighbourhood engagement through recurring public activities. Collectively, these near-term orientations reflect a shared emphasis on pragmatic consolidation, gradual capacity building, and the maintenance of organisational coherence rather than radical expansion or structural transformation.

We believe, MLU team can play an active role in supporting the initiatives as they pursue their near-term and longer-term development pathways. A central opportunity for such support will be the forthcoming T4.2 workshop, in which all case study initiatives will convene for a structured and comprehensive exchange. Through careful facilitation, we will create a space in which participants can reflect collectively on their current trajectories, articulate medium- and long-term aspirations, and explore what a more fully developed or 'mature' form of their

initiative might entail. The workshop will also provide an opportunity to identify practical steps and enabling conditions required to move toward these envisioned futures. Importantly, the gathering may help uncover areas of vertical integration and collaboration between initiatives—for example, strengthening links between CSA and CCs by exploring whether CCs could serve more systematically as buyers or distribution partners for CSA production. By moderating these exchanges, offering analytical tools, and providing a neutral platform for cross-case dialogue, the MLU team can help the initiatives to deepen mutual learning, identify synergies, and concretise pathways that enhance their capacity to sustain and scale their transformative potential.

6. Seed Innovation 04: Meet je Landschap [Measure your Landscape]: Monitoring of GreenBlue Veining in the Province of Utrecht, The Netherlands

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6.1. Case Introduction and Context

Policy context

The fourth DAISY seed innovation case addresses greenblue veining (In Dutch: GroenBlauwe DoorAdering - GBDA) in The Netherlands. Greenblue veining refers to connected networks of seminatural landscape elements such as tree lines, hedgerows, ponds, and ditches that thread through agricultural landscapes. These elements are crucial for biodiversity; about half of the 400 native species of butterflies, amphibians, reptiles, and mammals live in or near these structures. Greenblue veining emphasises connectivity and heterogeneity in fragmented landscapes, enabling species persistence and dispersal while enhancing ecological resilience and multifunctionality (GrashofBokdam & Van Langevelde, 2005).

In the Netherlands, a national strategy for greenblue veining was introduced in 2022, when it was embedded in the Nationaal Programma Landelijk Gebied [National Programme for the Rural Area - NPLG). This programme aimed for 10% natural landscape elements in rural areas to make a significant contribution to meeting European obligations. The national ambition derives from the Green Deal, but also relates to the EU Biodiversity Strategy, the Birds and Habitats Directives, the Paris Agreement, and the Water Framework Directive. In 2024, the Dutch government published the KennisAgenda voor GroenBlauwe Dooradering [Knowledge Agenda for GreenBlue Veining] (Roelofsen et al., 2024). It identifies knowledge gaps and outlines an action programme for implementation. It highlights the need for monitoring, regional tailoring, and integration with nitrogen reduction and biodiversity policies. In the same year, the NPLG was discontinued, but local governments continue working on the goals that were set within it.

To achieve these goals, the landscape elements must be monitored. The national government prefers a uniform method, and recently the ministry suggested that LASREG is the method with the most potential. LASREG is a monitoring tool that visualises green and blue elements in an overview map. The dataset is built from a combination of current Dutch elevation data, aerial photographs, satellite images (remote sensing), open data (LargeScale Topography Basic Registry, provinces, municipalities), and provincial nature management plans. The tool has advantages – because it uses satellite data, it promises fast data collection – but also drawbacks: for example, not all elements are included, and it is purely quantitative.

Aim and Approach of Meet je Landschap [Measure your Landscape]

Another innovative method to monitor greenblue veining, both quantitively and qualitatively, is Meet je Landschap, a citizen science project in the province of Utrecht, which is coordinated by Landschap Erfgoed Utrecht [Landscape Heritage Utrecht - LEU] since 2013. The aim is to map small landscape elements – both their quantity and quality – and to monitor their development over time. Meet je Landschap is an example of how citizen participation, technological tools, and cooperation between stakeholders come together to monitor landscape elements in order to sustainably manage and strengthen Utrecht's landscape.

Meet je Landschap focuses on collecting data on the presence and condition of these landscape elements. A network of about 65 volunteers plays a central role in this. They are equipped with tablets to collect and enter data in the field. The collected data is visualised in the Dashboard Monitoring Network for Small Landscape Elements (MKLE). This dashboard offers policymakers, ecologists, as well as citizens and farmers, insight into where restoration or reinforcement of the landscape is needed.

Since the end of 2024, the entire agricultural landscape in the province of Utrecht has been mapped in this way. This makes Utrecht the only province in the Netherlands with a comprehensive dataset. By continuing to monitor and record, the development of landscape elements can be tracked, and restoration, development and conservation can be planned. The project is active in various subareas within the province. This local approach allows the project to make use of the volunteers' local knowledge.

The Meet je Landschap project is innovative because of its unique combination of citizen participation, digital technology and cooperation between stakeholders. The most important innovative aspects are:

- Comprehensive full spatial coverage quantitative and qualitative data collection
- Visualisation through a digital dashboard that provides insight into action perspectives
- Volunteers acting as intermediaries with landowners
- A platform for collaboration between stakeholders

In this case study, we zoom in on an existing pilot of Hoogheemraadschap Stichtse Rijnlanden Water authority Hoogheemraadschap De Stichtse Rijnlanden – referred to in this document as the water board, in which farmers working and living in two polders (areas of low land, once under water, but now separated from it by water barriers such as dykes) are exploring ways to create and manage nature-friendly foreshores. Here, LEU collaborates with the province of Utrecht, the water board, two volunteers, and four farmers to develop a monitoring approach for the blue veining.

6.2. Methodology

Wageningen Research (WR) applied the learning history (LH) by conducting individual interviews and holding a workshop with the same interviewees. The semi-structured interviews lasted one hour and were based on a guide interview format provided by Coventry University (CU) and adapted to the participants' context.

WR interviewed six actors via five interviews as shown in Table 03:

Table 03: Descriptions of the actors interviewed for the greenblue veining case study

Actor	Description
Landschap Erfgoed Utrecht (LEU)	Landschap Erfgoed Utrecht [Utrecht Landscape Heritage - LEU] is the initiator and coordinator of the Meet je Landschap project. Their role includes volunteer coordination, responsibility for the technical infrastructure, support, data analysis and policy advice.

Hoogheemraadschap htse Rijnlanden	Hoogheemraadschap De Stichtse Rijnlanden [Water authority Hoogheemraadschap De Stichtse Rijnlanden – referred to in this document as water board] leads the pilot project with farmers in Oudewater. The water board is working on biodiversity by, for example, creating nature-friendly banks and managing dykes rich in flowers. The water board actively seeks collaboration and connections with local stakeholders to improve and promote biodiversity.
Province of Utrecht	Although the province of Utrecht is not the direct executor, it supports the project with financial and policy support. Moreover, it is developing and supporting the Greenblue Veining Platform. This platform facilitates collaboration between various organisations, including Landscape Heritage Utrecht, to promote the creation and restoration of landscape elements. The platform is advantageous for them as well, as they draw upon data collected by LEU and other partners to inform and support their own policymaking processes.
Volunteers	Volunteers for LEU monitor landscape elements in the province of Utrecht. They are equipped with software on tablets for data entry and work relatively autonomously in sub-areas.
Farmers	Farmers are part of the collaborating pilot in Oudewater. They participate in the planning, implementation, and management of landscape elements, in this case nature-friendly foreshores.

Each interview was conducted by a pair of researchers. One researcher facilitated the conversation, while the other constructed a timeline (Figure 10) in real time, checking with the participant to ensure that all relevant milestones were accurately captured. After the interview, a dual column record was completed to complement the timeline.

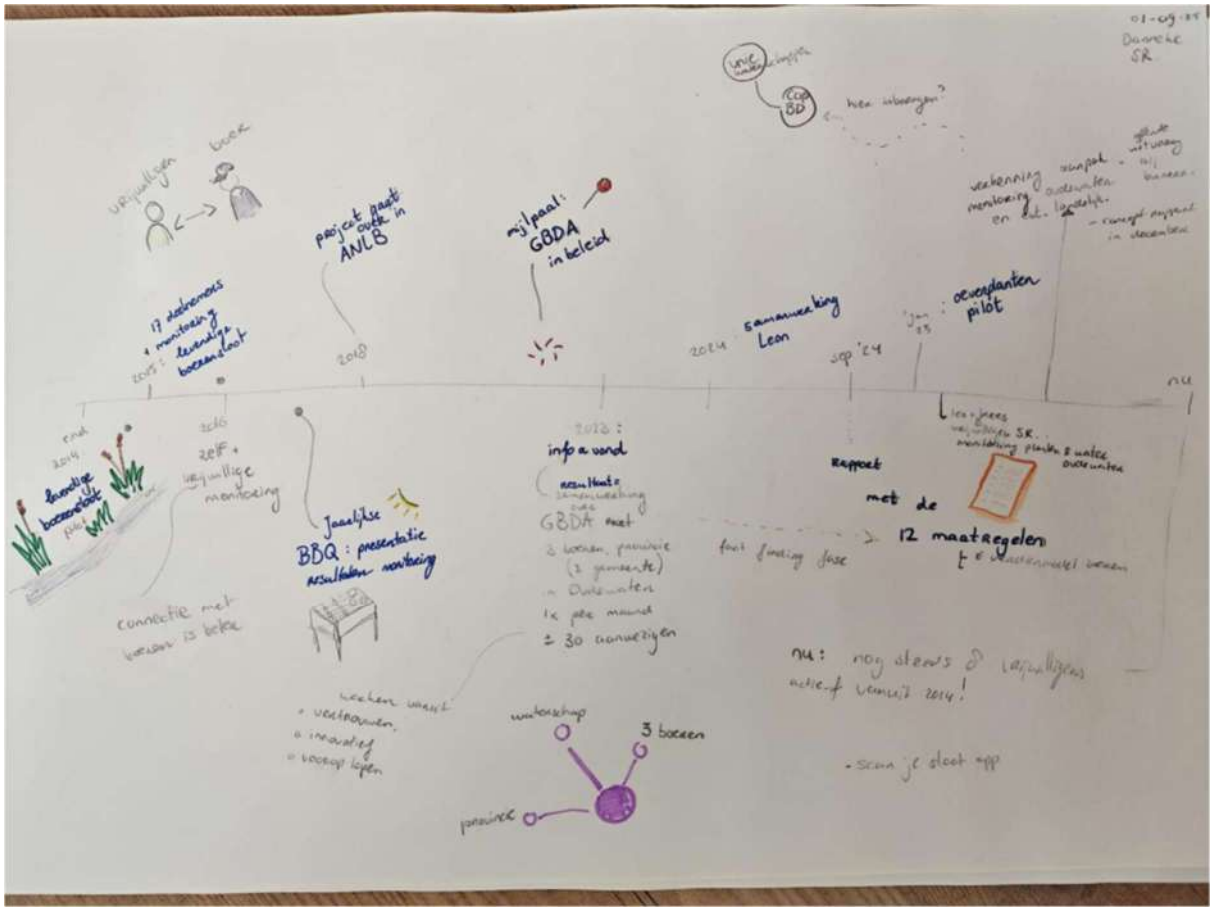

Figure 10: Example of a timeline drafted during one of the interviews.

This process resulted in five different timelines, each accompanied by a dual column record. In a working session, the three researchers involved in the case study collaboratively synthesised these individual timelines into a single timeline of the case. In addition, the identified milestones were systematically categorised into thematic clusters that emerged during the data analysis (Section 6.4).

During a workshop held after the interviews, the overall timeline and thematic groupings were presented to the participating actors. This step served both to validate the findings and to incorporate any necessary adjustments, ultimately resulting in a finalised timeline (Figure 11).

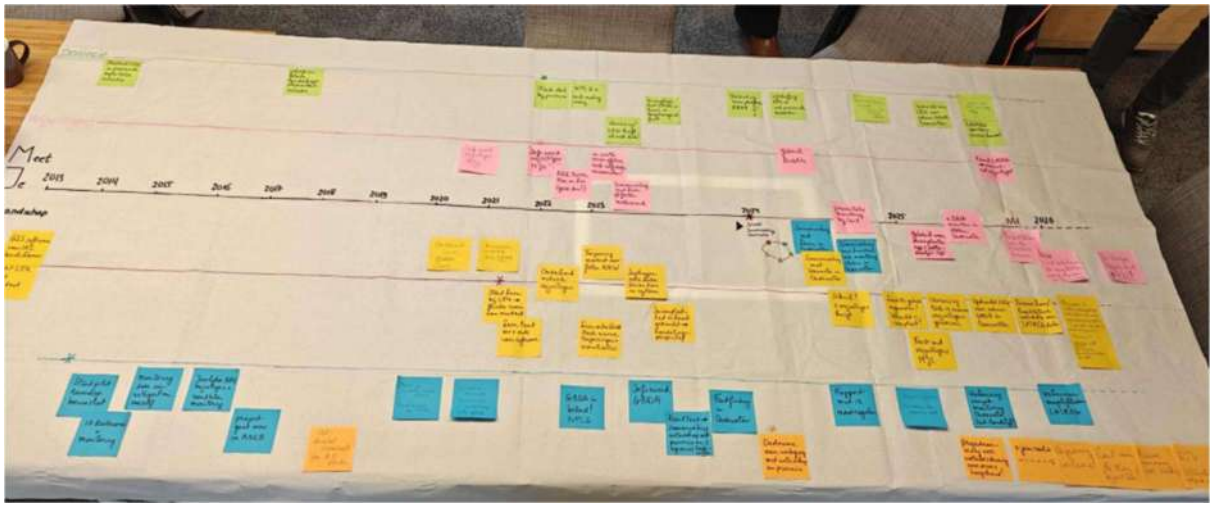

Figure 11: Finalised timeline created during the workshop where all interviewed actors were involved.

6.3. Synthesis of the Timeline of Meet je Landschap

The Meet je Landschap project started in 2013 following the release of ArcGIS software developed by ESRI. This was a software development where the condition of the landscape could be assessed through technological innovation, making province-wide implementation possible. With this development, Meet je Landschap had the ambition to map all landscape elements in agricultural land in the province of Utrecht and once mapped, monitor every five years. This mapping and monitoring shows the quality of the landscape and how it develops over time. The province is involved from the start as a financier since the monitoring network has been included as a permanent part of the provincial operating subsidy for LEU. Only seven years later the actual monitoring dashboard is developed. Only seven years later the actual monitoring dashboard is developed.

Parallel to this, the water board started the Lively farm ditches pilot in 2014 with the aim of improving the biodiversity of farm ditches. After a year, about 17 farmers participated and monitoring by volunteers started. When money became available in 2015, the water board also started monitoring by its own employees. Barbecues are organised annually with the volunteers and the farmers, where the results of the monitoring are shared, which has a stimulating effect.

In 2017, the province set up the Platform Meetnet Kleine Landschapselementen [Platform Monitoring Network for Small Landscape Elements] and provincial

subsidy opportunities became available for the construction and restoration of small landscape elements.

In 2020, LEU developed the Meet je Landschap dashboard in collaboration with Ordina, a service provider in the field of Consulting and ICT. This dashboard presents analyses of the collected data for potential users, such as the province. Around this time, the water board developed the 'Measure your water quality' app and a dashboard. Where LEU focuses on the landscape with the dashboard, the water board focuses on the water quality.

In 2021, the two volunteers in question responded to an advertisement in the newspaper about an information evening of Meet je Landschap, where new volunteers are sought. At their first meeting, the two volunteers immediately had a good connection because they get along well and because they complement each other well: one of them has a lot of ecological knowledge, and the other is 'technically savvy'. They decided to work together and from then on, they have been forming a good duo. But they did not perceive the former LEU coordinator of Meet je Landschap as very stimulating. For instance, during the winter period, the server went offline which meant the volunteers had to return their tablets. This brought the fieldwork to a complete halt. However, the volunteers were headstrong and were convinced it was possible to continue the monitoring during this time. Showing their initiative and creative character, they downloaded the software on their personal tablets and still collected a lot of data throughout the winter. The only problem was that the data could not be synchronised to the system in the Cloud. At this point, the volunteers were on the verge of quitting the fieldwork.

In 2022, a partnership of several nature and site management organisations published the Landscape Plan of Attack, in which the realisation of 10% greenblue veining is urgently advised to policymakers, for the restoration of biodiversity.

The Meet je Landschap project was flowing quietly until a new project coordinator was assigned, who brought new energy within the same year. This new LEU coordinator has a strong passion for enhancing data accessibility to better understand how to contribute concretely to landscape restoration and biodiversity improvement. This LEU coordinator learned the 'ins and outs' of the software, further expanded the technical possibilities and invested in the network of

volunteers. He is always seeking new applications and creates visualisations of data analyses that showcase concrete opportunities for landscape restoration and improvement.

In 2022, LEU started monitoring the landscape in the forts of the Dutch Waterline. During this project, the two volunteers met the new LEU coordinator. They appreciated his *'it is possible'* attitude and his continuous search for opportunities. For example, the LEU coordinator managed to plug the extra data into the system collected by the volunteers during the winter period. This act was very motivating and highly important to them, because it made them feel recognised, and it encouraged the volunteers to continue their monitoring work.

In 2023, the Nationaal Programma Landelijk Gebied [National Programme for Rural Areas –NPLG] started with a target of achieving 10% greenblue veining elements in the rural landscape. Each province was required to present an accurate baseline measurement of the greenblue veining present. The provincial policy officer, newly assigned in the same year, started working on this assignment. He happily discovered that LEU had been mapping the landscape for 10 years already. The province can use the monitoring network right away. For example, the LEU coordinator proposed an analysis of gaps in landscape elements, thereby identifying areas where deficiencies could be addressed, which allowed the province to pick the 'low hanging fruit' efficiently.

The NPLG also offered the water board an important stimulus to do more work with greenblue veining. In this momentum, the water board organised an information evening in 2023 for 30 farmers informing them about their possibilities for GBDA. This resulted in the pilot in Oudewater, in which the water board, the province and three farmers have been working together to improve the blue veining, including through the construction of nature-friendly foreshores. This pilot first started with a fact-finding phase that resulted in a report with 12 measures. At the beginning of 2024, the farmer involved in our case study joined the project group of this pilot. He was asked because he already has experience in the area process in Oudewater-Noord for the Utrecht Rural Area Programme (UPLG). He turned out to be an important connector, inspiring other farmers to participate as well.

In 2024, the province took the initiative to broaden the existing platform of small landscape elements to the GBDA Platform. Then the focus was no longer just on small landscape elements, but also on ditches and verges. This platform aims to bring different parties in Utrecht together, to exchange knowledge and to see where opportunities for cooperation are. The water board indicated that they have joined the platform because they recognise that it has potential for cooperation with other area parties. Utrecht is the only province with such a platform. At the same time, the province indicated that it has too little capacity to really make good use of the possibilities of the platform.

In 2024, the volunteers proposed to use the Bioblitz app from research institute for biodiversity Naturalis to monitor the landscape elements. This new addition to the monitoring approach is highly appreciated by the LEU coordinator, who ensures that the extra data is included in the dataset of Meet je Landschap.

In July 2024, the collaboration between LEU and the water board started in which they monitor the blue veining in farm ditches of four farmers and one nature reserve in Oudewater. The water board tracked down the LEU's Meet je Landschap approach during their fact-finding phase. The water board wanted to learn from this method, and a joint search was started to develop an approach for monitoring the blue veining. The two volunteers presented their approach at an information evening on the farm of the farmer involved.

In 2024, to the shock of the LEU coordinator, a number of other volunteers dropped out because they felt that the two volunteers are being favoured. That is a pity, because that was obviously unintended by the LEU coordinator.

In 2024, the newly formed cabinet abolished the NPLG, which meant that the national goals and resources for GBDA disappear. Fortunately, the provincial resources remained intact through the UPLG, and the project subsidy for Meet je Landschap also allowed the work of LEU and the province for GBDA to continue. Though continuation of NPLG would have strengthened the process.

The last sub-area in Utrecht was measured at the end of 2024. This means that the province of Utrecht has been fully and comprehensively mapped, which is unique among provinces. It is an important milestone that was celebrated with all volunteers in early 2025.

In 2025, the two volunteers started mapping the biodiversity in the relevant ditches in Oudewater. They proposed to use the Naturalis riparian plant tool, as well as the Measure your water quality tool that the water board has already developed. They also proposed to take eDNA samples from the ditch water to measure traces of the biodiversity present. Here the volunteers showed once again how they contribute to the development of the monitoring approach through their entrepreneurship and creativity.

In 2025, LEU recruited 19 new volunteers through an advertisement. The LEU coordinator is pleasantly surprised that there is apparently still a lot of potential in working with volunteers. Of these, 12 or 13 volunteers remain, of which five or six can already operate autonomously, due to prior experience.

In 2025, the province commissioned LEU to provide some advice on the greenblue veining in the Eem Valley and the Utrecht Valley. The data from Meet je Landschap can be applied concretely for this. By means of analysis of the data, concrete action perspective recommendations will be given.

In 2025, the water board gave an assignment to a consultancy firm to explore the purpose (in terms of definitions) and the best approach to monitoring the blue veining in Oudewater. The report, which will be available in December 2025, will also be useful for other peat meadow landscapes and water boards.

During the summer of 2025, the farmer involved, together with another agricultural company, submitted a subsidy application for the construction of 6 km of nature-friendly foreshores, which has now been approved. After months of waiting, the water board also granted the necessary permit for this in October 2025. The farmers now have another year and a half to realise the nature-friendly foreshores. In the autumn of 2025, the farmer involved, together with two other farmers, submitted another application for more than 4.5 km of nature-friendly foreshores.

In 2025, the LASREG data from a company called NEO is made public for the provinces and other actors. The Ministry of Agriculture, Fisheries, Food Security and Nature

(LVVN) paid for the costs of this because it would like to standardise monitoring nationally. This development raises questions about future integration, as combining quantitative LASREG data with the Meet je Landschap's qualitative dataset could yield new opportunities. At the end of 2025, a meeting will take place between the province of Utrecht, LEU and NEO to explore this possibility together.

6.4. Analysis of the Development of Meet je Landschap

6.4.1. Motivations for Monitoring GreenBlue Veining

The stakeholders are strongly motivated and committed to developing and implementing a monitoring approach for the greenblue veining of the Utrecht landscape:

Making results visible stimulates policy Both the water board and the province emphasise that monitoring the greenblue veining makes the outcomes of measures visible, which is encouraging and motivating – even for their administrators who make policy decisions. Monitoring also provides solid input for further policy development.

Contributing meaningfully and being appreciated Volunteers enjoy doing meaningful work outdoors. The recognition they receive from institutions for their monitoring efforts is motivating. The space and support they are given to contribute ideas and suggest improvements has encouraged them to continue. The increased visibility of landscape developments through visualisations is also highly motivating. Volunteers say it is inspiring to see concrete results from their measurements and to realise how much can be achieved through their fieldwork.

Becoming a valued partner through a data-driven approach For LEU, a key motivation is that their data-driven approach in Meet je Landschap has led to them being increasingly regarded as an important partner by governments and regional actors. LEU now participates in various national networks and working groups to share their expertise, approach and data.

Contributing to biodiversity while creating a business model The farmer involved is enthusiastic about improving water quality and biodiversity, which is why he is eager to create nature-friendly banks along his ditches. At the same time, this

provides him with a business model, and he believes that farmers can work in this way toward a more future-proof agriculture.

6.4.2. Enabling Factors

Positive dynamics between key figures with diverse capacities There was a strong connection between the key figures involved – for example, between the LEU coordinator and the two volunteers in further developing the Meet je Landschap approach. Likewise, the collaboration between the water board policy officer, the LEU coordinator, volunteers and the farmer, in their joint search for a monitoring approach for the blue veining in Oudewater worked very well. The process largely depended on the qualities and capacities of these individuals. Particularly stimulating was the LEU coordinator's passion for making data accessible for concrete action – his 'everything is possible' attitude, his strong trust in the knowledge and skills of the volunteers, and his ability to network, spot opportunities everywhere, and connect them. The two volunteers also brought extensive knowledge and skills, were entrepreneurial, independent, creative, and had a wide local network. The water board policy officer was open to learning, able to connect many different aspects, and encouraging toward the volunteers. The farmer involved was entrepreneurial, inspiring to other farmers and acted as a connecting link. From the province, the civil servant at the time showed foresight and dared to pioneer and invest in the future by structurally including the *Meet je Landschap* project in LEU's subsidy.

Supportive policy conditions From 2023 onward, favourable policy conditions were in place when the NPLG set clear national goals – namely, achieving 10% greenblue veining in rural areas of each province. The earlier Aanvalsplan Landschap [Plan of Attack Landscape] and the NPLG (and later, when NPLG funding disappeared, the UPLG which remained intact) provided a clear horizon, direction, tools and resources. Another important condition was that funding for Meet je Landschap was structurally included in the province's annual operating subsidy for LEU, offering a stable foundation. Despite changes in the national policy context (such as the loss of NPLG funding), the project could continue. The flexibility for LEU to allocate the subsidy also proved highly stimulating.

Space for valuable contributions from volunteers The software users – in this case, the volunteers – were given the space and capacity to improve and expand the existing digital tools. They proposed, for example, using the Bioblitz app for monitoring, as well as the Naturalis riparian plants app, the water board's *Meet je waterkwaliteit* app [Measure your water quality app], and eDNA samples to measure biodiversity in the Oudewater ditches and add it to the dataset. Beyond their technical contributions, the volunteers also played a valuable intermediary role with farmers. They were equally important in outreach and communication about the monitoring approach, for instance by enthusiastically sharing their working methods at a national information evening.

Collaboration between stakeholders Another key stimulating factor was the collaboration between two monitoring projects: Meet je Landschap by LEU and the water board's monitoring of ditch water quality. Both organisations wanted to learn from each other and combine strengths for monitoring the blue veining in the Oudewater ditches. The strong cooperation between the province and LEU, and between the province and the water board, was also an important positive influence. The division of tasks among these parties was seen as stimulating: the province mainly provided enabling conditions, while LEU, the water board, and municipalities could take concrete initiatives. In addition, Utrecht's GBDA platform is unique in the Netherlands and highly valuable for knowledge exchange and collaboration among the various regional stakeholders.

6.4.3. Hindering Factors

Loss of support and rigid policy context In 2024, the NPLG goals and funding from the national government suddenly disappeared. Although the Meet je Landschap project continued due to its strong alignment with provincial policy, it could have benefited from much stronger support and encouragement from the national policy context. In addition, the insistence on strict definitions of greenblue veining in policy is experienced by some stakeholders, such as farmers, as discouraging.

Vulnerability due to reliance on key figures The Meet je Landschap project is somewhat vulnerable because it relies heavily on a few key individuals with extensive networks, knowledge, skills and experience. If they were to step away,

the project could collapse, since not every project leader, policymaker, volunteer or farmer could simply take over; it requires specific qualities, drive, knowledge and expertise. Within the province, for example, there is currently limited capacity for GBDA, and the policymaker involved in Meet je Landschap continues to work on this because of his prior relation to the project. If he were to change jobs, no official function for this topic is in place and the provincial's role in the network would likely disappear. The province would like to do more to fully capitalise on the opportunities of Meet je Landschap, if capacity would allow. Likewise, the provincial GBDA platform, which now mainly serves a networking function, could be used more effectively to foster concrete collaborations between stakeholders and regional actors.

Competition between stakeholders and organisations There has traditionally been a weaker (trust) relationship between LEU and the agricultural collectives. A difficult situation has also arisen because the data on landscape elements is held by LEU, while the subsidies for creating and restoring landscape elements provided by the province are managed by the agricultural collectives. Better cooperation between them would allow data and subsidy allocation to align more effectively. LEU also experiences competition from commercial parties and consultancy firms that are contracted by governments, and request data from Meet je Landschap in that context. This sometimes creates tension between collaboration and sharing of methods and data on the one hand, and strengthening LEU's position in the field on the other.

6.4.4. Learning Overview

The parties involved highlight the following lessons:

Investing in people and personal interaction is essential It is important to pay close attention to maintaining the volunteer network, since the monitoring relies heavily on their fieldwork and benefits from having a stable group. This network can be strengthened by continually offering volunteers new tasks and applications to keep their work interesting, by making the results of their efforts clearly visible, by giving them a sense of appreciation through celebrating successes together, and by encouraging regular exchange among volunteers – for example, through annual barbecues. Personal interaction with farmers is also crucial. Here, the volunteers

have played an important role, as they are more informal in their approach, making them more accessible and less intimidating to farmers than government officials.

Providing trust, space, and freedom stimulates innovation It is important to dare to pioneer and to support new initiatives with foresight, including financial backing. Investing in the future pays off later. Equally important is creating space and freedom to innovate. The participants experienced this, for example, through:

- Structural and flexible funding from the province to LEU for Meet je Landschap
- Room for volunteers to contribute their practical experience with software and apps and to propose improvements and additions
- Flexibility in the definitions of greenblue veining, which gives farmers more opportunities to participate and remain enthusiastic

6.5. Conclusion and Next steps: Opportunities and Challenges for the Future of Meet je Landschap

The development of LEU's innovative monitoring approach Meet je Landschap has taken considerable time. It has been ongoing since 2013, when the software first became available, and gained momentum in 2022 and 2023 as the Aanvalsplan Landschap [Plan of Attack Landscape] and the NPLG formulated clear national goals with accompanying resources for greenblue veining. In 2022, the project also received a major boost from a new, highly driven project leader at LEU, who further expanded the technical possibilities. From that period onward, the innovation process was also fuelled by other key figures who worked well together, thanks to their shared motivation and personal qualities and capacities – such as their ability to think in terms of opportunities, their independence and entrepreneurial spirit, their talent for connecting and inspiring others, and their willingness to offer space, appreciation, and trust.

Although the national policy framework fell away in 2024, the development of the monitoring approach continued because the provincial policy context still provided sufficient entry points, and the province established a platform for knowledge exchange and collaboration. With this, Utrecht became unique in the Netherlands and a frontrunner, as by the end of 2024 it was the first province to map both the

quantity and quality of green veining comprehensively using the Meet je Landschap dataset. The water board also continued its policy development for monitoring blue veining despite the loss of NPLG support. In the summer of 2024, a collaboration emerged between the water board and LEU to explore and advance a monitoring approach for blue veining in Oudewater together with farmers and volunteers. This remains an ongoing joint search. The public release of quantitative LASREG data based on satellite imagery in 2025 has further prompted joint questions from the province, the water board, and LEU about how different types of monitoring approaches could best be combined.

Key factors influencing the development of Meet je Landschap, both positively and negatively, were linked to opportunities and constraints in the *policy context*. Supportive policy conditions were essential for the success of the innovation process – such as structural, multiyear and flexible funding, as well as clear policy goals that provided direction and points of reference. Equally important were the *capacities of the key figures* and their *mutual interaction and collaboration*. For example, the interplay between volunteers as users of the technical tools on the one hand, and the LEU project leader and water board policy officer on the other, was highly influential. Volunteers were given ample space to improve or supplement the existing approach based on their practical experience. The collaboration between the water board, LEU, and volunteers in Oudewater to explore and combine different approaches and technical tools in order to develop a robust monitoring method for the blue veining has also been a major stimulating factor. Finally, the provincial platform aimed at fostering collaboration among the various regional stakeholders involved has (potentially) a very important role in advancing the development of monitoring the greenblue veining.

Next Steps

The future development of Meet je Landschap will depend on enhancing its monitoring methodologies in a new playing field with LASREG as open source. The province and LEU, together with possible new partners, want to explore ways to combine this automatically generated quantitative LASREG data with the qualitative fieldwork data from Meet je Landschap. Strengthening volunteer engagement, to ensure a continuous monitoring is also key, whereby improving the user-friendliness of the software is perceived as a possible next step. Lastly,

continuing to find a robust approach to the complex issue of monitoring blue veining is essential if the initiative is to consolidate its role as a credible and effective platform for greenblue monitoring. Underpinning all of these next steps, is strong collaboration both with existing and new partners.

The parties involved mention the following opportunities and challenges for the future of Meet je Landschap:

Improving the monitoring approach Several improvements to the monitoring approach have been suggested. First, the software should be made more user-friendly: volunteers would like to be able to enter all information within a single app. Second, the data should be made more accessible to stakeholders, for example, through additional visualisations that strengthen the connection between the data and concrete action perspectives. Third, it has been noted that the definitions of blue veining should be formulated more broadly and flexibly, so that more farmers are encouraged to participate.

Strengthening the volunteer network Strengthening the volunteer network is another challenge. For example, the two volunteers wonder if setting up sub-networks that are led by volunteers could help, including quick and easy communication via, for example, WhatsApp groups. Could this be a renewed organisational model? And perhaps it could be explored how Meet je Landschap can learn from other landscape organisations working with volunteers in Europe, such as Natuurpunt in Belgium?

Responding to the changing policy context The province of Utrecht is considering whether the National Nature Plan, which the Netherlands must deliver next year under the Nature Restoration Regulation, could serve as a new starting point for GBDA. LEU would like to explore how GBDA monitoring can be aligned with different approaches used for monitoring the Basic Quality of Nature (BKN). Perhaps BKN monitoring could include certain temporary landscape elements such as wetlands and herb-rich grasslands, which do not fit within the definition of blue veining. BKN focuses more on the entire area, while GBDA concentrates on structural landscape elements. Another policy development the parties want to respond to is the quantitative LASREG dataset, which will be made public in 2025 at the request of the national government. The province and LEU want to explore

ways to combine this automatically generated quantitative LASREG data with the qualitative fieldwork data from Meet je Landschap.

Focusing on greater cooperation With the data set of LASREG made public, it would be promising to combine existing approaches and technical resources as much as possible. Therefore, the opportunity arises to put more focus on joining forces and resources by LEU, the water board, province, municipalities, agricultural collectives, technical developers, and also other (national) organisations such as Naturalis, Wageningen University and Research (WUR), Delta Plan Biodiversiteitsherstel [Delta Plan Biodiversity Recovery]. Furthermore, within Utrecht, the stimulating networking function of the GBDA platform is a big opportunity to collaborate between stakeholders.

Specific focus on collaboration for monitoring blue veining The greatest current challenge identified by the interviewees is to develop a robust approach for monitoring blue veining, which is much more complex to map. This is now being explored jointly in Oudewater, for example by combining existing GIS software with various apps and eDNA samples, so that different types of data on blue veining can be integrated. LEU is considering whether the technical requirements for the blue veining monitoring approach could be jointly formulated together with a software developer.

More communication towards society The province and the farmer involved suggest that better communication about the importance and possibilities of GBDA is needed to recruit more volunteers, involve more farmers, and secure additional funding for projects. The parties wonder whether the GBDA platform could be used for a joint communication strategy, with the province perhaps taking a leading role. Ideas have also been raised to give the project more visibility in the media next spring, for example, through a segment on RTV Utrecht, or perhaps in the national television programme Vroege Vogels [Early Birds] or an article on the national platform *Nature Today*.

Combating invasive exotic species The farmer involved warns that it is of crucial importance to tackle threats such as the arrival of invasive alien species (e.g. the American crayfish in ditches). These external factors can be very decisive (devastating) for the contribution of the greenblue veining to biodiversity.

7. Seed Innovation 05: Budapest Degrowth Doughnut

Veronika Kiss

7.1. Case introduction and Context

The fifth DAISY seed innovation case study is the Budapest degrowth doughnut (BDD). This seed innovation is built on the degrowth doughnut model (Domazet et al., 2019), which extends the Doughnut Economics model (Raworth, 2017), weaving together ecological ceilings and social foundations as a city-scale experiment. The degrowth doughnut model supplements biophysical and social-economic aspects with cultural ones, giving an overall picture of the strengths and weaknesses of the system, while providing opportunities to adapt the model for local circumstances. The degrowth doughnut model was originally developed in Croatia and since then, it has been extended to many countries using its digital software. Literature on the degrowth doughnut framework – spanning theoretical innovation, comparative cases from elsewhere in Europe, and local Budapest analyses – demonstrates that operationalising it often exposes both technical and socio-political challenges. These include issues of policy integration, power imbalances, entrenched institutional practices, and diverging stakeholder priorities (Smith, Horváth & Kovács, 2023; Horváth et al., 2024).

The Research Centre for Ecological Economics at the Corvinus Institute of Advanced Studies developed the degrowth doughnut model for Hungary (Domazet et al., 2023), assessing the current environmental and social capacity of the country for ecologically and socially sustainable transformation. In 2024, the Budapest degrowth doughnut (BDD) model was developed using the Hungary model as a basis, however as the first of this kind, the BDD emerged through a participatory co-creation process, involving workshops and bilateral consultations facilitated by researchers at Corvinus University of Budapest and GreenFormation. The resulting framework produced a localised set of socio-economic, cultural, and biophysical indicators tailored to the city's context, accompanied by a system map to highlight causal relationships and feedback loops between the identified indicators (Fischer et al., 2024). Crucially, this model has been embedded into the city's Climate City

Contract (Orosz, 2025), supporting Budapest's ambition to achieve climate neutrality by 2030, while addressing tensions between ecological objectives and social equity concerns, e.g., balancing building renovations for carbon goals with risks of gentrification and housing affordability (GreenFormation, 2024).

The BDD was selected as one of DAISY's seed innovations representing the energy domain for two main reasons. First, energy use is a key driver in crossing planetary boundaries, including biodiversity loss. Second, the Budapest degrowth doughnut includes both direct energy-related indicators (such as energy consumption, renewable energy use, and CO_2 emissions) and indirect ones (such as climate change denial, biodiversity loss, and the extent of green areas). By foregrounding organisational and inter-personal learning as ongoing, multidimensional, and collaboratively produced, the learning history (LH) for BDD not only records history, but actively catalyses new cycles of innovation, fosters critical reflection, and paves the way for mainstreaming degrowth-oriented strategies into urban policy and practice.

7.2. Methodology

The LH process for this seed innovation case began with targeted desk-based research that reviewed documents related to the BDD, including academic literature, and media sources. This was followed by the identification of key actors involved in the development of the BDD, ensuring broad inclusion of voices such as project originators, local government representatives, and core BDD workshop contributors central to the process (Douthwaite & Ashby, 2005; Fischer et al., 2024) illustrated in Figure 1. The initiative was originally launched by Corvinus University of Budapest (CUB – blue stakeholder group), which served as the academic driver for the process, providing the research expertise necessary to adapt the degrowth doughnut model for the Hungarian capital. In seeking to tailor the model to Budapest's needs, CUB formally approached the municipality of Budapest (BM – green stakeholder group) to collaborate on the project, as well as initiated a multi-actor BDD development process including specialised sectoral players (orange stakeholder group) such as the Budapest Public Transport Company (BKK).

A core group was formed with one representative from each of the three stakeholder types to guide the BDD seed innovation study throughout DAISY: a

PhD student from CUB researching degrowth and the doughnut model (Actor CUB), a municipal leader responsible for Budapest's Climate Contract and related policy for the city's 2030 climate-neutrality target (Actor Budapest Municipality - BM), and a representative from BKK (Actor BKK). Actor CUB organised the workshop series fundamental to the BDD's development, while the other two interviewees participated in one or two of the three co-creation workshops.

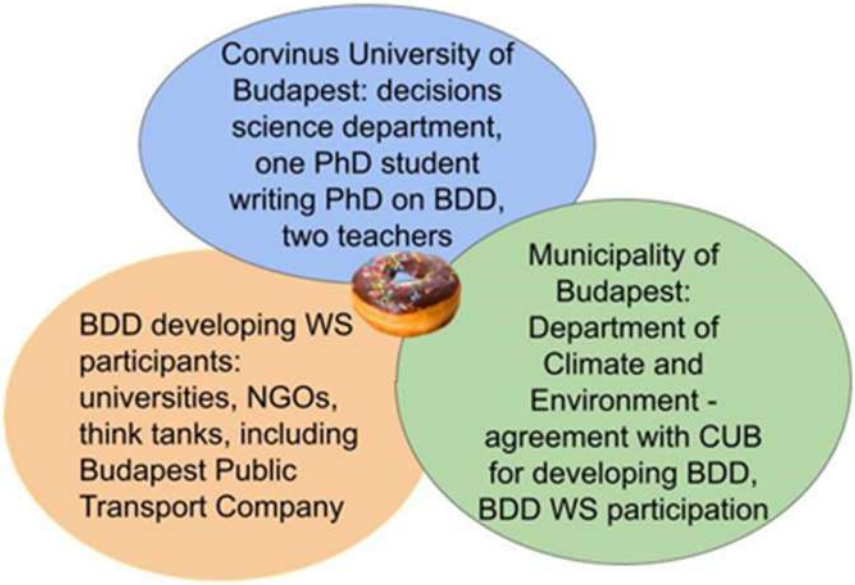

Figure 12: Stakeholder groups of Budapest degrowth doughnut development

The primary data-gathering phase comprised three semi-structured interviews (two in person and one online) with the core group members, conducted using a flexible guide tailored for the BDD context. The interviews were carried out in August 2025 providing first-hand perspectives from each of the principal constituencies engaged in the process. This multidisciplinary collaboration, described in more detail in Annex I, unfolds as a sequence of consensus-building phases, punctuated by occasional dissensus, especially on technical and participatory issues. Through these phases, the partners achieved transformative milestones that progressively advance BDD's adoption in urban policy and planning. These interviews elicited significant milestones, smaller moments, successes, challenges, disagreements and lessons learned, capturing both consensus and divergent perspectives.

The results were synthesised into a three-column timeline (see in detail in Annex 5.): the left column records reflections of the DAISY researcher relevant to each timeline segment, the centre column presents the main descriptive narrative punctuated by significant milestones and smaller moments, and the right column contains direct quotes from core group members corresponding to each segment, including contrasting perspectives when differences arose. Subsequently, a two-hour in-person validation workshop was held with all interviewees, where participants collectively reviewed and refined the draft LH, with the session being recorded and documented in the final updated LH. This participatory process deepened engagement, improved the recall of overlooked events, and validated the narrative's accuracy. The overall process ensured that the BDD seed innovation LH is rigorous and inclusive, grounded in systematic data collection and co-creation, featuring not only shared achievements but also differing viewpoints that help inform more effective and socially just urban sustainability transitions.

7.3. Synthesis of the BDD Innovation Process to Date

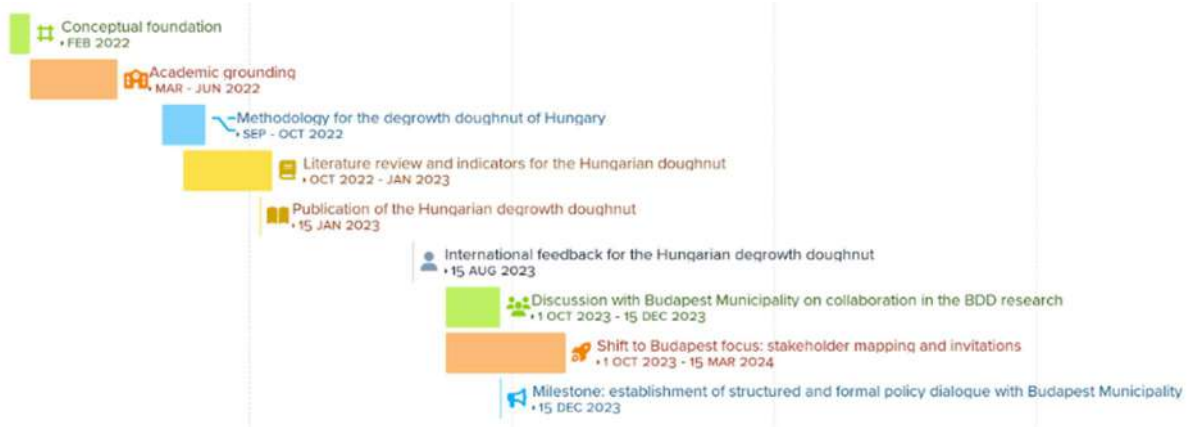

Figure 13: Preparatory phase (2022-2023) of the BDD seed innovation

The conceptual foundation of the BDD was set in February 2022, when the CUB team began exploring doughnut economics, motivated by the promise of alternative economic paradigms for Hungary's and Budapest's sustainability transitions. Early months were devoted to desk-based research, producing scientific legitimacy and international knowledge exchange. By September 2022, the team had refined its methodological approach in dialogue with Croatia's degrowth doughnut originators, ensuring both global relevance and local adaptation. The first national-level analysis of the degrowth doughnut for Hungary was published in January 2023,

providing a reference for subsequent urban application. Autumn 2023 marked a turning point as CUB mapped Budapest-specific stakeholders and formally invited the city's municipality to collaborate. A slow initial engagement – marked by scepticism and uncertainty on the city side – gave way to mutual understanding and the practical alignment of expectations by December 2023. This partnership was a key milestone, described by participants as 'a transformative moment' for trust and ongoing feedback loops. The interviews confirm that official municipal commitment not only strengthened academic confidence, but also showcased municipal interest for workshop participants and legitimised the process among urban decision-makers.

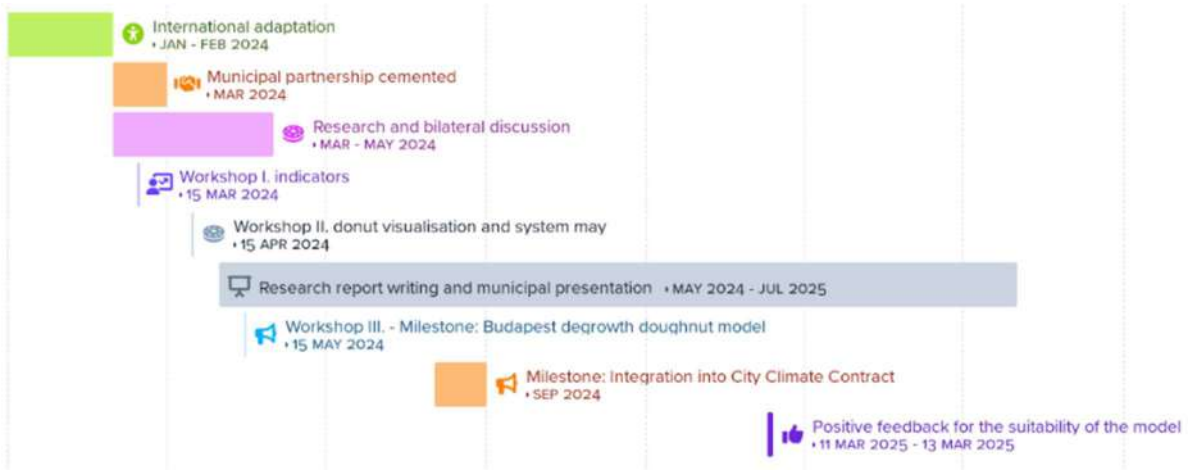

Figure 14: Timeline between 2024 and 2025 of the BDD seed innovation development

The core BDD development phase commenced in January 2024, with adaptation of the Barcelona and Croatian models to Budapest's context. In March 2024, partnership with the municipality was deepened, signalling readiness to co-produce city-relevant indicators and policy outputs. From March to May 2024, three participatory workshops formed the backbone of collective knowledge exchange and technical development:

- Workshop I (March 2024) introduced the degrowth doughnut framework, mapped potential enablers and barriers, and built preliminary consensus on indicator selection, setting a democratic and inclusive tone for the rest of the process. Smooth, highly productive bilateral consultations among the workshops, and open friendly workshop atmospheres with professional facilitation, supported effective consensus-building. The participatory

mindset fostered both individual and group creativity, with digital scenario visualisation and interactive discussion techniques seen as key for problem-solving and data integration.

- Workshop II (April 2024) produced the first BDD visualisation and participatory system map of causal relationships among socio-economic, biophysical and cultural indicators, making trade-offs and synergies tangible for all participants. The collaborative approach, supported by drawing and small-group brainstorming, enabled breakthroughs in understanding and mapped interconnected urban sustainability challenges.
- Workshop III (May 2024) validated core BDD model outputs: a final indicator set, a co-produced urban sustainability narrative, and actionable policy recommendations. This session was cited as a significant milestone, where open feedback and practical experience were integrated into the BDD story, and technical results were tied to Budapest's systemic vision for social and ecological transition.

Throughout the workshops, minor tensions appeared – around indicator selection, technical rigour, and interpretation for non-experts – but these were resolved through facilitative leadership, iterative adaptation, and robust discussion, as confirmed by interviewees: '*We resolved [our] tensions through consensus-building and joint discussion*.'

The adoption process concluded in September 2024 with the BDD's formal incorporation into Budapest's Climate Contract, marking a breakthrough for degrowth-informed policy and a significant milestone for the BDD development process. This achievement, celebrated by all participants and cited in interviews, was recognised as proof of impact and reflected the city's growing commitment to innovative sustainability approaches. By March 2025, further positive feedback indicated increasing acceptance, with additional decision-making bodies expressing interest in scaling or monitoring the model's results.

Interviewees agreed that the participatory methodology not only deepened content, but fundamentally shifted the learning culture – encouraging risk-taking, open reflection, and creative adaptation. Challenges in defining indicators and sourcing local data triggered important 'crises', ultimately reframed as opportunities for

group learning. Respondents noted that technical complexity often gave way to clarity through workshop visualisations and scenario modelling, highlighting the motivational power of accessible graphics for decision-makers and the public. Collaboration and communication were universally described as positive, with trust-building reinforced by professional organisation and effective summarising practices. There were calls for more time to enhance workshop participation and reflection, and to widen engagement beyond the core expert group to city departments and civic stakeholders.

A major challenge – and triumph – of the process was the development of locally relevant, context-sensitive indicators. Workshop participants avoided simply importing global models and, via iterative discussion and scenario exercises, crafted solutions responsive to Budapest's legal, social and ecological realities. Difficulties included integrating food systems, city mobility, and mapping trade-offs between ecological and social priorities. Creativity was actively supported by tools for real-time digital modelling and collaborative drawing. Successes were measured by both tangible outputs – academic publications, documented policy impacts – and cultural or procedural shifts within the city administration and stakeholder community. The BDD's inclusion in official municipal documents, ability to finish on time, and creation of a supportive, reflective learning environment were highlighted as key outcomes. Success indicators also included the extent of BDD uptake in city planning, and its ability to facilitate informed debates on urban complexity and well-being.

During the LH validation workshop, interviewees described how they envisage and plan the future of BDD seed innovation beyond the activities to be implemented through DAISY. They highlighted several directions, including applying the BDD model at the level of individuals to strengthen personal responsibility and connection to urban nature, while also revealing systemic limits, as shown by earlier attempts to tackle consumer and market-based barriers to sustainability. Interviewees noted that behavioural shifts towards biodiversity-conscious practices encounter obstacles similar to those seen in climate action, where market drivers such as aggressive pricing and regulatory gaps often override individual intentions. Empowering individual action for biodiversity therefore requires practical tools

linked to BDD indicators, which can translate systemic goals into everyday behaviour.

They emphasised that transparent, regular monitoring and open-access guidance, published on relevant municipal and other platforms (e.g., DAISY communication channels), can sustain engagement and inform leadership, drawing on existing structures such as the Budapest Climate City Contract. Research dissemination, in this view, must reach beyond academic audiences, using public-facing materials, educational platforms and civic engagement campaigns so that biodiversity features prominently in debates on climate neutrality, urban resilience and inclusive well-being.

Furthermore, core group members noted that the wider impacts of Budapest's sustainability transition – locally and internationally – should be assessed not only in terms of CO_2 reduction, but also through greener infrastructure, higher public awareness, and better access to environmental goods. New research – including ongoing PhD work that links doughnut metrics directly to biodiversity policy – should steer indicator refinement and guide future municipal strategies. Finally, interviewees suggested that proposals to update Budapest's SECAP (Sustainable Energy and Climate Action Plan) should integrate biodiversity metrics and concrete mechanisms for public engagement that foster a city-wide culture of ecological stewardship. Exploring the links between biodiversity, climate neutrality and social openness indicators can clarify how attitudes and collective behaviour shape outcomes and municipal responsiveness.

7.4. Analysis

7.4.1. Motivation

The BDD seed innovation has been driven by strong intellectual curiosity and the need to experiment with alternative sustainability paradigms. The initial motivation stemmed from academic interest at Corvinus University of Budapest (CUB), where researchers recognised the potential of doughnut economics, accompanied by concepts of degrowth, to move beyond traditional models and address both social and ecological aspects at the urban scale. The approach offers not only a framework for analytical rigour but also a tool for engaging policymakers and practitioners around shared urban challenges. Motivation has deepened as

international exchanges – especially feedback from Croatian colleagues – validated the idea that Budapest's sustainability transition could benefit from adapting innovative and holistic approaches. Initiators expressed their desire for a multidimensional framework and highlighted the value of connecting academic theory directly with municipal policy, underscoring a mutual motivation: creating a model that is both credible and locally impactful.

7.4.2. Enabling Factors

Several enabling factors have been contributing to the success and resilience of the BDD project. Structured facilitation and professional organisation help maintain high participant engagement through all stages of the process; the open and democratic atmosphere of the BDD development workshops was repeatedly cited during the interviewees as an essential enabler. Bilateral consultations and participatory events during the BDD development have encouraged transparency and trust among academic, municipal, and sectoral actors, with methodological flexibility allowing for adaptation to local contexts. Visualisation tools, collaborative mapping, and real-time digital scenarios have been instrumental in fostering creativity and problem-solving. Participants describe how the inclusion of diverse voices – ranging from academic experts through policy actors to public transport and nature conservation practitioners – enriched the learning process and built a broad base for consensus. The ability to integrate feedback and accommodate divergent perspectives about practical implementation, indicator selection, and data accessibility is proving essential to achieving progress.

7.4.3. Hindering Factors

Challenges are evident at multiple points in the BDD timeline. Initial scepticism and limited capacity within the Budapest Municipality delayed early engagement and practical policy alignment. Technical barriers – including difficulties in sourcing local data and the complexity of integrating context-sensitive indicators – has slowed model development and required persistent stakeholder effort. The challenge of marrying global frameworks with Budapest-specific realities has led to tensions around indicator selection, accessibility of language for non-experts, and balancing ecological versus social priorities. Limited workshop time and resources in the BDD development phase have constrained also hindered deeper engagement for some

participants. Differences emerge particularly when participatory processes are scaled beyond the core group, highlighting the need for clearer communication, additional resources, and more inclusive strategies. Variations in experience have also become apparent: while some participants consider the process expert-driven and effective, others feel there was potential for broader civic and departmental involvement.

7.4.4. Learning Overview

The BDD process provides rich opportunities for organisational and individual learning. The iterative co-creation process – refined through workshops, bilateral consultations, and science-policy meetings – shows the value of adaptive facilitation and flexible goal-setting. Participants have learned that visualising complex relationships between indicators and translating multidimensional evidence into accessible formats are beneficial for enhancing understanding and ownership. Tensions and crises – such as failure to integrate certain sectoral interests or struggling with ambiguous policy targets – are reframed as learning moments, leading to improved problem-solving. Stakeholders have developed a greater appreciation for participatory methods, risk-taking, and continuous feedback, and emphasise that real transformation depends on openness to consensus and conflict alike. Workshop narratives and participant quotes underscore how, to date, co-creation of the growth doughnut development process enhances reflective practice, legitimises new approaches in municipal policy, and strengthens the bridge between theory and action.

7.5. Conclusion and Next Steps

The BDD seed innovation LH illustrates how motivation, enabling factors, and effective learning practices can overcome substantial hindrances and differences of experience to produce a robust, stakeholder-owned sustainability tool. The collaboration between academia, policymakers and sectoral experts, while not without some challenges and diverging perspectives, ultimately resulted in increased mutual understanding, technical innovation, and willingness towards institutional change. The BDD model stands as both an experiment and a case of successful seed innovation – one with direct lessons for future participatory projects in Budapest and beyond.

Interview-based recommendations from core group members emphasised the importance of cohesive teams, participatory and risk-tolerant facilitation, the creative use of drawing and digital tools, deliberate planning for both consensus and conflict, and ongoing reflection on both process and content. Participants underlined that the real added value of the participatory learning history lies in its detailed documentation and analytical synthesis, which together reveal the level of complexity and adaptability required for seed innovations to succeed. Future iterations of the process should provide more time for conceptual digestion and stakeholder feedback, widen participation beyond the current circle, and tailor outputs more carefully to non-expert audiences.

Next Steps

Next steps include updating the BDD with new data, embedding the findings in wider city strategies, enhancing visual communication, and maintaining continuous feedback and monitoring. Interviewees hope that BDD-inspired methods will inform academic guidance and practical handbooks for other cities pursuing degrowth or deep sustainability transitions. The BDD seed innovation shows that transformative urban sustainability depends on deeply participatory and networked learning processes, grounded in structured reflection and adaptive co-creation.

While it was first adopted within Budapest's Climate City Contract, a subsequent shift toward biodiversity – driven by the DAISY project – marks a new strategic direction. Strong support from municipal leaders should be complemented by targeted, low-barrier interventions and pilot activities focusing on habitats, green corridors, and pollinator pathways. Integrating BDD/DAISY proposals into ongoing city projects will reduce administrative burden and enable practical steps toward urban ecological resilience. Future investments in these processes should prioritise social and collaborative design that empowers diverse actors, not only for climate mitigation but also for urban biodiversity enhancement. Updating biodiversity-related indicators within the BDD framework will take place in close connection with DAISY project efforts, which will ensure that indicator updates address not only energy and climate but also ecological functions, species diversity, and nature connectivity.

Furthermore, continued engagement with workshop experts will be essential for shaping future biodiversity policy design. Different sectors need opportunities to engage iteratively and dynamically, supported by flexible structures capable of responding to ecological challenges, institutional inertia, and dissent. Concrete plans for BDD include integrating doughnut-inspired models into strategies such as the Budapest Public Transport Company's sustainability plan.

Taken together, the next steps related to DAISY will contribute to transforming Budapest into a safe and just ecological space and help guide future agendas for urban nature, effective policy implementation, and ongoing municipal collaboration.

8. Conclusion

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8.1 Summary of Key Insights

The five LHs presented in this deliverable report confirm that transformative change for biodiversity and equity does not emerge from isolated technical solutions but from socially embedded, iterative processes (see also Deliverable 1.3 and Deliverable 2.2). Across very different contexts – urban citizen science, agri-environmental policy innovation, commons-based food systems, landscape connectivity and urban sustainability planning – innovation unfolds as a dynamic and non-linear journey. Each seed innovation case demonstrates that success depends on adaptability and responsiveness to local social-ecological realities rather than adherence to rigid design.

A recurring insight is the critical role of enabling conditions. Where stable funding, supportive policy windows and skilled facilitation align with trust-based networks and collaborative governance, seed innovations are able to gain traction and legitimacy. Equally important is the participatory character of these processes. Whether through co-creation workshops, citizen science engagement or cooperative governance, deep involvement of stakeholders has proved essential for building ownership, fostering trust and creating shared visions. These participatory spaces also allow tensions to surface early and be reframed as opportunities for learning rather than obstacles.

Another common thread is the challenge of balancing normative ambitions – such as biodiversity restoration, food democracy or degrowth principles – with operational realities, including resource constraints, regulatory requirements and digital skill gaps. Across cases, adaptive governance and transparent communication have emerged as key strategies for managing these trade-offs. Even where immediate policy uptake or large-scale implementation is limited, the processes generate enduring capacities: improved ecological literacy, strengthened networks and new collaborative norms.

The LHs also evidence that amplification requires bridging scales without losing local relevance. Promising pathways include linking grassroots initiatives to formal policy frameworks, integrating digital tools for monitoring and feedback, and fostering cross-case exchange to diffuse learning. Taken together, these insights highlight that transformation is rarely linear or rapid; it is relational, iterative and deeply dependent on the quality of collaboration and learning cultivated along the way.

8.2 Summary of Key Interpretation and Implications

The findings underscore the significance of the five seed innovation cases in providing insight into the conditions and dynamics that make transformation possible. Namely, how institutional arrangements, social practices and learning processes interact to turn promising ideas into systemic change. Across all cases, seed innovation pathways emerge as a deeply social process, requiring alignment between governance structures, local practices and shared values. This has important implications for how policy and practice are designed and evaluated.

For policy, the evidence suggests that seed innovations succeed when they move beyond top-down implementation and embrace co-production as a guiding principle. Participatory approaches – whether through citizen science, cooperative governance or co-creative events and workshops – are not peripheral but central to legitimacy and uptake. Policies that create space for experimentation, provide stable resources, and reduce perceived risks of adopting novel instruments, are more likely to enable systemic change. Equally important is the integration of diverse forms of knowledge: combining quantitative datasets with qualitative, locally generated narrative insights, strengthens both credibility and relevance.

For practice, the seed innovation cases underline the importance of capacity building and adaptive governance. Skilled facilitation, transparent communication, and boundary-spanning roles consistently emerge as critical enablers. Practitioners need governance arrangements that preserve democratic intent while allowing timely decisions, alongside monitoring systems that blend digital tools with low-tech, user-friendly methods. Sustaining engagement over time requires attention to behavioural design (including such as feedback loops and recognition mechanisms) that keep participation meaningful beyond short-term events.

8.3 Contribution to the Project

This deliverable makes a direct and substantive contribution to DAISY's overarching goals and the specific aims of WP4. By documenting and analysing the LHs of five seed innovations, it provides an evidence base for understanding how socio-economic, political and behavioural processes shape responses to the biodiversity crisis. Rather than focusing solely on outcomes, the report captures the dynamics of seed innovation pathways – how enabling conditions, governance arrangements and participatory practices interact, to influence trajectories of change. This insight is essential for identifying amplification strategies and designing intervention mixes that can accelerate systemic transformation. According, both the individual LH accounts and the above synthesis of cross-case patterns offers practical guidance for future foresight and amplification activities within DAISY. They highlight which factors consistently enable progress – such as stable resourcing, inclusive governance, and adaptive learning – and which barriers recur across contexts, including capacity gaps and regulatory rigidity. These findings will inform the development of tools and strategies for scaling and replication, ensuring that subsequent DAISY project phases build on lessons learned rather than reinventing processes.

In addition, the participatory research approach of Task 4.1 advances DAISY's methodological objectives by demonstrating the value of LHs. The method has not only generated rich empirical material, but also fostered reflexivity among case holders, strengthening their capacity for adaptive action. This dual LH function – knowledge production and capability building – aligns closely with DAISY's overall ambition to combine research with transformative practice.

8.4 Recommendations and Next Steps

The results of this deliverable report provide an evidence base for identifying practical implications for policy, design and stakeholder engagement, as well as priorities for future research and implementation. For policy, the findings indicate that embedding participation and adaptive governance as core principles is likely to enhance the effectiveness of biodiversity-related interventions. This involves creating mechanisms that connect grassroots seed innovations with formal strategies and funding streams, while integrating monitoring systems that combine

quantitative indicators with qualitative, locally generated knowledge. The evidence suggests that such approaches can reduce perceived risk, provide stable resourcing, and enable iterative adaptation rather than rigid compliance.

For design and practice, the cases indicate that governance models balancing democratic intent with operational efficiency are associated with greater resilience and uptake. The evidence points to the value of structured facilitation, transparent communication, and behavioural design features - such as feedback loops and recognition mechanisms - for sustaining engagement over time. Technical tools that integrate digital and low-tech approaches appear to enhance accessibility and usability, making monitoring more meaningful for diverse user groups. These design principles can inform practical guidance for municipalities, cooperatives and citizen-science networks, aiming to adapt or replicate elements of the seed innovations.

In terms of engagement, the findings highlight the importance of strategies that address capacity asymmetries and minimise the risk of reinforcing social or economic barriers. Evidence suggests that outreach combining educational components with participatory formats can strengthen co-creation and foster a sense of ownership and legitimacy among stakeholders (Franklin, 2022). Communication efforts that extend beyond academic audiences – using accessible narratives and visualisations – are likely to improve engagement with civic actors, practitioners and policymakers.

Looking ahead, follow-up actions within DAISY will focus on amplifying these lessons through foresight exercises and cross-case learning workshops. The next deliverables will build on this evidence to develop intervention mixes and policy recommendations that integrate biodiversity objectives with social equity considerations. Future research could use these findings to examine how enabling conditions – including such as trust networks, facilitation and adaptive governance – are institutionalised across different scales and contexts. There is also scope to adapt and extend the LH methodology to strengthen its application in contexts addressing the interconnected ecological and social dimensions of transformation, particularly by integrating multi-level governance perspectives, cross-case synthesis techniques and digital tools for participatory validation. These refinements would enhance its utility, not only for documenting seed innovation

processes, but also for informing foresight and amplification activities within systemic efforts to enable transformative change for biodiversity and equity.

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Statement on data availability

The LHs are available in Annex 1. All available supporting empirical data, processed in compliance with participant informed consent, GDPR and the requirements of the DAISY Data Management Plan, will be made openly available on Zenodo before the end of the DAISY project in January 2027.

Statement on ethics

This report is supported by information gathered through a combination of primary and secondary data collection activities. Primary data collection included volunteer human research participants. All research was undertaken in accordance with the Research Ethics standards of Coventry University and the DAISY Data Management Plan. The DAISY project was granted ethical approval by Coventry University on 01/04/2025 (P185462).

Annexes

Annex 1: Learning history for seed innovation 01 - Coventry-Warwickshire-Solihull City Nature Challenge (UK)

Analysis & Context	Year	Event	Observations & Reflections
iNaturalist began as a master's project at UC Berkeley's School of Information by Ken-ichi Ueda, Nate Agrin and Jessica Kline. The website was highly innovative for its time.	2008	iNaturalist launched (as a website)	'Mission: iNaturalist's mission is to connect people to nature and advance biodiversity science and conservation.' (iNaturalist, n.d)
INaturalist App: also highly innovative for its time – especially with regards to its social-network design and data integration (iSpot came out at a similar time but fizzled out in comparison)	2011	iNaturalist App launched	'We started iNaturalist to explore how technology could be used to connect people to nature [... ...] But we also found that the observations and identifications people were sharing were an exciting new source of data for science and conservation.' (Loarie, cited in UNEP, 2017)
Inaugural CNC event held across 8 days CNC started and led by professionals from Natural	CNC 2016	CNC inaugural event (participation restricted to San Francisco v's Los Angeles)	'Connecting People with nature; collecting biodiversity data for science and conservation; encouraging public participation in biological recording/ increasing the number of biological recordings' (City Nature Challenge, 2025)

History Museum of LA and California Academy of Sciences			
4-day long-weekend format introduced (now standard)	CNC 2017	CNC events held across the USA	
CNC events hosted by 3 UK cities (Bristol, London, Plymouth) Limited overall awareness of iNaturalist in UK for the first few years of UK CNC events being hosted	CNC 2018	CNC becomes an international event	
CNC events hosted by: x7 UK Cities Use of iNaturalist by (subsequent) Coventry CNC hosts initially in a personal capacity only	CNC 2019	First use of iNaturalist by (subsequent) Coventry CNC host organiser	
CNC events hosted by: x7 UK Cities Use of iNaturalist by (subsequent) Coventry/ Warwickshire CNC hosts continues in a personal capacity only, with some (subsequent)	CNC 2020	First Birmingham CNC	

hosts preferring alternative apps at the time			
CNC events hosted by: x11 UK Cities Coventry's first CNC was relatively small and faced challenges such as low public awareness and limited familiarity with iNaturalist. *Motivation* (for Coventry CNC): Engage public with biodiversity, inspired by Birmingham's participation and healthy competition. *Challenge:* Lack of prior familiarity with iNaturalist in the UK at that time. *Overall:* First year was 'not particularly successful' due to COVID and low awareness.	CNC 2021	First Coventry CNC – hosted by Coventry City Council	'Join in with the 2021 City Nature Challenge - the first time that Coventry has been part of this global event. Wildlife in Coventry is important - all wildlife - help us record what we've got so we can have more in the future' (iNaturalist, 2021) *'I wanted to get people infused and engaged with wildlife and City Nature Challenge seemed a good way of taking an international approach towards making the public, trying to get the public more interested and aware of biodiversity in cities.'* *'There weren't that many cities who were involved in it in the UK at the time. Birmingham was, and Birmingham had been doing it for a while. And Birmingham and Coventry have a healthy competition.'* *'I don't think the first year was particularly successful... it was COVID and it was difficult.'* *'Immediately there is a conflict... between trying to engage local people and trying to get records.'*

CNC events hosted by: x12 UK Cities WWT's motivation for joining CNC was largely engagement.	CNC 2022	CCC and WWT join forces to jointly host Coventry CNC CU-CAWR staff participate in the Coventry CNC	*'I took quite a lot of time trying to engage local people with the [Charterhouse] site... so we decided to do pop-up events, to do a City Nature Challenge.'* *'I encouraged families to come and snap anything in urban places – I don't think I'd do that now.'* *'Thinking back to the first year, it was a little bit ramshackle.'*
CNC events hosted by: x20 UK Cities Warwickshire County Council & Solihull Metropolitan Borough host their first CNC	CNC 2023	Coventry CNC + first Warwickshire/ Solihull CNC - Jointly hosted by Warwickshire County Council (WBRC) and Solihull Metropolitan Borough (SMB); run as a separate CNC to Coventry CNC; CU-CAWR staff begin hosting CNC events (as part of the Coventry CNC)	'We are working closely with other local partner organisations [CCC, WWT] to promote the City Nature Challenge and to run various bioblitzes and other events across our project areas for the City Nature Challenge 2023.' (iNaturalist, 2023)
CNC events hosted by: x20 UK Cities Improved coordination, based on experience and familiarity with running the event	CNC 2024	Coventry CNC ranked in UK top-10 CNC events CU-CAWR staff continue hosting CNC events (as part of the Coventry CNC)	'*I think one year we met like every three weeks to discuss it because people had a lot of questions... Whereas I think* [...] *said she had two meetings* [for the 2024 CNC].'

Global CNC timing (April) clashes with UK weather and academic calendars. Events shifted from general walks to specialist-led activities and ID parties to improve data quality and engagement			*'It's not the ideal time of the year to have a City Nature Challenge in Coventry… it's invariably pretty cold and wet.'* *'We did a really popular joint botany and fungi walk one year… that got loads of people coming.'* *'It was just nice to get out for an hour and have a little look around the gardens and stuff.'* '[Q.] How about the decision then, to expand beyond just Coventry? [A.] … *I think that was relatively unanimous… next year, let's try and collaborate.*' '*After a year or two we got other voices [specialists] involved which gave us more focus on records. We got specialist groups to support on flora, fungi and amphibians. They were good at working with non-experts. The closest to marrying the two together.*'
CNC events hosted by: x26 UK Cities Coordination further improved, including clearer roles among partners and less stress during planning. However, work continues on sustaining engagement beyond the event.	CNC 2025	Coventry, Warwickshire and Solihull join forces to host a single combined CNC Coventry/Warwickshire/Solihull CNC ranked in UK CNC top-10	'*It's our like* [5th] *year of doing it now. So, a lot of things have got a lot more flexible* [… …] *It's getting a lot more relaxed year on year, because everyone trusts that it will be fine.*' --- '*We've joined forces with Warwickshire… everybody else wanted to do that because we're trying to compete with Birmingham.*'

Combining of area helps to ease slightly on-going challenge of limited resources and staff capacity – however this continues to remain a challenge. CNC acts as a 'launchpad' for broader initiatives (e.g. Nature Towns and Cities). Tension over recording platforms/ apps (iNaturalist vs other ways of recording). Efforts to involve diverse groups remain inconsistent; school engagement is hindered by timing. Event design shifted toward fixed locations and activity-		CU-CAWR staff continue hosting CNC events	*'It's a conscious attempt to try to get as many records... so it would be England versus Birmingham.'* --- *'There is no prize. It's just bragging rights and ego.'* *'Last year, I was at the top of the leaderboard... and then someone uploaded a load after the event and beat me.'* *'Come the second year, I wanted to try and make sure I'd done more observations than the previous year... I think I* [beat my record] *by about 300.'* *'It's nice to have a rival through the local town or try and be the best in the UK.'* *'Just makes it a little bit more fun for me, I think, sometimes. I can be a little bit competitive.'* *'There was a bit of competition... people were taking photographs of plums and spider plants in their house'* --- *'We realised that we were spending half of the events teaching people how to use iNaturalist... Next year we'll run online training events.'* --- *'When we've tried to recruit specialist recorders groups... there's a lot of resistance around that... they have their own technology and they all have their own apps.'*

based formats for better engagement Regional and individual competition drives engagement but can distort priorities. Organissers adjust strategies, but outreach remains challenging. CNC project scaffolding is a year commitment, with structured meetings and forms to complete.			*'Trying to get the local experts who don't use iNaturalist... to lower themselves to using iNaturalist for a weekend.'* *'He was getting very frustrated... how do people expect me to identify this when they haven't taken photos of the right part of the plant?'* *'Experts in Warwickshire tend to look down on City Nature Challenge and iNaturalist... that's a struggle.'* *'You'll get the die-hard recorders who prefer iRecord... they see that as more for your serious hobbyist.'* --- *'We've started finding places that have a centralised location... Or alternatively, you would pick a wildflower meadow and advertise it as a wildflower meadow event.'* *'We had one of the trainees sitting with the Flora Group... that probably got us tens of additional sightings.'* *'Having someone who wants to talk to people at an event and someone who's happy to get records in... that's important.'* --- *'We've tried Eventbrite... but the return from all of that effort was negligible.'*

			'People might do it for that weekend and not engage with it again for the rest of the year.' --- *'I've ended up introducing my children to it who are both really keen on it now as well.'* *'My eldest... found a newt at school and a dragonfly when she was at the park one time that she got really excited about.'* *'I've obviously been keeping my eye out for things ever since... If I spot anything on my way around.'* *'I have learned so much about both areas through it.'* --- *'I don't usually make news year resolutions, but I did start the new year with a target of how many new species I wanted to observe on iNaturalist... and I've just met it!'* (LH Workshop Participant) *'The question now with regional record centres is 'who isn't doing CNC?' - because most of them are.'* (LH Workshop Participant) *'We are reinforcing our existing [ecologist] group of networks and structures – not making new ones.'* (LH Workshop Participant)

			'*There is a UK CNC network now, so a new structure. But generally, it's opportunistic collaboration.*' (LH Workshop Participant)
First coordinating meeting for 2026 reflects the high level of experience with CNC event planning for the majority involved. Organisers struggle to balance CNC's dual aims – generating biodiversity data and engaging the public. Perceived cultural divide between experts and public. iNaturalist is central but creates barriers for some; alternative apps exist but are rarely integrated Capacity of recorders to verify all the observations raised as a specific point to attend to – noted however that currently	November 2025	WCC take over from CCC in co-ordinating and host CNC planning meetings. First (online) planning meeting for CNC 2026 event hosted with attendees from government, environmental charities and university sector	

C/W/S CNC is above the % of some other UK cities iNaturalist data is valued for engagement and education, but concerns remain about accuracy and verification Desire to scale CNC regionally and integrate it into broader biodiversity strategies and planning. Importance of specialist involvement, targeted training, and balancing engagement with data quality. Positive event experience fosters commitment to future participation. Place-based attachment; leveraging known biodiversity hotspots for engagement.			
CWS-CNC 2026 running outside of school Easter holidays, creating opportunity	April 2026	Coventry, Warwickshire and Solihull continue to jointly host a single combined CNC	[Looking forwards to CNC 2026:] '*I just wish it was bigger… I wish we had 10 more staff and we could run events in every park.*'

for greater diversity of participants – via engagement with schools. Potential to organise sub projects within Coventry and Warwickshire for individual event leaderboards. Organisers would like to work with faith-based and other community groups but currently have to balance time needed vs benefits.			--- '*City Nature Challenge is not a one-off event. It's a launchpad for engaging with people 365 days.*' '*I would not want City Nature Challenge to be* [...] *'I've done wildlife this year, tick.'*' '*It's half getting people into nature and then it's half using it as an excuse to survey the city.*' '*I'm not entirely convinced how valuable it* [iNaturalist] *is as a recording tool, but as a way of engaging people, it's brilliant.*' '*We can either focus it being a chance for outreach or we can focus on it being a chance for recording. It doesn't seem to work as both.*' '*We want as much data as possible... but we also want to get more people interested in the natural environment.*' --- '*Misidentifications are so numerous as to render all of the information completely worthless.*' '*It's not scientifically robust. It's just random people with a camera.*' --- '[iNaturalist:] *There isn't a non-digital alternative really that we could widely promote.*'

			'We've had people who come to events and basically say, 'I'm not really interested in using the app.'' --- *'There's a vanguard of recorders who are slowly stepping down... and at the moment there aren't a vast amount of people coming in to fill their places.'* *'Our ambition now is to use CNC data to influence biodiversity planning directly.'* *'We might link CNC to the Nature Towns and Cities Project.'* (LH Workshop Participant) '*We want to use CNC to improve relationships with networks and community groups e.g. establish a small CIC.*' (LH Workshop Participant) '*We have a school project offering an accreditation scheme for Green Schools which would use CNC.*' (LH Workshop Participant) '*To improve record quality, we could alternate each year. One year focus on records and the next on engagement.*' (LH Workshop Participant) '*The council's priority is community. We are focused on engagement.*' (LH Workshop Participant)

Annex 2: Learning history for seed innovation 02 – Inclusive biodiversity monitoring: emerging socio-technological innovation from a Hungarian results-based payment scheme.

The table below includes all the milestones (column two) listed in the Miro board and discussed during the learning history workshop (Figure 07) - information included here covers the English translation of the post-it notes included on the Board. The first column of the table stands for reflections of the DAISY researcher(s) (as relevant to the segment of the timeline described in the corresponding column two). The second column of the table includes milestones: the main descriptive narrative of what happened and when. The third column includes direct quotes from the seed innovation participants regarding the timeline event described in column two. These quotes include the translations of the written notes from the Miro board filled during the LH workshop and snippets of the recorded discussion of the workshop (and in a few cases of the interviews with case-holders).

Reflections	Milestones	Quotes
Securing EU funding was a critical precondition for initiating the innovation process, both in terms of providing the necessary financial resources and ensuring human capacity.	May 2019 - Start of the Contracts 2.0 project	'*From that point on, the Contracts came in handy when the opportunity arose to try out new approaches in agricultural support that might work better than the previous ones (...) we tried to combine the economic side with the nature conservation side.*'
This essential step created a structured space for collaboration and allowed researchers to observe how stakeholders negotiate interests in practice, as well as shed light on hidden aspects.	November 2019 - Establish the Őrség Contract Innovation Lab (CIL) and select the preferred contract type	'*There were four branches of the Contracts, if you remember, and this was one of them. The first turning point was deciding which of the four we should choose. At the beginning, two were selected: the result-based one and the local products one. We then narrowed it down to one, and later it also became clear*

		that the local products option wasn't really working.' (National Park)
This was a valuable moment for introducing the CIL and building a shared understanding of its purpose. Meeting the experts helped clarify expectations and provided insights for shaping the next steps of the process.	October 2020 - Consortium meeting in the Őrség – introducing the CIL and meeting with experts	
The expert workshops were essential for grounding the project in ecological realities and ensuring that habitat types and indicators were selected on a sound scientific basis. These sessions also highlighted how expert knowledge can guide clearer priorities and strengthen the overall design. The field trip also helped participants to experience biodiversity and raise awareness.	February 2021 - Workshops with experts to select the main habitat types and indicators	'*And the next milestone was probably that we put together the framework of these constructions, again within the context of these innovation workshop sessions – meaning what criteria the value-chain-based or the result-based support system should meet, how many years it should cover, and how differentiated it should be.*' (National Park)
The Austrian study trip was especially outstanding because it provided concrete, real-world insights into how result-based schemes operate in practice. Seeing an established programme and hearing directly from practitioners offered lessons that helped researchers better understand potential challenges, feasibility, and the kinds of support farmers might need when adapting similar approaches in the Őrség.	September 2021 - Workshop and Austrian study trip on the results-based payments	'*I especially liked the part with the Austrian partners – there was also a study trip to an Austrian result-based, roughly farming-focused programme, and what they told us came with a lot of valuable lessons.*' (State Treasury)

The 'Dream Landscape of the Őrség' exercise proved to be a significant milestone because it shifted discussions from restrictive rules toward a shared vision of landscape and cultural values. Its impact has proven remarkably long-lasting, even three years later, participants still recall and reference it, showing how deeply the exercise shaped collective imagination and guided the direction of later decisions.	May 2022 - A series of workshops to choose indicators and develop categories	'*The 'Dream Landscape of the Őrség' helped us move beyond thinking in terms of what is allowed or forbidden, and instead take a broader perspective: what are the landscape and cultural values, and what needs to be done to preserve them?*' (National Park)
It is noteworthy that none of the learning workshop participants mentioned this event, despite the fact that it was the first opportunity where the pilot result-based scheme was introduced for a professional and international audience.	November 2022 - Synthesis workshop in Berlin on results-based payments' key lessons	
The closing conferences in Őrség and Brussels were described as meaningful final moments that brought all stakeholders together almost like a 'family gathering' after years of shared work. These events not only showcased the project's results to policymakers and practitioners but also highlighted the sense of community that had formed, making the conclusion feel both celebratory and reflective. However, there were some doubts from the policy side regarding the programme's financial feasibility.	April 2023 - Project closing conferences in Őrség and in Brussels to present results to policymakers and practitioners	'*Getting the other directorates interested in this was also important. That's basically what the final conference and the demonstration of the whole thing were for. A few people came from some places, and of course they said, 'yeah, this would be really great,' but for them to actually invest energy in it, they would need at least some expectation that in x amount of time they would get money out of it or something. Otherwise, why would they put effort into it?*' (National Park)

The field trip with policymakers demonstrated that the monitoring system truly works in practice. Even initially sceptical participants became convinced that biodiversity outcomes can be measured reliably, reinforcing the need to include such a monitoring system.	May 2023 - Field trip to test the monitoring system with policymakers	'*I was sceptical, really sceptical (...) How are we supposed to demonstrate such a result in a tangible way? And then, toward the end of the project, we had a field day in the Őrség, where (...) the others basically showed us how. And you get the hang of it. Even as an economist, I have to say there are methods for this. So it is possible to check this kind of biodiversity target in a tangible, relatively objective way. That was a kind of revelation too, that this can actually work under fairly objective conditions.*' (State Treasury)
While the presentation in the Ministry of Agriculture was a cornerstone mentioned by multiple stakeholders, it failed to live up to the expectations tied to it. Stakeholders mentioned differing possible reasons for this, such as different priorities and heavy workload in the Ministry, and distrust in new innovations.	December 2023 - Meeting in the Ministry of Agriculture	'*And the milestone that came after Contracts2.0 was that we presented all of this to the Ministry of Agriculture, hoping that we could include it as a pilot in the agri-environmental management programme that was launched this year and as we can see, this did not happen. But at the time, the reception was very positive, and we received all kinds of promises that have not been fulfilled to this day.*' (National Park)

Annex 3: Learning history for seed innovation 03 – Urban-rural transformations through commons governance in Germany

KoLa CSA learning history

Our Reflections	Milestones	Quotes
Motivation: Make community-supported agriculture (CSA) attractive and accessible to more people; Create a professional, scalable, and fair farming model that combines ecological, social, and economic sustainability; Living lab for sustainable agriculture; Seize a unique opportunity. **Enabling Factors:** Land offered by the church.	**2018**: Offer from the church for land (first decision point); 40 ha	*'The big vision of KoLa is to bring community-supported agriculture out of its niche.'*

Enabling Factors: The founding members were driven by idealism and the desire for systemic change, not just regarding local agriculture; High professional competence and valuable skills within the team; There was a strong need to connect urban consumers with regional, organic food while building a cooperative, transparent workplace; Personal motivation (employees); Joining due to alignment with values, community, and meaningful work; Government agricultural investment support (funding program 'Sustainably Out of the Crisis' for fruit growing from the state of Saxony; Social Impact Lab fellowship); Low-interest loan from GLS Bank. **Insights:** Creating visibility and openness builds trust.	**2019:** Planning phase, concept development, and Social Impact Lab fellowship (contacts and know-how like subscription/order systems); Public outreach: over 1,000 newsletter sign-ups before first planting; First survey with 800 participants (high engagement before founding); Cooperative founded in September 2019 (16 members, 3-person board); Partnership with Konsum Leipzig eG – key milestone enabling over 50 distribution points in urban areas.	*'Jan Felix said: Hey, now we have the chance to build this from scratch... Let's seize it.';* *'We consciously invest money and resources to inform people, attract them, and explain what we do and why it's good.';* *'The actors in the initial team were extremely skilled.* [...] *One knew about financing, another about funding applications, another about starting a project, building requirements, energy efficiency, agriculture.'* *'Cooperation with Konsum Leipzig eG... That was basically a free pass.'*

Barriers: Initial difficulty financing infrastructure and machinery; Balancing the solidarity pricing system—after six years, financial imbalance began; Cuts in government support for public events; Conflicts in decision-making due to sociocracy (consensus slowed processes); Different opinions on how strictly 'organic' should be practiced; High workload and dependence on a few key people; Drought conditions and concerns about members' declining ability to pay.	**2020**: Start of operations on temporary land; First loan campaign: target €200,000, result €500,000; Signing long-term land lease agreements (heritable building rights and land lease); Introduction of solidarity pricing system (Soli 1–3, reduced 1–3); 500 boxes delivered weekly at the start; August 2020 – official takeover of own land.	*'It worked for six years that enough people chose Soli 1, 2, 3 – now it's starting to tip.; There were always subsidies... and those were cut.'* *'Sometimes people say: 'Do we always have to discuss everything three times?''* *'The climate is crazy... and many people have less money available.'*

Enabling Factors: Trial memberships lowered entry barriers and increased retention; Investments in staff development, mediation, and team events strengthen cohesion and sustainability **Learnings:** No cautious, incremental growth – instead, full concept implemented from the start; Continuous communication with members is crucial; A transparent wage system creates fairness and motivation; Member satisfaction, team cohesion, and stable membership numbers are key indicators; Flexibility in production and delivery (e.g., self-harvest fields, bike couriers) are important, innovative additions.	**February 2021:** Approval of agricultural investment funding & GLS Bank loan; **2021**: Move to own farm & completion of buildings (storage, office, community and seminar rooms, cooling units, operating technology); **2021–2023**: Expansion to over 1,500 weekly boxes and more than 2,000 members; Growth of education and training programs (largest training provider in Saxony); **2022**: Switch to sociocracy after team conflicts (organisational turning point); Innovations: trial subscriptions, digital ordering.	*'The trial subscription was a great entry point... It brought us a lot of people.'* *'I would personally measure success by the team... if the atmosphere is good, that's a huge success for me.'* *'There was a clear vision from the start. It wasn't one step at a time, checking how people react, then moving on. It was: this is the concept from the beginning.'* *'We can't manage it ourselves in the team – so now there's a self-pick field for sugar snap peas and strawberries.'* *'After extensive calculations, we introduced a system with nine joker skips: four are included, for five more half a box is charged.'*

Barriers: Climate change – late frost causes crop losses. **Enabling Factors:** Climate adaptation through investment in technology.	**2023–2024**: Installation of frost protection sprinklers after massive crop losses.	*'In 2024 we installed frost protection sprinklers after all blossoms and fruit sets died the previous year due to climate changes.'*
Motivation: Part of the energy concept, consistent implementation.	**2024**: Use of electric truck for deliveries (powered by solar energy).	*'Since 2024 our truck runs, which was a huge investment. But it was planned in the business plan from the start and [...] it basically uses our solar power and that's super cool. It just fits perfectly with the whole concept.'*

Gemüsehof Naderkau learning history

Our Reflections	Milestones	Quotes
Motivation: Desire for career change; Interest in the concept of self-sufficiency and commitment to community-supported, ecological agriculture; **Barriers:** Pandemic increased demand but made building relationships and meeting members and interested parties difficult; **Learnings:** No long-term strategy, rather experimental and incremental growth; Starting small with few members was not optimal, as constant adjustments were necessary (no stability); Cons: With more members, the initial effort and overload would have been significantly higher;	**2019:** Founding of the CSA	*'At the same time, we were already gardening for self-sufficiency... And then we said: Okay, now we take this step and dare to do it ourselves here.'* *'Sometimes I'm not sure if we shouldn't have started with more members right away.* [...] *whether it might have been better to say from the start: This is it, we need this many members to be financially secure.'* *'I think if we had immediately said: Now we build a farm for 50 households* [...] *That would have led to so much overload* [...] *that a lot might have gone wrong.'*

Enabling Factors: supportive social networks; versatile use of existing resources; use of cattle farming for fertilisation proximity of home to the farm **Barriers:** many processes at once (conflicting goals); **Learnings:** lack of recovery, lack of time boundaries, risk of overload	**2020:** First harvest and vegetable box delivery; 7-day work week	*'We were already hooked... of course it works. And now we want to prove it... and do it ourselves here.'* *'We start first with our friends in Leipzig.'* *'One member always takes the vegetables (to Leipzig). That's why we also have people in Leipzig.'* *'We use cattle manure as CSA, of course.'* *'Do we make the website* [...] *or do something in the garden?'* *'Maximum structure* [...] *that's very, very important from our experience.'*

Motivation: Request conveyed appreciation for our work **Enabling Factors:** Insights from the project can directly flow into our work (e.g., solidarity contribution for gardening work); Networking among participating CSAs **Learnings:** Recognised as a relevant practice site	**2022:** Part of a TU Berlin project panel	*'That was a nice thing for us because* [...] *just the fact that research projects are interested in us strengthened our self-confidence.'* *'We introduced that* [...] *those are things that came simply through this research project.'*
Motivation: More tunnel space enables winter supply and growth; Second foil tunnel in planning as additional pillar: seedling production (and sales) **Enabling Factors:** Know-how among members for building foil tunnels **Barriers:** Not always wanting to give in to growth pressure	**2023:** First large foil tunnel	*'Tunnel space is always what limits members.'* *'Short-term goal is the seedling tunnel, so we have year-round seedling production outside in the tunnel and can sell seedlings to be visible externally.'*

Barrier: Weather dependency; Climate resilience; **Learnings:** We don't want to be pure employers/bosses (only with partners who have a stake in the project)	**2024:** Poor winter harvest; decline in membership; first intern	*'In one year we had* [...] *over 20% cancellations.* [...] *That was definitely stressful.'*
Motivation: Growth (members) is needed for CSA to be financially viable **Barriers:** Personal capacities already exhausted with current status quo—more members would mean unsustainable extra burden **Enabling Factors:** Professional CSA consulting by Urs Mauck Consultant, speaker and workshop leader in the fields of regenerative agriculture and market gardening) **Learnings:** More structure can relieve pressure, not more performance	**2025:** Consulting by Urs Mauck / efficiency improvement	*'We have the problem that my job won't last forever* [...] *we need to build the farm so that it financially compensates for that. But we just don't know how to take on more members* [...] *without completely breaking down.'* *'We said: Okay, let's bring in Urs Mauck and see where we can become more efficient in the farm.'* *'Put as much as possible into structure... cut what's unnecessary.'*

Motivation: Health, recovery, social sustainability; Transition from pioneer phase to structured, sustainable work organisation **Enabling Factors:** Consulting by Urs Mauck **Learnings:** Consulting, planning, and efficiency topics are perceived as relief, not economisation; Relief not through reducing workload but through reorganisation	**2025:** Implementation of 5-day work week	*'In the beginning, it was really Monday to Sunday.'* *'Maximum structure* [...] *not just work, but efficiency* [...] *thoughtfully structured.* [...] *Pay attention to small things that make life sweeter every day.'*

Rübchen learning history

Our Reflections	Milestones	Quotes
Motivation: Members joined because they want to actively participate in deciding what food they consume – not just be passive consumers; Alternative to commercial mass food consumption; Long-term food sovereignty in the region; Members value transparency and connection, shortening transport routes, fully self-organised and non-hierarchical structure; transformative political potential as a 'utopian preview'; Transformation of agriculture: want to buy organically produced food **Enabling Factors:** Commitment of the founders; there was no comparable offer in Halle	1998: Founding and moving into first store space	*'It's really about that. About the bigger picture. About the background of the environment, agriculture, large monocultures and everything that exists.'* *'For me, it also has transformative potential politically, because it's a store – an organisation that is completely self-organised, functions without hierarchy, and can essentially be a utopian preview* […] *of* […] *food security.'*

Enabling Factors: Operation as a non-profit association and passing on products at purchase price; No economic interest in maximising sales (allows the community to continuously prioritise its core principles over commercial pressure for continuous growth); All daily activities (except two part-time positions for finance and store management) are carried out by volunteer members; Mandatory member participation and restrictive opening hours are considered key to high involvement, as they foster social contacts, community feeling, and responsibility; Special feature: supplied by wholesale as a food coop (other food coops are not) **Barriers:** Store space offers limited capacity (storage, number of people) **Learnings:** There is a natural growth limit at this location	**Around 2001** (no exact date): Gradual move to a larger location; Opening days and hours gradually extended due to growing membership and increased product volume; eventually operated like a 'normal' store five days a week (No exact date): Store and finance positions introduced and paid (mini-job) Pre-Corona (no exact date): Membership grew significantly, leading to a waiting list of up to three years; membership was eventually capped as physical space and logistics could no longer handle the volume	*'I can't say the exact year we moved, but within the first five years.'* *'...at some point we said we don't want to grow any further because it becomes problematic to keep it truly member-run.'* *'Except for our store and finance positions, two people are paid and they're not full-time. All daily tasks are done by members – that's something you rarely see at this size.'* *'...there's simply no economic interest. The coop has no interest in making high sales and I think so much follows from that.'*

Enabling Factors: Digitisation: Introduction of the digital door code system reduced logistical effort, eliminated bottlenecks in key distribution, and minimised communication errors; Automatic integration of the code into the digital duty roster significantly relieved administrative work, especially in coordinating store shifts, whose failure had severe consequences. **Barriers:** Excessive burden on a few for coordination tasks (especially board members, generational change difficult) **Learnings:** Need for decentralisation: A key insight is the importance of involving many more members in responsibility, decision-making, and project design from the start.	**2022:** Digital door lock system with code **2023:** Gradual introduction of digital duty calendars **2024:** Door code assignment via digital roster	*'About two years ago... digital duty roster.'* *'It's all automated now.* [...] *That's a huge relief.'* *'I would involve many more members – from the start or later – much more in responsibility and decisions and design possibilities.'*

Barriers: The Corona crisis caused a significant personnel and ideological crisis within the community; recurring challenge in defining the product range and resisting member demands for non-seasonal or heavily processed organic products; difficulties ensuring new (younger) people join the board and replace long-standing members; the board must handle externally imposed administrative tasks such as tax audits or compliance with EU cash register regulations; a modern challenge is the existential question of the need for food coops, as organic food is now widely available in supermarkets and often cheaper than at the coop **Learnings:** Consciously limited growth (growth would endanger core identity), trust and delegation: It is necessary to have the courage to 'let go' and trust that others – including younger members with new ideas about self-determination and grassroots democracy – can perform tasks just as well; Mandatory member participation is the 'key' to success, as it creates a cycle where members work to access products and thus value the community beyond simple commercial exchange.	**2025:** After Corona (no exact date): Decline in membership and rising food prices (inflation); Reduction of opening days (closed on Wednesdays) to regulate workload; Consideration of expanding the range to include foods that are not certified organic but are trusted to be grown organically (certification as a hurdle for producers)	*'During that time, I think there was a drop in membership or the inflation explosion afterwards. And then it was decided to close on Wednesdays. So now we're open only five instead of six days, and that regulates things.'* *'And then we realised that the idea everyone still had in mind about what the coop actually is no longer quite matches reality. Buying cheap organic food here isn't really the case anymore. So it has to be more than that.'* *'What keeps coming up is the question: What is our product range? What do we want in the store and what are our rules and ideas about what good food is and what bad food is?'* *'Or are local producers those you know, where you can visit, who are nearby, who don't want to deal with bureaucracy because they might be alone or two people and bureaucracy takes ten hours a week.'*

Koope CC learning history

Our Reflections	Milestones	Quotes
Motivation: The initiative arose from a perceived gap in local food coops: Existing food coops in Leipzig were 'overcrowded,' so a new, accessible alternative was founded; Core values: solidarity, regional and organic food, community building, breaking down barriers to these foods; Project as a 'real-world lab' for alternative economic and social structures; Desire to act locally, connect engaged consumers, and create a social space beyond consumption. **Enabling Factors:** Online workshop/educational offering on food coops; Network and email list	**2021:** Online workshop on food coops sparked the idea; A small group (7 founding members) formed after exchanges via email lists and local networks	*'There wasn't an empty one or no food coop. So we needed one – and that's why we founded it.'* *'[...] the fixed idea emerged that we needed another food coop in Leipzig because the ones that existed at the time were totally overcrowded. And then we connected via an email list with others who also wanted to start a food coop.'* *'I just want inequalities to be reduced. And food is somehow... a good start.'* *'We're not just a place to get food, but also a place to meet.'*

Enabling Factors: €5,000 prize money for first shelves and equipment; Know-how within the group **Barriers:** Administrative hurdles, restrictions, choosing the right legal form; Complex legal process to establish a non-profit association; Drafting the association's statutes;	**2022:** Association founded and first space rented; €5,000 prize money secured for shelves and equipment; Official founding of the association and first info events plus neighborhood outreach at local festivals; Introduction of 'online shop' (ordering system)	*'We always had the right people at the right time to take care of things* [...] *Then we had Daniel, who was there for IT.'* *'This membership fee is structured in solidarity... the more we are, the cheaper it gets.'* '[...] *the biggest administrative contact was at the beginning when it came to the legal form* [...] *the hurdles were relatively high and felt somewhat* [...] *opaque.'*

Barriers: Wholesale supplier ended cooperation; Imbalance in workload and engagement: few people carry most responsibilities; Ongoing efforts to motivate members for equal participation; Consideration of mechanisms like mandatory contributions or 'penalties' for inactive members (controversial within the group); Initially relied on private loans and donations; Recognition as an association delayed until mid-2023; Communication overload: Telegram chats became overwhelming; Inconsistency between inventory and finances (losses) **Learnings:** Explicit introduction of a consensus model (agreement, minor concerns, major concerns, veto) instead of yes/no votes; Check-ins at meetings to improve atmosphere and mutual awareness; Membership growth recognised as crucial for coop survival; Growth brings opportunities and new challenges (coordination, organisation, losses)	**2023:** Launch of website and logo; Professional identity created; Recruitment of new members (~47 officially, plus ~25–30 household members), stable memberships; Recognition as an association; New sourcing points; Second prize won (source not mentioned), partly invested in software development	*'The wholesaler* [...] *eventually shut down* [...] *and then we really had a problem where to get our products.'* *'We need more active people so it doesn't fall on the few.'* *'I think what's always the tension is that we're volunteers, we all do this alongside our jobs.'* *'So yes, it's a challenge we can't address with control mechanisms. But what our finance working group suggested was adding a certain percentage to the purchase price to offset [losses]. Of course, you can't do that indefinitely and it's not what we want because ideally we pass on at purchase price, but right now it's probably the best solution.'* *'There's shrinkage, which has increased with rising membership, more products, and more consumption.'*

Enabling Factors: More members = more financial security, a larger space could be rented; Digital technology (software, locking system) **Barriers:** Security concerns (after break-in attempt) **Learnings:** Recognition that the project is a 'laboratory for social innovation' and constantly evolving; Ongoing negotiation between (utopian) ideals and real constraints; Making idealistic models (e.g., trust-based) realistic; Events (film screenings, cafés, seed swaps) foster social cohesion and neighbourhood connection and attract new members	**2024:** Move to a larger store space to enable growth (more products, more members); Introduction of a digital locking system (24/7 access for members); Over 120 products available via online shop; Introduction of a solidarity contribution system (€6–27 monthly); Development and introduction of an inventory tool (open source) in the online shop; Currently more than 40 members	*'This digital locking system… in an analogue country like Germany, that's extremely innovative.'* *'Events that aren't just internal, where we open the door and say now there's coffee for the neighbourhood or to get to know each other – we've developed different formats, like seed swaps or a film series.'* *'Well, on the one hand we're still looking for new members. Making ourselves better known. But also, as Alexa said, creating a place in the neighbourhood where people can come together.'* *'Yes. Last year we actually had a break-in attempt here and that was a small crisis'*

Annex 4: Learning history for seed innovation 04 – Meet je Landschap [Measure your Landscape]: Monitoring of greenblue veining in the province of Utrecht, The Netherlands

Descriptive information, analysis and interpretation	Key moments	Narrative alongside key moments	Voice of which actor?
Software development: From paper to digital. A major milestone was the idea of assessing the condition of the landscape through technological innovation, making province-wide implementation possible. In other words, the software began to offer precisely these capabilities	2013: Availability of ArcGIS software (ESRI)	*'In the beginning, fieldwork was conducted simply with a paper map, marking dots and lines accompanied by extensive notes. This approach was hardly suitable for systematic analysis, as there was insufficient capacity to enter all the information in an orderly manner. The introduction of software, however, made it possible to conduct fieldwork remotely and synchronise the results through a cloud-based system. Once this was adopted, the project gained remarkable momentum, enabling the completion of all baseline measurements across the entire province during the past year – thus covering the full agricultural cultural landscape.'*	LEU coordinator
Pioneering. Foresight.	2013: LEU takes initiative for a monitoring network	*'I believe that if they had not initiated this process, we would not have started either. That is my assessment, since at that time we were not engaged with landscape issues at all. Their foresight was*	Province of Utrecht

		excellent; it was pioneering work. In retrospect, it is clear that their initiative was highly beneficial, as we eventually reaped the benefits, though at the time, of course, we could not have foreseen this. Nor was it evident when the platform was established in 2017.'	
Pioneering	End of 2014: Start of *Lively Farm Ditch* pilot for monitoring	*'We then started with volunteers. Yes, very simply. Because we didn't have a project monitoring budget at the time, so we couldn't really afford it. Perhaps, because that was the right reason to recruit volunteers. But we thought of something, right? We wanted to at least keep an eye on things, so we started with it* [...] *Those living banks are really something that those farmers were talking about at one of those first meetings, right? It was pioneering, wasn't it?'*	Water board
Loyal, building networks through gatherings. Important for network formation and satisfaction. Eight volunteers who started in 2014 are still active today, showing loyalty sustained through network maintenance.	2014–present: Annual barbecues to present monitoring results	*'So, everyone agreed, 'Well, if you organise a barbecue, we'll come.' So, we organised an annual barbecue after that, where the farmers and volunteers came, and it was actually quite a fun way to do it. We also shared the results of that monitoring.'*	Water board

	2015: 17 participants in *Lively Farm Ditch* pilot	*'That Lively Ditch project started with those 17 pioneers among farmers; the nice thing is that there are about eight of them who are monitoring volunteers. I still have them, and they're still monitoring, both with those same farmers and with other farmers.'*	Water board
Connection. Both forms of monitoring have their own quality. Staff monitoring requires fewer measurements and follows different principles. Volunteers serve an important function as intermediaries between farmers and the water board.	2016: In addition to voluntary monitoring, budget allocated for monitoring by staff	*'We'll be monitoring ourselves, so we'll also be doing that later on. But we also really valued the monitoring by volunteers. Because we saw that it's truly a collaborative effort. And when we come as the water board, it was definitely a kind of inspection, so to speak, so the water board would come and check if things were going well, while those volunteers came; they chatted with the farmers'*	Water board
First step by the province	2017: Province initiated Dashboard Monitoring Network for Small Landscape Elements (MKLE) platform and subsidy opportunities for	*'That happened in 2017. Through colleague Jeanette, which was a milestone, as it marked collaboration between agricultural collectives and municipalities that were involved from the start. Allocation was difficult; the right expertise was required'*	Province of Utrecht

	creation and restoration of small landscape elements		
	2021: Dashboard *Meet je Landschap* developed in collaboration with Ordina	*'...and that then ends up in a kind of dashboard which is then visible and accessible to all kinds of users.'*	LEU Coordinator
The project leader at the time was not very inspiring. The volunteers complemented each other well: One had extensive knowledge of nature, the other was skilled with technology. Both were local entrepreneurs. They connected strongly as independent and enterprising volunteers.	2021: Newspaper advertisement for information evening *Meet je Landschap*. Introduction to the project (with then project leader Maarten), meeting between the LEU Volunteers who began working together as a duo	*'I wanted to do something in nature. Then my wife saw an ad in the local magazine 'Meet Your Landscape.''* *'I went there. An information evening. It was held here too.'* *'And that's where I met K. When was that? Three or four years ago.'*	LEU Volunteers
	2021: *Measure Your Water Quality* app and dashboard of the water board		Water board
	2021: Landscape Action Plan with 10% GBDA in		Water board & LEU Coordinator

	rural areas as urgent advice		
Passionate about making data accessible and saw great potential for Meet je Landschap (MJL). Learned the ins and outs of the software, giving the project significant new momentum.	2022: the LEU coordinator began working at LEU and became project leader of MJL	*'I actually worked for the landscape department and for Utrecht, where I became the project coordinator. I discovered we were experiencing significant capacity problems. They simply couldn't find people, so it became a bit of a back-and-forth. Within two weeks, I moved to the other side of the table.'*	LEU Coordinator
Keeping the network active	Since 2022: Several times a year interaction with volunteers to show monitoring results	*'Do they have wishes of their own? And showing what comes out: information exchange and recognition.'*	LEU Coordinator
Gradual development of data visualisations	Since 2022: Development of data visualisations in small steps over time	*'From the moment I started, I continuously added new data visualisations and shared them with the volunteers, involving them step by step.'*	LEU Coordinator
Stubborn. MJL approach was restrictive for these volunteers.	Winter 2022/2023: Winter break of MJL project (server offline, tablets returned). But the LEU Volunteers continued independently,	*'And then you reserve that for yourself. And then we just do that. And we just kept doing that all winter long.'* *'So, we had downloaded a lot of areas before we closed the server. We would have done that too, but then they said, well, look. So, we were able to*	LEU Volunteers

	downloading software on their own tablets.	*continue all winter long. And then the monitoring was actually closed.'*	
Pleasant places, pleasant people	2022/23: Measuring forts. Meeting with LEU volunteers K. and L.	*'And that was commissioned by the provincial Waterline Knowledge Centre. That was just when I started, around 2022/23.'*	LEU Coordinator
Strong connection; triad	Since 2023: Collaboration between the LEU Volunteers for MJL	'[*K.*] *and* [*L.*] *are very interesting volunteers because they began experimenting independently. Now we have a strong triad:* [*Volunteer K,*] [*Volunteer L,*] *and myself.'*	LEU Coordinator
Inspiring. The LEU coordinator acted as a central connector. Volunteers felt heard and valued. He integrated their extra data into MJL and listened to their feedback on the dashboard.	May–Oct 2023: Landscape measurements for the forts project NHW, meeting new project leader / LEU coordinator for MJL	*'Well, at one of those forts and there. That's where we met the LEU coordinator. We had to do what we needed to do based on that programme, which he hadn't developed either. There was one person there with the province, and then we went there to measure it. Then they said, 'Yeah, this isn't working.' We always run into this problem in the field. We have to change this.'*	LEU Volunteers
Policy integration	2023: GBDA in NPLG		Water board

Concrete national assignment. Mark began working at the province. Province tasked with establishing a reliable baseline measurement.	2023: NPLG with 10% greenblue veining as target	*'To have been given a place in the NPLG, that's quite impressive.'*	Province of Utrecht
Leadership, trust, storytelling. Water board ahead of provincial policy; ambitious. Farmer perspective kept central.	Early 2023: Information evening on GBDA with 30 participants. Resulted in collaboration between water board, three farmers, and the province. Values: trust, innovation, leadership. Meetings every six weeks in the first year.	*'About 30 or so? That's quite a lot. Actually, I think 25, 30, yes, is a large part of it. That's the advantage of the evening being organised by the agricultural collective.'*	Water board
Collaboration. Municipality less active. Farmer highly engaged and spoke positively about group.	2023: From UPLG area process Oudewater-Noord, farmer invited to join project group with three farmers, province, and water board. Municipality also involved.		Farmer

Discovery / surprise. Benefiting from years of investment and foresight of others.	2023: Province could use LEU data	*'It turned out that LEU had already been monitoring landscapes for years with volunteers, nearly completing mapping of the entire province. Only one area remained. This allowed immediate benefit from their work, providing baseline data on green veining.'*	Province of Utrecht
Milestone! Province as frontrunner	Dec 2023: First baseline measurement		Province of Utrecht
Concrete actions possible based on GIS analysis	2023: Analysis of incompleteness of landscape elements, identifying gaps that can be easily filled	*'Mark asked me whether actionable perspectives could be created from the data. I explained that incomplete elements could be visualised easily, showing where small interventions (e.g., planting trees) would complete them. The province was very pleased.'*	LEU Coordinator
Experimentation on own initiative. Volunteers proposed Bioblitz themselves. Their creativity and initiative were highly valued and supported by the LEU coordinator.	June 2024: Use of Bioblitz app (Naturalis) by the LEU volunteers for ditch edges	*'And then [K.] discovered that if you collect that data and create a bioblitz for the farmers, you'll instantly see all the plants on that farm, in their correct locations. And what's a bioblitz? That's also from Naturalis. Let's see, I'll show you.'*	LEU Volunteers
Learning from others technologically. Collaboration. Previously monitoring was basic (Excel forms).	July 2024: Collaboration with the LEU coordinator and MJL	*'And then we came into contact with the LEU coordinator. Questions arose about the current state of greenblue veining: how much is present, what*	Water board

		counts, what does not? They were already doing smart things, and we wanted to contribute too.'	
Taking on new challenge of blue veining	July 2024: Collaboration with water board and three farmers in Oudewater pilot to explore monitoring and improvement of blue veining	*'That's a bit tricky to say, 'Yes, we're just zooming in on that old wind. Because Oudewater. That was actually one of my... well, I'll say it, presents, we want to participate. The water board likes something. The farmers like something. Volunteers live nearby. Let's see if we can bring those parties together.''*	LEU Coordinator
New project and expanded role for volunteers. App motivates farmers. Volunteers act as intermediaries, trusted more than institutions. Digital tools (Bioblitz app) also motivate farmers by visualising what is present on their land.	July 2024: Start of collaboration between LEU and water board to measure and realise nature-friendly foreshores at five sites in Oudewater (four farms and one nature reserve)		LEU Volunteers
Milestone	Sept 2024: Publication of report with 12 measures for GBDA, compiled with project group	*'Then they could also provide input, and it would truly be a report they support, so to speak.'* *'And what are our shared goals? And...'*	Water board

		'Ultimately, we have 12 measures we're working on.'	
Milestone. Platform fosters collaboration and learning among stakeholders. However, underutilised due to limited provincial capacity.	2024: Launch of GBDA Platform by province, expanding scope beyond small landscape elements to include ditches and verges		Province of Utrecht
Major setback, but MJL continued	2024: Abolition of NPLG, though goals remained, national funding ceased. Province continued with own resources.	*'So, the context changed, But the project still continued steadily'*	Province of Utrecht
Role model	Oct 2024: Project presentation (by LEU Volunteers) at farmer Carl's farm for 50+ participants nationwide	*'This was told to Carl at the farm and other people were also invited to share it and spread it.'*	LEU Volunteers
Milestone! Pride	Dec 2024: Entire province of Utrecht mapped with MJL	*'That was quite a milestone to reach. The entire province of Utrecht has been mapped.'*	LEU Volunteers

Complete! Celebration	Dec 2024: Baseline measurement complete	*'Final baseline measurement completed in last area. Celebrated in Jan 2025.'*	
Social dynamics; loss and recruitment of volunteers. Later, fortunately, new volunteers were recruited.	2025: Social dynamics; loss and recruitment of volunteers	*'To my dismay, I lost two or three volunteers over the past year because they felt I was favouring certain individuals. I explained that this was not the case – I was not giving preferential treatment. Rather, some volunteers had expressed a desire to take on more responsibilities, and I welcomed that initiative. It should not be seen as favouritism. However, this was interpreted differently by that group than I had expected. To my great surprise, we were nevertheless able to recruit 19 new volunteers recently through a newspaper advertisement.'*	LEU Coordinator
New concrete application of MJL. Blue veining is significantly lagging, as it remains difficult to map and monitor.	2025: Province commissioned LEU to provide advice on greenblue veining in the Eem Valley and Utrecht Valley		Province of Utrecht
Providing actionable perspectives	2025: Province requested LEU to formulate advice on greenblue veining in	*'I think that's also a milestone. We were commissioned to contribute ideas, or we have to provide a greenblue interconnection recommendation*	LEU Coordinator

	the Eem Valley and Utrecht Valley	*for the single Utrecht Valley. That's a mandate from the province.'*	
	January 2025: Riparian plant pilot, monitoring conducted by water board volunteers together with the LEU volunteers related to MJL	*'Yes, that's another process altogether. It's that farmers are going to monitor more themselves. We've created search maps for that now, showing the most important aquatic and bankside plants so they can identify them, and you're also using the 'Identify' tool, and so on.'*	Water board
Experimenting on their own initiative	2025: Use of riparian plant app (Naturalis) and water board's *Measure Your Water Quality* app by the LEU volunteers for monitoring blue veining in Oudewater		LEU Volunteers
Turning point. A new course must be determined. Where will this lead? Competition for MJL or complementarity? How can the two support each other, and what added value does MJL provide?	2025: Public release of LASREG data by the national government; data available to all provinces	*'Because I think that will become the new standard nationwide.'* *'Yes, that's what the Ministry of Agriculture, Fisheries, Food Security and Nature'*	Province of Utrecht

		'[LVVN] would like, right? They want all provinces to work with LASREG.' *'But of course, there are all sorts of pitfalls.'*	
Future prospects	2025: Public LASREG datasets become available	*'I have a meeting with the province in two weeks to discuss our position. I already spoke briefly about it in Drenthe this morning and will do so soon in Overijssel. We are now exploring how our volunteer-based landscape measurements might contribute to a constructive and, in my view, long-term collaboration with the parties behind LASREG. We could, in principle, provide field validations to train the models underlying LASREG. These discussions are already underway. These are future opportunities we must pursue; otherwise, we risk fragmentation, as there are currently many parallel initiatives in the Netherlands in which I am also involved.'*	LEU Coordinator
Solution-oriented, optimistic, ambitious. Ambitious plan; he was aware of the subsidy through the project group. Also provides him with a revenue model.	2025: Together with another farmer, he applied for a subsidy to construct 6 km of nature-friendly foreshores	*'We committed fully because we know that GBDA entails a significant challenge. Much has already been achieved, but the final percentages are often the most difficult.'*	Farmer

Institutionally complex, long waiting period, but hopeful. Granted now, though not yet started due to permit application with the water board.	February 2025: Subsidy granted	*'That's an application with the Rijksdienst voor Ondernemend Nederland (RVO) and that was indeed for funding. Yes, and that's the subsidy we have been granted.'*	Farmer
The farmer is now working on nature-friendly foreshores; nearly 1 km completed, though progress is slow due to weather.	September 2025: Permit granted by water board. October 2025: New application submitted by three farms for approximately 4,600 m	*'About six months ago, HDSR, our water board in this area, also has to issue a permit for this.'*	Farmer
Uncertainty. Searching for added value and new opportunities.	End of October 2025: Meeting between LEU and NEO to explore collaboration for a new baseline measurement		Province of Utrecht
Exciting new development. What will this mean for the approach?	2025: eDNA samples of *Datura*. Results expected at the end of October	*'For each sample, you have to take a scoop of water from the ditch and then pull it through a filter and look at that, because then you can inventory the quality much faster.'*	LEU Volunteers
Searching. Scaling up? Exploring the right method; several possibilities	Current: Exploration commissioned to a	*'From these initiatives we want to develop a plan for next year: how we will monitor, what role volunteers*	Water board

exist. What works best nationally, or is remaining small more effective for success and coordination? Exploration of apps.	consultancy on monitoring approach in Oudewater and potential national implementation. Could be presented to Community of Practise Biodiversity and the Union of Water boards to scale up. Which data should be included in apps, which data are needed for monitoring? Potential to link with expert colleagues.	*can play, and what we will do ourselves. I am also working on a project using satellite imagery to see what information can be extracted. The aim is to bring these initiatives together, assess the information they provide, and determine the best monitoring approach for us.'*	

Annex 5: Learning history for seed innovation 05 – Budapest Degrowth Doughnut

The Budapest Degrowth Doughnut (BDD) LH is presented here, in two parts. LH Part 1 (below) (see also Figure 13) are concerned with the BDD preparatory phase (2022-2023); LH Part 2 (see also Figure 14) are concerned with the BDD development phase (2024-2025). CUB refers to core group members from Corvinus University of Budapest, BM from the municipality of Budapest, BKK from Budapest Public Transport Company. The three identified milestones, defined by all the three interviewees, are marked in bold.

Learning history Part 1: timeline for preparatory phase (2022-2023) of BDD seed innovation

Critical thought and reflection	**Key moments and significant milestones**	**Participants voices**
The research process was carefully structured and grounded in both established and current scientific literature, featuring a clear and precise timeline that produced outcomes across multiple sectors, advancing both academic understanding and policy development.	Feb 2022 – Conceptual foundation: initial discussion identifies Doughnut economics as a promising research direction The project's roots began with open-ended academic exploration of a PhD research project to pursue new economic paradigms. At this stage, the focus was on analysing how the Doughnut framework and Doughnut economics could be utilised in practice with regard to national or city-level sustainability transitions. This phase also established a foundation for subsequent creativity and experimentation, opening the door to stakeholder input and international learning.	*'The holistic approach to the social aspects of sustainability – this framework is very good at highlighting the interconnections. Personally, I am more interested in social injustice than the ecological crisis at this point.'* (CUB)

	March - Jun 2022 – Academic grounding: PhD essay drafting; conceptual clarity and academic basis Formalising initial concepts into academic work provided the project both legitimacy and a clear intellectual structure for future collaboration. The groundwork at this stage also enabled effective resource mobilisation, and CUB research participants highlighted the confidence gained from developing a coherent and well-elaborated research direction, strengthening future interdisciplinary partnerships.	*'While writing this essay, I realised how rich the literature on Doughnut economics is. This inspired and motivated me, as it is clear that the academic world pays great attention to this alternative economic approach.'* (CUB)
	Sep - Oct 2022 – degrowth Doughnut of Hungary: selection of methodology: consultations with international experts to refine methodological framework Drawing on experiences from international partners in Croatia, the first phase of the research (Degrowth Doughnut of Hungary) was prepared. Consultations with the Doughnut expert were held, which helped adapt global best practices to Budapest's local needs. The CUB team appreciated external validation and described how these early collaborations shaped broader ambitions while ensuring methodological rigour aligned with both local expertise and model-related standards.	*'At this stage, we conducted an in-depth study of the Degrowth Doughnut framework, which included consultations with one of its creators'* (Mladen Domazet). (CUB)

	Oct 2022 – Jan 2023 – degrowth Doughnut of Hungary: review of literature, collecting indicators, assessment of Hungarian policies By reviewing international and national literature and indicators, the CUB team ensured that the approach of the national level analysis (degrowth Doughnut of Hungary) would be both contextually relevant and theoretically robust. Furthermore, the research team assessed Hungarian policies in light of the degrowth Doughnut.	*'During the preparation of Hungary's Degrowth Doughnut, the study of the literature and experiences related to the framework also laid the foundation for the Budapest Degrowth Doughnut research phase.'* (CUB)
	Jan 2023 – First academic publication on degrowth Doughnut of Hungary Publishing early results allowed the project to gain national visibility and credibility. Interviewed stakeholders saw this as a key moment solidifying both scientific legitimacy and broader city-level engagement. The publication also served as a touchstone for dialogue with policymakers, motivating future local authority participation in the model's development and practical use.	*'At the same time, the journal organised an online colloquium on the special issue in which the paper was published.'* (CUB)
	Aug 2023 – degrowth Doughnut of Hungary: international feedback: presentation at Zagreb Degrowth Conference, outside perspectives, course correction Sharing findings internationally provided external feedback that informed local decision-making and allowed for correction of course where gaps were	*'The presentation given at the conference attracted considerable interest and prompted a number of constructive critical comments. One of these concerned the narrative potential of Degrowth Doughnut.'* (CUB)

	identified. A contributor noted that this exchange of ideas built collective confidence and strengthened peer review, which would later help the team remain adaptive in the face of challenges and ensure the model's robustness for further stages.	
	Oct 2023 - March 2024 – Shift to Budapest urban context; stakeholder mapping and invitations The deliberate inclusion of diverse city-specific experts marked a new phase where broader practical needs were brought into focus. Interviewees highlighted the successful expansion of the team to include public decision-makers, researchers, and practitioners, which ensured wide-ranging perspectives and set the stage for a truly participatory co-creation process.	*'The intensive period of preparation for the workshops involved putting together a panel of experts, a process in which the research team relied heavily on the professional network of senior researchers.'* (CUB)
	Oct - Dec 2023 – Municipality collaboration: inviting Budapest Municipality to collaborate on the BDD research The process started slowly due to limited capacity and uncertainty about time and energy. It took time to clarify expectations and ensure the effort was useful and feasible. The current city leadership is more supportive. Involving city officials helped secure legitimacy and align the effort with municipal climate policies.	*'First, I came into contact with the Doughnut in November-December 2023, when we were examining how it could be utilised in the climate agreement.'* (BM)

Although the process began with initial challenges, such as difficult early collaboration with the Budapest Municipality, it ultimately led to the development of a well-structured and ongoing partnership.	Dec 2023 – **Milestone: establishment of structured and formal policy dialogue with Budapest Municipality** The beginning of direct and formal dialogue with the local authority enabled academic research to impact policy processes. Stakeholders described this as a transformative milestone, which established trust and ongoing feedback loops. This transition allowed the work to move beyond theory, fostering iterative adjustments in response to practical local governance needs and anchoring future collaborative success.	*'A key turning point was when the local government committed, thereby strengthening the application of the framework.'* (CUB, BM)

Table A2: Learning history timeline of BDD seed innovation development (2024-2025)

Critical thought and reflection	Milestones	Participants experience
The carefully designed participatory process generated valuable new insights, yet it also could introduce challenges if not managed with sufficient attention and care.	Jan–Feb 2024 – International adaptation: application of Barcelona and Croatian models tailored to Budapest Drawing on hands-on experience from other, already established models provided methodological flexibility and helped avoid common pitfalls. Interviewees highlighted the value of learning from mature projects, which resulted in solutions tailored to Budapest's legal, social, and ecological context, and strengthened the adaptive nature of the seed innovation.	*'Although we gained useful insights during the consultations of both research projects, the final methodology of the Budapest Degrowth Doughnut workshops was a completely new approach.'* (CUB)

It was a cornerstone for the long-lasting science-policy collaboration.	Mar 2024 – Municipal partnership cemented: practical policy alignment with municipality Deepening of municipal partnership led to participants recognised as essential for local credibility. The process was seen as a mutual learning opportunity, enabling the alignment of stakeholder interests, increasing buy-in, and creating space for co-developed solutions that addressed both technical and political priorities.	*'The municipal cooperation was established on a solid foundation. The local government committed and officially joined the process.'* (CUB, BM)
Professional organisation and skilled facilitation throughout the process sustained high levels of participant motivation and ensured active contributions from all involved.	Mar 2024 – Workshop I: introducing the degrowth doughnut framework, mapping enablers/ barriers, and discussing possible indicators. The opening workshop brought together core contributors and municipal stakeholders, creating a forum for sharing perspectives and building trust. Participants highlighted the effectiveness of professional facilitation and the positive, democratic atmosphere where everyone's input was valued. This session set a collaborative tone for subsequent meetings and enabled open discussion of challenges and opportunities among experts. The workshop outputs included an enhanced understanding of the degrowth doughnut framework, the identification of enablers and barriers to its adoption, and a preliminary set of possible indicators to be assessed within the BDD.	*'The selection of indicators significantly shaped the direction of the doughnut.'* *'At the workshops, we managed to reach a shared consensus on the indicators. It required significant joint thinking and consultation, with a wide range of opinions.'* (BM, BKK)

Bilateral consultations between the workshops were smooth and highly productive, a result of the open, friendly, and professional atmosphere cultivated during the workshop sessions.	Mar–May 2024 – Research and bilateral discussion: focused consultation with stakeholders on relevant urban data and source indicators for the model This phase was crucial for identifying the best available data and evaluating which indicators would be locally meaningful for Budapest. Bilateral discussions with expert representatives enabled tailoring the set of indicators to reflect both scientific standards and city realities. Interviewees emphasised how this data-focused groundwork laid the technical backbone for the model and enabled consensus-building in workshop settings.	*'The collection of local data was a critical moment in the process, as it required several consultations with local government and participants, and after defining the indicators, it was difficult to find data sources and obtain data.'* (CUB)
Visualisation and collaborative approaches facilitated the development of effective outcomes throughout the process.	Apr 2024 – Workshop II: BDD visualisation and understanding – jointly constructing a causal system map linking thematic indicators The main achievements were the first visualisation and understanding of BDD as well as participatory construction of a complex system map was created, making explicit the cause-effect relationships between social, ecological, and economic indicators. The mapping exercise fostered cross-sector dialogue about trade-offs and synergies and illustrated the interconnected nature of urban sustainability challenges. Participants felt this analytical visual stage enhanced the group's collective understanding.	*'Creativity and problem-solving were enabled by the collaborative nature of the workshops. Both individual and collective thinking played a role, and using drawing as a tool helped participants develop ideas visually and work together to map problems.'* (BKK)

All participants in the workshop expressed strong enthusiasm for continuing collaborative efforts aimed at making the capital more resilient and inclusive.	May 2024 – Workshop III: Milestone: Validated BDD, co-producing -narrative, policy recommendations; group reflection and synthesis for BDD Interviewees described this session as a critical learning moment where technical outputs – validated indicators, BDD and policy measures – were connected to a shared urban sustainability narrative. The workshop's collaborative exchanges were seen as affirming, and the resulting narrative and policy recommendations better articulated Budapest's systemic vision for social and ecological transition. Stakeholders appreciated the open feedback and the integration of practical experience into the BDD story.	*'We received very positive feedback, and the participants felt the work was valuable.'* *'The live, personal communication really helped the process because it was easier to absorb the information. There were tensions, we resolved them through consensus-building and joint discussion.'* (CUB, BKK)
As a result of the positive outcomes, the municipality has shown growing interest in continuation and monitoring.	May-July 2024: Research report writing and municipal presentation The BDD research report was written and presented to representatives of the Budapest Municipality. Presenting the findings enhanced municipal ownership and accelerated collaboration on monitoring. The episode demonstrated the participatory character of the BDD approach and resulted in constructive, actionable feedback for policy uptake.	*'I felt a great sense of responsibility regarding the public policy proposals compiled by the workshop participants. I considered it important to make the experts of the capital's local government more committed to putting the proposals into practice.'* (CUB)
The integration of the BDD serves as clear evidence of the municipality's increasing commitment to sustainability and innovative policy approaches.	Sep 2024 – **Milestone: BDD integrated into Budapest Climate Contract** The incorporation of the BDD indicator set into official city climate policy marked a policy breakthrough for the degrowth approach. Interviewees viewed this as the main proof of impact, reflecting both the effectiveness of previous collaboration and the growing political commitment for	*'I consider it a success that the doughnut was included in the climate agreement document... '* *After the research report, it was encouraging to see it incorporated into Budapest's climate agreement.'*

	systemic sustainability – though it was also clear that national engagement remains a prerequisite for broader influence.	*'An important idea is that actions related to the climate agreement can only be effectively implemented through government cooperation…'* (CUB, BM, BKK)
This approach is recognised as distinctive and promising not only by the Budapest Municipality, but also by other decision-making bodies, who consider it suitable for broader application.	Mar 2025 – Positive feedback regarding the model suitability strengthening the project's significance and effectiveness Evaluations received in this period indicated that the BDD model was well-suited for its urban context and appreciated by both city administration and participants. Interviewees felt that participatory seed innovation had real impact and that the resulting model could continue to inform urban policy and action. Additional feedback reinforced the importance of participatory processes and highlighted the growing acceptance and effectiveness of systemic, collaborative work going forward.	*'We also received feedback, which further strengthened the significance and effectiveness of the process.'*