RUSTIK

Deliverable 3.1
First Living Lab Report

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First Living Lab Report

This deliverable is a compendium of reports from RUSTIK's 14 Pilot Regions, which collectively describe and reflect upon the implementation of Living Labs in 2023 (months 9-16). Each report identifies the relevant transition challenges – and opportunities – that the Living Lab will focus on for RUSTIK's duration. Reports further provide the results of collaborative audits of local data use and future needs and look ahead to next steps.

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Austria: Nockregion-Oberkärnten

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Summary and overview

The Austrian Pilot Region Nockregion-Oberkärnten is located in the Central Alps, in the southernmost province of Austria (Carinthia) and includes 17 municipalities that face a persistent challenge of population decline. The total area spans 1,324 km², with a permanent settlement area comprising only about 15% of the area. Key sectors include tourism, agriculture, forestry, trade, industry, and construction.

Living Lab achievements

Besides a continuous exchange with the Pilot Region Partner about project process, RUSTIK tasks and the formation and organization of the Living Lab, several activities were undertaken to gain a deeper understanding of regional processes within the Pilot Region, its governance structure, mode of cooperation, transition challenges and data needs. Based on a first contact with regional stakeholders during the first stakeholder workshop two focus group meetings were conducted bringing together Pilot Region Partner, regional actors, and Living Lab Coordinator. Furthermore, participant observation was conducted during an ongoing LEADER project, dealing with the possibilities of creating the best working and living environment. Additionally, five expert interviews were conducted with small business owners representing diverse sectors and branches (hotel industry, agriculture, business consulting, IT, and the clothing industry). The primary objectives of these interviews were to capture the current state of Small Rural Businesses in the region in terms of perceived challenges and to identify areas that need more attention and support as well as pinpoint data needs.

Key learning to date

Key learnings from Cycle 1 revealed a robust Pilot Region Partner with a trusted network of stakeholders, fostering active participation and enthusiasm among stakeholders eager to contribute to the region's development. The active engagement of our partner in regional development presented a unique aspect, making it challenging to pinpoint topics that haven't been explored in previous projects. The primary challenge identified was the ongoing socio-economic transition in Nockregion-Oberkärnten, aligning with the Pilot Region Partner's regional strategy of "becoming the best working and living region". Discussions with the Pilot Region Partner and within the focus group led to the development of two potential topics for the upcoming data experiment in Cycle 2, i) Applying a Quality of Life Index and ii) Establishing a network of Small Rural Businesses. Subsequently, the decision was made to pursue the second concept, focusing on small rural businesses, as the application of the Quality of Life Index was deemed unsuitable for the data experiment.

Living Lab challenge

The Living Lab's challenge is focused on identifying the needs and challenges of Small Rural Businesses in Nockregion-Oberkärnten and establishing a network to address them. The primary objective is to pinpoint and address data gaps, enabling the mapping of the current regional state and fostering a comprehensive understanding of the challenges faced by entrepreneurs and business owners. This data serves as the foundation for assessing and justifying the necessity of establishing a regional network/platform for Small Rural Businesses, potentially functioning as a central hub providing crucial support for addressing challenges faced by Small Rural Businesses which will be identified during the Living Lab process. This approach addresses an area overlooked in previous projects, particularly in the foundation and takeover processes of small-scale businesses, which was identified as a problem and main challenge during FG discussions.

Emerging data needs

The integration of quantitative and qualitative local data in the upcoming Living Lab process holds the potential to: (1) show the current regional state of Small Rural Businesses in Nockregion-Oberkärnten, serving as the foundation for our Living Lab discussions, (2) facilitate the identification of specific needs, challenges, and obstacles faced by Small Rural Businesses, (3) underscore the significance of this overlooked topic and highlight the importance of a potential network/platform, (4) form the basis for establishing such a future platform for entrepreneurs, and (5) provide recommendations for future actions and measures.

Next steps

Next steps involve conducting additional expert interviews with regional key stakeholders who have not yet been engaged in our study to gain more in-depth insights into existing forms of support and networks within Small Rural Businesses. We will also participate in two workshops organized by the external LEADER project "Becoming the Best Working and Living Region." Additionally, we will initiate the design phase of the upcoming data experiment in close cooperation with the Pilot Region Partner, involving the elaboration of suitable methods for the Living Lab and the initiation of a data selection process for discussions within the Living Lab. Further steps in Cycle 2 include planning the first Living Lab meeting with relevant stakeholders for our chosen challenge, aiming to identify specific topics, challenges, and data needs. Subsequently, based on these needs, we will proceed with further statistical analysis if necessary and the initiation of surveys.

Figure 1 The municipality Seeboden in the Nockregion-Oberkärnten

Part 1: Progress Review

Pilot Region introduction

The Austrian Pilot Region (PR) Nockregion-Oberkärnten is located in the southernmost province of Austria (Carinthia), bordering the province of Salzburg and Styria. The region includes 17 municipalities spread over three political districts. The total area is 1,324 km^2, with a permanent settlement area comprising only about 15% of the area. In addition to Spittal/Drau, the main settlement areas are the municipalities of Seeboden/Millstätter See and Radenthein. The population of about 52,500 inhabitants has been continuously shrinking for the past years (-3.5% between 2011 and 2021) with considerable differences between the municipalities, a trend that will not change, according to population forecasts. The region is located in the Central Alps, the highest peak lies at 3,360 m (Hochalmspitze). The natural features range from hilly mountainous areas to high alpine mountains and lake landscapes. A specifically mountainous municipality is part of the national park "Hohe Tauern" and carries the touristic label of a "Mountaineering Village". Furthermore, four municipalities are part of the Biosphere Reserve Salzburger Lungau and Kärntner Nockberge. According to the geographical and spatial conditions the predominant land use is agriculture (mostly permanent grassland), forestry, mountain pasture management and tourism.

Besides tourism other significant sectors are agriculture and forestry, crafts, trade and industry, regional energy production, construction, and the wood sector (Amt der Kärntner Landesregierung, 2021a). Some municipalities in Nockregion-Oberkärnten are situated on an important European north-south connection (motorway A 10) and at other supra-regional traffic routes, which build a good connection to the Carinthian central region and the surrounding federal provinces, while others are more remote and less accessible. The region faces major challenges for development, in particular with regard to a declining population causing negative impact on regional labour force availability, out-migration especially of young people and women, or aging. Other challenges are insufficient public transport or the impact of too much tourism on locals' quality of life and the impact of climate change (e.g. natural hazards).

Pilot Region Partner

The RUSTIK Pilot Region Partner (PRP) is the Regional Association Nockregion (German: Regionalverband Nockregion - RVN), a non-profit organization consisting of seventeen municipalities in the Nockregion-Oberkärnten area, with the objective of guiding the region's strategic development while fostering inter-municipal and regional cooperation. It closely collaborates with the LEADER Local Action Group (LAG) Nockregion-Oberkärnten, sharing a managing director and jointly implementing municipality and regional projects. In addition to its focus on socio-economic development, which includes addressing demographic challenges and promoting regional well-being, the association also acts as an umbrella organization for various sustainability projects. These initiatives include three *Climate and Energy Model Regions (KEM)* and a *Climate Change Adaption Model Region (KLAR!).* A *Competence Centre for regional development* has recently been established, where the RVN (including KEMs and KLAR! Nockregion and other relevant project of the RVN), LEADER LAG and tourist destination of lake Millstätter See (MBN) are going to have a new, joint location in the municipality of Radenthein in January 2024. The Competence Centre will serve as an anchor and contact point for key actors

in the region and supports the pooling of resources (e.g. knowledge and expertise, funding, technical assets) and the use of synergies while preventing double funding and dual approaches. All actors involved are committed to the goal of developing the region as a common living space and to put the sectoral goals in the background. The new regional strategy of **"becoming the best working and living region"** is based on this joint approach and designed to encompass all sectors and branches to foster integrated regional development.

The RVN team consists of Christine Sitter, the regional manager of the RVN and simultaneously the LEADER manager of the LAG Nockregion-Oberkärnten and Maria Aichholzer, project lead and supervisor of many ongoing projects of the RVN. Both of them have a vast knowledge of regional development activities, regional and local stakeholders and networks.

Living Lab Coordinator

The Austrian Living Lab Coordinator (LLC) and research partner is the Federal Institute of Agricultural Economics, Rural, and Mountain Research (BAB), a socio-economic research institute affiliated to the Federal Ministry of Agriculture, Forestry, Regions, and Water Management (BML) targeted at analysis of agricultural economic issues, rural and mountain development research. Within its socio-economic research perspective, it has a particular focus on the assessment of the impacts of rural and regional policies on mountains and other less-favoured areas.

The BAB team has a core team to tackle the main tasks with regard to the RUSTIK project including the coordination of the Living Lab, data management and tasks related to general project duties and WP 5 lead, consisting of Ingrid Machold, Daria Ernst and Karin Schroll. Furthermore, the core team can rely on support of additional expertise from other staff members, namely Klaus Wagner, Oliver Tamme and Heidelinde Grüneis who assist in the following topics: EU structural funds, rural development policies, spatial planning, digitalisation and mobility in rural areas, dissemination.

Functions and transitions

Functions

Production functions

The region is characterized by a diverse economic landscape with several key production sectors including agriculture and forestry, crafts, trade and industry, regional energy production and construction and the timber sector, typically revolving around small enterprises (below 50 employees) and very small enterprises with up to nine employees. Among these sectors, there are considerable variations in employment levels among municipalities with the capital of Spittal/Drau being the economic centre and in-commuting hot spot of the region. In settlement centres and tourist areas, the service and public sector play a pivotal role, contributing significantly to the region's economy showing high employment rates. In more remote municipalities agriculture and forestry is still very important with an employment share of up to 16%. Farming systems predominantly consist of small farms in mountainous areas (84% of all farmers are mountain farmers), featuring alpine pastures and forestry. The proportion of forested land in the Nockregion-Oberkärnten is notably high at 62.5%, therefore forestry and timber industries are viewed as potential future markets, especially concerning new regional markets, the bio-economy, and renewable energy sources.

Consumption functions

Many municipalities in the region are heavily focused on tourism, which accounts for 11.5% of total employment (in some municipalities even up to 37%), surpassing the national average (6%) (Statistik Austria, 2023) of the total workforce. The region's diverse landscapes make it attractive for both summer and winter tourism, with almost 2 million summer overnight stays and about 1 million in winter. Apart from the regional capital Spittal/Drau, three other sub-centres and various tourist centres provide selected infrastructure and services, contributing to a "polycentric spatial development" (Fischer, Zwirschitz and Hochmaier, 2022). A significant concern in the Nockregion is the prevalence of secondary residences, which reaches 25% in contrast to national (16%) levels. This issue, particularly evident in tourist-oriented municipalities, leads to a loss of municipal revenue as taxes associated with primary residences are foregone. Additionally, the prevalence of secondary residences drives up land prices, posing challenges for young residents trying to purchase property in the region. While the districts' capital and regional centre of Spittal/Drau offers most services, access to services of general interest such as public transport, healthcare services, and primary and secondary schools may be limited in more remote areas.

Ecosystem services

Protected areas cover 49% of the region's total area due to its unique natural conditions as a mountainous area with a high percentage of afforestation. In terms of energy consumption, the region demonstrates a commitment to renewable energy sources, with 44% of its energy derived from renewable sources in 2019, surpassing the national average (36.5%) but below Carinthia's (51%) (Abart-Heriszt and Reichel, 2022). Transport causes 40% of CO_2 emissions, likely due to high reliance on internal combustion engine vehicles. Recognizing the urgency of climate change (as its effects are clearly noticeable in the region through increasing mean temperature, increase of extreme weather events, etc.) the Nockregion-Oberkärnten has integrated climate protection and adaptation measures into its local development strategy. Additionally, the region has implemented climate and energy model regions (KEM) as well as a climate change adaptation strategy, demonstrating a proactive stance toward addressing these pressing issues.

Summary

The pilot region Nockregion-Oberkärnten is strongly oriented towards tourism and services, albeit municipalities have different focal points ranging from a clear priority on tourism to a high importance of agriculture as employer but also as basis for bio economy and renewable energy sources. This refers to the region's unique national conditions as a mountain area and its diverse landscapes including a lake and hilly sites as well as forests and steep mountains. The regional capital Spittal/Drau, centrally located in the main valley of the river Drau, is the economic centre and in-commuting hot spot of the region providing for about one third of all regional employment. In most municipalities construction industries and goods manufacturing is an important factor with a few larger companies with more than 100 employees. Municipal labour markets tend to be one-sided and are oriented towards small sized enterprises up to 50 employees. While the urgency of climate change is well recognized the issue of public transport and mobility is of major concern and currently tackled by a public transport initiative.

Transitions

Key transition challenges

The Nockregion-Oberkärnten faces significant **socio-economic challenges** due to unfavourable demographic dynamics, notably characterized by negative birth and migration rates, prevalent across multiple municipalities. The shrinking population, coupled with an aging demographic

population and diminishing numbers of young and employable adults, results in a critical scarcity of skilled workers and employees, experienced in all sectors and branches but particularly salient within the tourism sector. With regard to the **climate and environmental transition**, Nockregion-Oberkärnten is particularly impacted by climate change. Its natural features make it prone to natural hazards and other impacts of climate change. Another critical point is tourism, especially too much tourism, and coming with it the negative impacts of environmental degradation and social and cultural disruption. To tackle these challenges, the region has already evolved several approaches including a climate change adaptation check and many other initiatives. **Digital transition** is aggravated by an unsatisfactory coverage with digital infrastructure in remote municipalities and a lack of digital know-how. These gaps in coverage impact the region's appeal as a business hub and residential area. However, digital development is largely influenced by external forces while regional actors perceive only limited influence of their own.

Chosen transition

The Living Lab will focus on the strategic objective of the Pilot Region Nockregion-Oberkärnten of "becoming the best working and living region". This objective addresses regional challenges in a comprehensive way by involving all sectors and branches but has a particular emphasis on the **socio-economic transition.** The pressure of lacking work force combined with negative population forecasts led to the conviction that joined forces of all sectors are needed to attract new inhabitants (notably young families) and returnees as well as to encourage locals to stay. As this strategic objective is currently evaluated and tested by a LEADER project, and therefore of high regional importance, a focus on the socio-economic transition seems adequate to support and meaningfully contribute to this regional strategy.

Living Lab Cycle 1: Planning Possibilities

Setting up the Living Lab

In setting up the Living Lab (LL), the initial step involved identifying the specific challenge and transition area to be addressed in the forthcoming process. Valuable insights and data were gathered in order to formulate potential transition challenges and to continuously test them for relevance and applicability.

The collaboration with the PRP proved to be advantageous due to its existing strong network and established trust with regional actors. The task of communicating with stakeholders and inviting them to LL meetings was carried out by the PRP, who possess a deep understanding of the individuals involved and their potential contributions to the LL process. To ensure efficient collaboration, several on-demand meetings were conducted with the PRP and LLC, both online and in person, allowing for discussions on LL progress, updates, and coordination of planned activities. Additionally, a fixed weekly meeting (jour fixe) was established within the LLC team, ensuring consistent communication, and streamlined operations within the research group.

Collaborative methods

To present the RUSTIK project to a wider audience of different regional actors a first stakeholder workshop (WS) was held already in 2022. In the course of T1.2 two focus group (FG) meetings were organized bringing together PRP, regional actors and LLC, the first FG addressing the establishment of the forthcoming Competence Centre in the region, the second FG centred on (ecological) sustainability. Furthermore, participant observation has been carried out in the course

of an ongoing LEADER project dealing with the possibilities of creating the best working and living environment. One WS, attended by the BAB- team, facilitated joint discussions involving numerous employers from the region, the other WS involved the presentation of a regional survey defining the best working and living region, addressing all inhabitants living and/or working in the region. Additionally, 5 expert interviews were conducted with small business owners representing diverse sectors and branches (hotel industry, agriculture, business consulting, IT, and the clothing industry) within the region. The primary objectives of these interviews were to capture the current state of small rural businesses in the region in terms of perceived challenges and to identify areas that need more attention and support as well as data needs.

Participants and stakeholders

In the LL activities, a diverse group of stakeholders has been actively engaged, enriching the depth of our research, and fostering a holistic approach to our initiatives. This includes regional representatives from various fields and sectors such KEM, KLAR!, LEADER-LAG, tourism, Biosphere Reserve, agriculture, mayors, cultural sector, and consultancy. Notably, some individuals have multifaceted roles, representing different fields simultaneously. The level of involvement varied, with each stakeholder contributing unique perspectives and expertise to the collaborative efforts. Additionally, external scientific expertise was consulted (e.g. University of Natural resources and Life Sciences).

Data collection methods

In addition to the already mentioned LL methods for collecting qualitative data, other forms of data collection were utilized: Firstly, existing knowledge from previous projects and initiatives conducted in the region served as a foundational framework, allowing the study to build upon established insights (e.g. LEADER Development Strategy 2023, Climate Change Adaptation Concept 2022, Monitoring of Municipalities Oberkärnten 2019, Demography Check 2014,). Secondly, quantitative (geo)data from official European, national, and Federal statistical sources and from the results of specific research projects were collected and analysed. The preferred spatial level of the data for high informative value is the municipalities (LAU2). While the data search was thematically very broad at the beginning of the process and covered all functions and transitions, the search became more thematically focused as the LL challenge became clearer. The collected data covered various aspects such as population demographics, economic sectors, geographical location of companies, well-being, agriculture, small businesses, energy consumption, labour force and much more.

Living Lab activities in 2023

The following table shows all the activities that have been carried out in the course of the LL process.

Table 1 All Living Lab activities carried out (own elaboration)

Activity/ Method	Month	Location	Topic/Agenda	Type of stakeholders/ participants*	No*
Stakeholder Workshop	Nov. 2022	Nock-region	Presentation of the RUSTIK project	PRP, LAG, KEM, KLAR, agriculture tourism, BR, consultancy, mayors, etc,	20
Focus Group Meeting 1	April 2023	Nock-region	Competence Centre	PRP, LAG, KEM, agriculture, tourism, culture, major	7
Focus Group Meeting 2	April 2023	Nock-region	(Ecological) Sustainability	PRP, LAG, KEM, KLAR, agriculture, tourism, BR, consultancy	9
Observation external workshop	April 2023	Nock-region	External LEADER project: "Becoming the best working and living region"	Regional employers from different branches	30+
Bilateral meeting WP3 lead	Aug. 2023	Online	Exchange about LL progress and upcoming data experiment	RUSTIK WP3 team, RUSTIK coordinators team	2
Expert consultation MCRIT	Sept. 2023	Online	Consultation about the Territorial Quality of Life Index and its applicability to the PR	Scientific stakeholder	2
Expert consultation FH Kärnten	Sept. 2023	Online	Exchange about an ongoing Quality of Life project in Carinthia	Scientific stakeholder	1
Full project meeting BAB-team	Sept. 2023	Vienna	Update about status quo; discussion about potential data experiment ideas	-	-
5 expert interviews with SRB**	Oct. 2023	Nock-region	Challenges perceived by small business owners: needed support, existing collaboration	Hotel industry, agriculture, consultancy, IT, clothing industry	5
Observation external project	Nov. 2023	Nock-region	Reflection group of LEADER project: "Becoming the best working and living region"	PRP, LAG, tourism, industry, consultancy, mayors	12
Meetings PRP and LLC	Continuous	online/ on-site	Exchange about project process, RUSTIK tasks, organization of LL	PRP	1-2
RUSTIK BAB Jour Fixe	Weekly	Vienna	Updates, task assignments, discussions, next steps	-	-

*Members from the LL coordinator team are not counted as participants or stakeholders
** SRB Small Rural Businesses

Reflections from Cycle 1

The advantage of having a strong PRP with an established network of stakeholders and trust within the region was a significant asset in setting up a LL. Active participation and enthusiasm were observed among stakeholders, showcasing a genuine eagerness to contribute to the region's development. In the course of Cycle 1 mutual trust could be built, as well as a supportive and fruitful culture of discussion.

However, a notable challenge arose due to the partner's active involvement in regional development, making it difficult to identify topics that had not been previously addressed by other projects. Navigating the integration of project outcomes into the pre-existing project structure in Nockregion-Oberkärnten posed a complex task, as PRP focuses more on practical and immediate aspects in the regional context while the LLC has to emphasize the scientific and theoretical component of the project. There is an inherent challenge of striking the balance between fulfilling the tasks and assignments of the RUSTIK project and ensuring practical benefits for the region. An additional challenge encountered during Cycle 1 was the rigid structure of the project with its clear assignments, strict timeline, and task deadlines. This sometimes contradicted the dynamic nature of the LL environment, creating a mismatch between the predetermined project framework and the complex realities within a LL.

Cycle 1 results

During the work in Cycle 1, the predominant challenge identified was the ongoing socio-economic transition in Nockregion-Oberkärnten with a focus on the overarching regional strategy of the PRP of "becoming the best working and living region" encompassing various sectors, including tourism, housing, and employment. Throughout discussion meetings with the PRP and the FG discussions, two potential topics for the upcoming data experiment in Cycle 2 have been developed that resonate with this regional strategy. In the following work, both ideas have been tested out to assess their applicability for the data experiment: **Applying a Quality of Life (QoL) Index to Nockregion-Oberkärnten and/or establishing a network of Small Rural Businesses (SRB) within the PR.**

The first approach of applying a QoL Index received considerable favour and interest among the PRP. When applied to a region, a QoL Index serves as a tool for measuring progress and territorial development. It incorporates a comprehensive set of indicators coming from the personal, the socio-economic and the ecological sphere. This index can be a pivotal tool for policymakers, offering insights into various facets of the region's well-being. Moreover, it has practical applications beyond policy, serving as a valuable tool for tourist representation and enhancing the understanding of the region's overall appeal, both for visitors and residents. However, drawing on insights from the ESPON project Territorial QoL Index, conducting a literature review and consulting experts in the field led to the determination that **applying the QoL Index to Nockregion-Oberkärnten is unsuitable** for the upcoming data experiment. Key issues and problems identified with the QoL index include:

1. Problem of comparability with other regions:

An index value is calculated for each region from the set of indicators. This overall index value only becomes meaningful through comparison with other regions and a ranking of these. The problem of comparability arises from the necessity to compare regions with congruent index values derived from the same dataset. A comparison of a QoL Index for Nockregion-Oberkärnten

with regions from the precalculated ESPON territorial QoL Index would therefore not be possible as different indicators and datasets would be used. Alternatively, a ranking of the individual municipalities within Nockregion-Oberkärnten could be used for comparison. However, it would not be appropriate to rank the municipalities against each other, as the region is intended to be considered as one entity. Furthermore, data gaps hinder the comparison of Nockregion-Oberkärnten with other regions in Austria, limiting the experiment's cross-regional evaluative scope.

2. **Inapplicability of the Living Lab approach:**

The LL approach, characterized by dynamic and collaborative problem-solving and stakeholder engagement, encounters impracticalities when applied to the QoL Index. The challenge arises from QoL's reliance on existing data systems for Index value computation, limiting stakeholder involvement due to the constrained availability of regional-level datasets.

3. **Data gaps and capacity constraints:**

The most important element in achieving a high level of meaningfulness with the QoL Index is the selected indicators and data. When researching possible useful indicators, it became clear that there are large data gaps at regional level for numerous multi-thematic indicators, the collection of which would far exceed the capacities of the project. Additionally, the intricate process of index-calculation demands significant time and resources, posing efficiency and timely completion challenges.

Instead, the LL will now focus on the second concept of **Small Rural Businesses**, as elaborated further in part 2. The idea is to establish a network of SRBs that aims to enhance cooperation among businesses, increase their market visibility as well as their influence in regional decision-making processes, and serve as a centralized support hub for addressing identified challenges that business owners face.

Part 2: Challenge and next steps

Living Lab challenge

The selected transition challenge for our Living Lab revolves around the socio-economic transition. Following the realization that the first idea of applying a QoL Index to the Nockregion was not feasible, the Living Lab's transition challenge focus shifted to **identifying the needs and challenges faced by Small Rural Businesses in Nockregion-Oberkärnten and establishing a network to address them**. As a tentative definition Small Rural Businesses include small businesses of all sectors (including farmers) with no more than 50 employees (probably less).

The primary objective will be to pinpoint and address data gaps, enabling the mapping of the current regional state and fostering a comprehensive understanding of the challenges faced by entrepreneurs and business owners. This data serves to lay the groundwork for assessing and justifying the necessity of establishing a regional network/platform for SRB. Envisioned as a central hub, this platform aims to tackle challenges such as strengthening awareness about regional products, fostering regional value chains, facilitating joint training, enhancing negotiation power, addressing sustainable green business management issues, navigating rental space availability, managing challenges in employee recruitment and retention, and focusing on women as a specific target group. This analysis may pave the way for innovative projects in support of SRB.

Rationale

This approach offers the advantage of addressing an area unheeded in previous projects. The absence of representation for SRB in regional strategies, particularly in their foundation and takeover processes, was identified as a problem during focus group discussions. Furthermore, so far there is no representation for SRB planned in the upcoming Competence Centre. Another advantage of this concept is the potential to leverage the outcomes of the external project "becoming the best working and living region," building upon its results and findings. In alignment with this theme/topic, the PRP proposed an additional project idea: This idea involves the establishment of a new position dedicated to assisting and supporting (young) entrepreneurs in the region with bureaucratic tasks during the establishment or succession of businesses.

The decision to focus on SRB is rooted in their significant contribution to the local economy, providing diverse employment opportunities. In Carinthia, the share of businesses with less than 10 employees amounts to approximately 94% of all businesses, employing about 18% of the state's population (WKO 2022). Small businesses may not be of particular importance when it comes to overall employment shares; however, they increase the diversity of service offers particularly in remote municipalities, stimulate local activities in village centres (in fighting against vacancies), and therefore contribute to the attraction of a rural municipality as working and living area. Furthermore, a well-developed service sector in rural municipalities affects in particular job opportunities of women, who are primarily employed in this sector (Eller and Oedl-Wieser 2023). As the Nockregion is facing significant emigration of young women, a strong service sector could avoid women emigrating due to their lack of job opportunities. Moreover, diverse job opportunities may help to attract both returning residents and in-migrants.

Knowledge to date

Based on previous expert interviews, meetings with the PRP and literature research, the following insights have been gathered: The IGO (Industrie Gewerbe Oberkärnten), a former association for businesses, focused on industry and commerce in Upper Carinthia and specifically targeted business settlements and the attraction of new enterprises in the region. However due to shifting regional business needs the association has recently been disbanded. Another partnership of multiple regional employers, the AGZ (German: Arbeitgeberzusammenschluss) was established as a former LEADER project (period 2014-2020) with the aim of sharing employees among different employers to counteract the shortage of skilled workers. However, this project is currently also inactive and is likely to be discontinued soon. Furthermore, there are currently plans for establishing a new association for small commerce in Nockregion-Oberkärnten.

During the expert interviews, it was noted that various forms of business collaboration already exist, including partnerships with the economic chamber, chamber of agriculture, sector-specific networks and privately formed networks. Despite the economic chamber's high activity in the region, challenges were acknowledged such as difficulties to get and maintain an overview of the available services and offers. Moreover, it was highlighted that small business owners currently face limited time capacity. Their participation in a new cooperation relies on perceiving personal benefits and understanding how to leverage innovative collaboration. Additionally, it was stated that, with numerous projects and cooperation forms happening concurrently, it is crucial to consolidate them for more effective use, rather than creating entirely new pathways. Other challenges faced by SRB in Nockregion-Oberkärnten include employee retention, the compatibility of job and family (mental overload) for employees, reliance on individual transportation, high rental prices (for both employees and companies), difficulties with apprenticeships and a lack of awareness about regional production and services among the local population.

In response to inquiries about a potential new platform and associated expectations, stakeholders emphasized the importance of enabling easy access to information for Small Rural Businesses, raising awareness of available offers and a clear communication regarding anticipated outcomes. Moreover, there was a call for better inclusion of agriculture in these discussions. Stakeholders also highlighted various potential benefits of a new platform and network, such as increased negotiating power, cost savings through collaborative training sessions and workshops, and enhanced visibility for their businesses.

Research question/s

- What is the current state of the Small Rural Business landscape in Nockregion-Oberkärnten concerning the number of businesses, sector, and branches, as well as employment sizes? How does this compare nationally?
- Which data points, indicators are relevant for stakeholders to describe or gain a better understanding of the current situation of Small Rural Businesses? What are the opportunities and shortcomings?
- What are key indicators to measure SRB impact on the socio-economic development of the PR?
- What benefits do Small Rural Businesses envision from a new platform or network, and how should it be structured to ensure acceptance?

Policy relevance

To tackle the socio-economic transition challenge in the region, a holistic approach that addresses various issues is required. The pressure of lacking work force combined with negative population forecasts led to the conviction of the relevant regional actors that joined forces of all sectors are needed to attract new inhabitants (notably young families) and returnees as well as to encourage locals to stay. The present evaluation and testing of this strategic objective are facilitated through a LEADER project, aligning with the distinctive bottom-up approach of the PR. It is noteworthy that, within this strategic goal, larger enterprises, particularly in the tourism sector, are adequately represented, while SRB so far lack representation. As a consequence, the Living Lab's transition challenge focuses on identifying the needs and challenges faced by SRB in Nockregion-Oberkärnten and establishing a network to address them. This has the objective to strengthen the position of SRB in the regional decision-making processes as well as identifying priority topics of SRB development. Following the demography check that the PR already carried out in 2014, the LL data experiment serves as a collection and creation of consistent data underlining the relevance of establishing a network of Small Rural Businesses within the PR. It is assumed that a solid presentation of the needs and challenges of SRB will lead to awareness raising of both, SRB, and regional stakeholder (e.g. chamber of commerce, agricultural chamber), and hence, might as well be following by an adaptation of regional policies (likewise the regional adaption strategies with regard to demographic change).

Emerging data needs

The LL will focus on SRB in the region, with the aim to identify and fill data gaps in order to understand the challenges and obstacles faced by them and show the significance for a potential regional business network or platform. The combination of quantitative and qualitative local data can provide a comprehensive understanding of the current state, ongoing developments, and challenges, serving as a foundation for future strategies and decision making.

Data availability

To capture the development of SRB statistical data on workplaces, companies and employees is available at different levels. This data includes various attribute definitions and combinations, as illustrated in Table 2 Statistical available data on the LL challenge (own elaboration). For agricultural and forestry businesses, the annual IACS (INVEKOS) geodata and the data from the Agricultural Census surveys serve as basic statistical reference. For a broad understanding and contextualisation of these developments, discussions with experts will also be important. Currently there is no available data to identify the specific needs and challenges of Small Rural Businesses in Nockregion-Oberkärnten, except for the 5 expert interviews conducted in the frame of preparing the LL approach. As part of the preparation and designing the LL, more expert interviews with relevant stakeholders and businesses will be conducted to improve the current knowledge base. Since 2012, annual OpenStreetMap data has been stored at the LLC office, which is available for analyses. Businesses, infrastructure, and other points of interest are spatially localised in the OpenStreetMap, which could enable a spatial view of economic activity.

Table 2 Statistical available data on the LL challenge (own elaboration)

Dataset	Abgestimmte Erwerbsstatistik	Arbeitegeberunternehmensdemographie	Arbeitsstätten	Untermehmensdemographie
Description	**Characteristics of Austrian population**	**Active employer companies** (=entities with at least one employee in dependent employment)	**Workplaces, companies, and employees**	**Active companies** (can perform activities in multiple workplaces)
Spatial level	LAU 2	NUTS 3	LAU 2	NUTS 3
Temporal level	Annual (2011-2021)	Annual (2007- 2021)	Census years 2011, 2021	Annual (2007- 2021)
Values	• Regional characteristics • Demographic characteristics (e.g. age, gender, nationality...) • Educational characteristics • Employment characteristics • Commuting characteristics	• Number of active employer companies, foundations, closures • Classification of Economic Activities (ÖNACE) • Employment size classes • Legal form	• Number of workplaces, companies, and employees • Legal form • Classification of Economic Activities (ÖNACE) • Employment characteristics (gender, age, nationality, place of residence, ((self)employed) • Company structure	• Number of active companies, foundations, closures • Classification of Economic Activities (ÖNACE) • Employment size classes • Legal form • Gender for one person businesses

Limitations

As some of the statistical data sets are only available at NUTS 3 level, their relevance for the PR is less precise. Cycle 1 showed that qualitative data and assessments from stakeholders and companies are highly relevant. A large proportion of the data to be collected is gathered qualitatively in the form of interviews, which does not limit the spatial resolution, but the choice of interviews must be carefully selected to obtain a broad and comprehensive picture of opinions and needs.

The availability of spatial data that depicts economic activity and its development is limited. The OpenStreetMap data is open source and contains data on business locations. It has to be analysed with great expertise and effort in order to develop meaningful information. Google Maps data, on the other hand, comes with associated fees, and the processing of this data may also

entail a significant time investment. However, the quality of this data is probably higher and more up to date than OpenStreetMap. At this stage of the project, it is not yet clear whether and to what extent the spatial view of economic activities is helpful for the work in the LL.

Capacities

As a socio-economic research institute, our core competences include conducting, analysing, and interpreting qualitative interviews as well as evaluating quantitative data. Our team is skilled in finding data sources/platforms, handling (searching, processing, analysing, visualizing) multi-thematic data and geodata. While we have a comprehensive database containing OpenStreetMap (OSM) data spanning from 2012 to the present, we would benefit from additional support in the selection of OSM tags for the analysis and visualization of economic activity.

Next steps

In the early months of 2024, we will conduct additional expert interviews with regional key stakeholders who have not yet been engaged in our study, including representatives from the economic chamber, chamber of agriculture, additional small rural crafts businesses, and the regional apprenticeship coordinator. The primary objective of these interviews is to acquire in-depth insights into the existing forms of support and networks within the Small Rural Businesses. Simultaneously, in February, our participation in two workshops organized by the external LEADER project "Becoming the Best Working and Living Region" is scheduled. These workshops are tailored for municipal representatives and entrepreneurs.

Additionally, we will commence the design phase of the upcoming data experiment in close cooperation with the PRP. This entails, besides elaborating on suitable methods for the LL, initiating a data selection process to serve as the basis for discussions within the Living Lab. The chosen dataset aims to accurately depict the current status of Small Rural Businesses in Nockregion-Oberkärnten, emphasizing its relevance to the overarching theme and the potential establishment of a new platform or network to the Living Lab participants. Extracting and preparing meaningful data from the extensive dataset is recognized as a challenging task.

Further steps in Cycle 2 include the planning of the first LL meeting with relevant stakeholders for our chosen challenge. This inaugural meeting aims to identify specific topics, challenges, and data needs. Subsequently, based on these identified needs, we will proceed with further statistical analysis if necessary and the initiation of surveys.

Figure 2 Workshop with relevant regional stakeholders

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Bulgaria: Troyan-Apriltsi-Ugarchin

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Summary and Overview

The Pilot Region of Troyan-Apriltsi-Ugarchin (TAU) is situated in Bulgaria, in the 'heart of the Balkans', on the mid-northern side of the longest mountain crossing the Balkan Peninsula. The TAU region covers the territories of three neighbouring municipalities: Troyan, Apriltsi, and Ugarchin, with a total area of 1,650.2 km² and 33,858 inhabitants. TAU is located about 150 km northeast of the capital, Sofia, and the main route linking the capital with the Black Sea crosses its territory. All three municipalities are classified as rural with the exception of the urban territory of the town of Troyan. Nevertheless, each has its own unique 'rural profile'. Ugarchin is dominated by agriculture and has a relatively mixed demography comprising ethnic Bulgarians and Roma. Troyan is dominated by traditional industry and is predominantly populated by ethnic Bulgarians. Apriltsi is characterised by a mixture of mountain tourism and limited industry. It has the same demographic profile as Troyan. These three rural municipalities face a common problem: continuing depopulation, mainly due to out-migration. Since 2009, Troyan and Apriltsi have established the TAU Local Action Group (LAG-TAU). Ugarchin has been invited to join the LAG-TAU in 2014. Since then, the LAG has been trying to apply different place-based solutions to help the territory counter depopulation via the LEADER approach.

Living Lab Achievements

Both the University of Sofia (USOFIA), as a Living Lab coordinator and LAG-TAU (Pilot Region Partner) are applying the Living Lab approach in the territory of the PR, which coincides with the territory of the LAG. This is being supported by a network of local stakeholders. The overall objective of the Living Lab is to identify a specific challenge to explore a key transition in the region using both qualitative and quantitative data. Thanks to the analysis of the collected data, both RUSTIK partners and the network of local stakeholders have selected the key transitions to be explored (socio-economic and demographic). They have also identified a specific challenge on which to focus their experiment: exploring the unknown potential of rural food systems. The ultimate aim of the Living Lab is to explore rural food systems to understand their potential to facilitate socio-economic and demographic transitions in the pilot region.

Key Learning to Date

Within the first year (cycle 1), the partners found that the region was stagnating due to a lack of diverse and innovative entrepreneurial opportunities that could harness local assets and turn them into solutions for attracting locals and visitors to the area. We found that the overarching asset common to the three rural municipalities was related to food. However, the pilot region territory lacks a rural food policy and strategy and data to develop them. Such a strategy could establish links between the production, consumption, and ecosystem functions of the rural areas related to food and could also promote collaboration between local actors.

Living Lab Challenges

The main challenge identified in the PR is related to the unknown potential of the rural food system to address socio-economic and demographic transitions. The work performed during the first year has identified knowledge data gaps related to the linkages between food production and consumption in the PR and the lack of cooperation between local actors. The development of the area is also hampered by the lack of linkages between young people trained in food- and tourism-related vocational schools and local businesses. Informal economy practices related to unfair payments and undeclared jobs are also prevalent in the agri-food business. The task of the Living Lab participants during the next year will be, firstly, to map the rural food system in terms of food-

related activities, actors, and relationships within (rural-rural) and outside (rural-urban) its geographical boundaries. The second step will be to identify the strengths and weaknesses of these food-related relationships in terms of inequalities, cooperation (including entrepreneurship), and sustainability. The third step will be to define a rural food policy as a specific governance instrument applied through the LAG activities in the area. Some preliminary tests could be carried out to measure the impact of this data-driven policy experiment.

Emerging data needs

Although urban food policies in Bulgaria have been on the agenda of researchers and policymakers for many years, they remain relatively unexplored in rural contexts and are most often understood in the context of urban-rural relations. The body of knowledge and data on rural food actors and relationships is limited. Existing data is focused on describing the number of farmers, the types of crops they produce, and the share of the agricultural sector in employment in the rural economy. There is a significant need for more data on rural agri-food cooperation, family gardens and their place in the overall rural food system, inequalities in access to food and opportunities for food-related entrepreneurship, and the quality of food-related jobs. To collect this information, we are exploring new (e.g., family gardens cadastre-based registers) and existing sources (e.g., registers of organic farms and of farmers registered for direct sales) of both qualitative and quantitative data. These will be triangulated to establish a rural food map of actors and functions.

Next Steps

The next step in carrying out this data-driven rural food policy experiment will be to prepare the research design for the data experiment. This will involve developing a research toolkit and a plan for data collection and research activities. Information and knowledge about our work in the pilot region will be disseminated to engage local stakeholders; this will be a horizontal and ongoing commitment.

Figure 3 TAU first workshop: engaging the inner circle of the Living Lab

List of Abbreviations

CSA	Coordination and Support Action
LAG	Local Action Group
LEADER	*Liaison Entre Actions de Développement de l'Économie Rurale/* Links between activities for the development of rural economy
LDS	*Local Development Strategy*
LL	Living Lab
MAFF	Ministry of Agriculture Food and Forestry
NSI	National Statistical Institute
PR	Pilot region
RIA	Research and Innovation Action
TAU	Troyan-Apriltsi-Ugarchin

Part 1: Progress Review

Pilot Region Introduction

The Pilot Region (PR) representing Bulgaria in the RUSTIK project includes three neighbouring rural municipalities situated in the North-Western NUTS2 region in the Lovech district (NUTS 3) of the country: Troyan, Apriltsi, and Ugarchin (TAU). Since 2014, the three municipalities have formed a joint local action group (LAG). LAG-TAU was selected as the RUSTIK PR because the three municipalities represent three types of rural areas in Bulgaria: agriculture-dominated (Ugarchin), industry-dominated (Troyan), and tourism- and industry-dominated (Apriltsi). TAU covers a total area of 1,650.2 km² and has 33,858 inhabitants. The three municipalities are situated in predominantly mountainous and semi-mountainous areas; this geographical position reflects the land use structure of the area. Forests cover 76% of the area, 21% is used for agricultural activities, and only 22% represents built-up area. There are three natural reserves in the area, one of which – "Central Balkan" – is part of the UNESCO network of biosphere reserves. Although they neighbour each other, the three municipalities differ in some key functional terms and have different rural profiles. Troyan is the largest municipality with a strong but predominantly traditional industry (furniture, textiles, food and beverage production, and pharmaceuticals). It is known for its rich cultural life (sustained by community centres, fine arts and crafts galleries, and local food festivals) and a well-developed and relatively diverse educational system. This system includes different vocational schools specialising in tourism, food, and applied crafts and arts. Since 2006, Troyan (17,200 inhabitants) has been defined by national regional policies as a 'rural town' because of its low population density and the lack of settlements in the area of more than 30,000 inhabitants. This categorisation has prevented it from receiving sufficient funding from Cohesion policy funding during the last two programming periods. Since 2021, a new categorisation of territories has been developed. Troyan is now considered a 'town', which enables it to access more funds for development. Only the 21 villages in the territory of Troyan municipality will remain under the rural category. Population loss (25% over the last twenty years) is due to the impact of traditional industries employing mainly mid to low-level qualified workers and low levels of wages in comparison to the average wages in the country. It is also due to youth migration, as young people seek educational opportunities outside the area and unexplored opportunities for collaboration among local businesses, particularly in the agri-food sector. In addition, informal economic practices are typical for the local economy and hinder the area's development.

The smallest of the three PR municipalities (both in terms of population and territory), Apriltsi (2,700 inhabitants), is closely linked to Troyan and is attempting to catch up in its developmental progression. Its leading sectors are manufacturing, transport, wholesale, retail, and agriculture. With a rich cultural heritage [festivals], mountainous landscape, and proximity to the highest peak in the Balkans, Apriltsi's economy could be dominated by tourism. However, it is not due to informal economic practices in the region and the lack of a local tourism strategy. Although agriculture is one of the leading sectors, local livestock and orchard farmers monetise their production seasonally and rather 'non-officially'. Scaling up the production processes would create expenses and be linked to regulations that are more likely to reduce than increase their profit if they maintain the same amount of production. Education opportunities outside the municipality are the strongest driver of youth outmigration (33% population loss for the last twenty years). Due to population decline, private services have also declined. For example, only one ATM

and affordable grocery shop remain in the municipality. The most prevalent issue in Apriltsi is related to over-pollution from household waste produced by tourists. Troyan and Apriltsi are more aligned with one another than with Ugarchin, as they are geographically, demographically (about 96% of their populations are ethnic Bulgarians), culturally, and economically closer. In 2009, Troyan and Apriltsi established the LAG and developed the first LEADER LDS. Ugarchin joined the LAG in 2014 (LAG-TAU). With its large Roma community, Ugarchin's population is younger but still decreasing. During the last twenty years, the municipality lost 45% of its population. Its economic development is almost entirely driven by agriculture – a limited number of large land-rentiers and landowners grow cereals applying intensive methods driven by support from CAP direct payments. These agricultural practices conflict with other agricultural sectors, such as beekeeping. All industry inherited from the communist time has since been closed. Several new micro and small enterprises have been established; however, like in Troyan and Apriltsi, informal economic practices prevail in Ugarchin. These are related to employment conditions that further prevent local development and erode the credibility of EU funds. Collected qualitative data (as part of the RUSTIK project) triangulated with data about the absorption of EU funds by local enterprises and data of foreign investment show that even companies – beneficiaries of EU projects and foreign investors – apply informal employment practices. Local people in Ugarchin have no tourism-related aspirations, as they see no attractions. The cultural life in the municipality is sustained by the community centre offering extracurricular activities for children. While Troyan and Apriltsi seem to have a clear strategy for recovery from both decades of depopulation waves and the COVID-19 pandemic (in trying to develop tourism and food-related strategies), Ugarchin seems to be driven by inertia.

Pilot Region Partner

The Bulgarian PR Partner is the LAG-TAU. Established in 2009 as an NGO to implement the LEADER approach, LAG-TAU mostly acts as a secondary funding distributor of EU funds provided by CAP and Cohesion policy. LAG-TAU develops and acts according to five-year multi-funded strategies for community-led local development. Each programming period sets specific priorities and delegates their corresponding budgets, which are then distributed by the LAG to local organisations, following open-call application procedures. The LAG does not independently define the area's priorities; in the different operational programmes and the CAP Strategic Plan, the measures applying to LEADER are already pre-defined. Most of these measures are not usually centred on problems the LAG identified as most important for the territory. The LAG's strategy has been developed as an instrument to implement these pre-defined measures and meet the CAP Strategic Plan and Cohesion Policy Operational Programme requirements. The operational programmes that provide funding for the LAG LDS are (cohesion policy) environment, education, human resources development, and innovation and competitiveness. In addition, the CAP Strategic Plan provides funding to implement the LAG LDS. The LAG also depends on the decisions of local municipal councils and mayors, as it is a project-based organisation that relies on loans from local authorities to remain sustainable. The only 'freedom' the LAG has to meet local needs is to use so-called 'design measures' to fund activities identified as important. During the last four years, the LAG identified that local food production, preservation, and distribution are important for the local population, as they help to preserve local identities and promote social cohesion. Furthermore, it has the potential to further increase collaboration among local businesses and populations and boost production and access to food. Currently, LAG-TAU relies on four full-time employed experts: an executive director of the LAG, two rural development experts, and an administrative assistant.

Living Lab Coordinator

The Living Lab Coordinator in Bulgaria is a research team from Sofia University's St. Kliment Ohridski (USOFIA) within the Department of Sociology. The team is led by Associate Professor Petya Slavova, PhD, who has vast expertise in agri-food and rural policy and scientific research. This has been acquired through publications and active participation in RIA and CSA Horizon projects like LIAISON, COOCREADO, EFUA, and the ESCAPE ESPON. The USOFIA team has two more members – Nina Denisova, PhD and Rosalina Todorova, PhD candidate. Nina Denisova holds a PhD in Sociology, which she obtained through extensive qualitative research on craft foods and beverage consumption in Bulgaria. Rosalina Todorova is developing a PhD dissertation on inequalities, transitions, and newly emerging strategies for rural adaptation to the climate crisis.

USOFIA and LAG-TAU began their formal partnership within RUSTIK. However, the two organisations have collaborated since the ESCAPE ESPON project (Slavova et al. 2021), within which the LAG emerged as one of the key local actors supporting and driving local initiatives and development.

Functions and Transitions

Functions

RUSTIK Deliverable 1.2. identified three types of rural functions: production, consumption, and ecosystem services. This sub-section adapts this typology to the evidence identified about TAU PR.

Table 3 RUSTIK rural functions typology adapted for the case of the TAU Pilot region.

Production	Consumption	Ecosystem services
Industrial development (furniture, textile, food and beverage production, and pharmaceuticals)	Tourism development	Water quality and quantity
Services (trade, transportation, and gambling)	Local foods	Soil preservation
Agri-food sector	Education	Landscape and biodiversity
Synergies: tourism	Healthcare	Land-based functions, e.g. food production

Production Functions

The data on TAU PR show that the industrial sector has the highest number of employees and the highest turnover in the PR. This is followed by the service sector and the agricultural sector. These data confirm what is already known from the literature: agriculture does not always have the greatest weight in rural areas in terms of employment but remains important as an additional activity in terms of food security (Creed, G. 1999). Of the three municipalities in the PR, agriculture

is the leading sector only in Ugarchin, while industrial production is dominant in Troyan and Apriltsi. Electrical engineering, mechanical engineering, wood and furniture processing, textile manufacturing, pharmaceuticals, and food processing are the primary industries shaping the profile of the production function. These industries, inherited from the communist period, have managed to become part of global supply chains during the transition years. However, they largely support medium- and low-skilled jobs, which in turn hampers development and youth employment. In two of the municipalities in the PR – Troyan and Apriltsi – there is no unemployment. However, in the third municipality, the level of unemployment has varied between 8% and 11% over the last three years. Connectivity between economic operators in the three municipalities in the PR is weak; this is mainly due to there being a distance of 70 km between them (Ugarchin to Troyan distance) and a lack of direct transport links. Services are the second most important sector in the regional economy, but they are mainly related to trade, transport, and other services (cosmetics, hairdressing) and gambling/casino games. In Troyan, a cluster of jobs focused on IT is beginning to emerge. The agri-food sector ranks third in terms of turnover and number of jobs (except in Ugarchin, where it ranks first). However, it fails to create innovative jobs, new products, or services through cooperation. It does not apply the principles of the circular economy to keep young people in the region. Tourism is not yet a dominant sector despite the aspirations of local communities. This is largely due to the non-declaration of income from tourism activities, which in turn leads to less revenue for municipalities and low official wages for employees. The situation is similar for local food production, much of which is produced in the informal sector and is not easily accessible because it is sold informally to trusted individuals. Local entrepreneurship in Troyan and Apriltsi is focused on hospitality and recreational businesses. This seems to be the most aspirational route for economic and demographic growth and has the potential to diversify the traditional industrial sector.

Consumption Functions

Although tourism (e.g. hospitality and accommodation) is fully developed in the informal sector, available public data show that it is not a well-developed sector. This is due to the natural and cultural heritage and the development of the local food and craft production and festival culture. Surprisingly, even during the Covid-19 pandemic, tourism-generated income increased. Some people have a second home in the PR area; this may help to explain the large number of building permits for new houses issued in Apriltsi, the lack of property for sale in Troyan, and the high prices in the region (in comparison to the average in the NUTS 3 region). The municipal school network in Troyan includes 11 schools, of which two are vocational schools – one specialises in applied arts and crafts (ceramics) and the other in mountain tourism. In Ugarchin, the municipality has decided to keep three of its four existing schools despite the lack of students. They have made efforts to deliver quality education, attract teachers from neighbouring towns, and invest in school infrastructure. However, many Roma children attend these schools, and ethnic Bulgarian parents tend to send their children to schools in the larger neighbouring towns. During the last twenty years, Apriltsi closed three of its four schools and is facing the threat of losing its last secondary school. Critically, there is a gap between local industrial and economic workforce needs and the quality and quantity of educated youths entering the labour market.

Troyan also has a well-developed health services sector represented by two hospitals and general practitioners, with a ratio of 276 patients to one general practitioner and an average distance to health care of 17.6 km. This is not the case in Ugarchin and Apriltsi, where the distance to health care for people living in the most remote areas is 30 km. Furthermore, there are no hospital

facilities. Troyan is the only municipality with access to rail infrastructure. Transport connectivity between settlements within the PR has been an issue since public transport was privatised.

Access to processed and unprocessed fresh, seasonal, and local food is also challenging due to low incomes and insufficient supply at the local market. In contrast, processed mass-produced foods offered in supermarkets are the main source of food for the local population, complimented by some domestic foods produced in family gardens.

Ecosystem Services

In Troyan and Apriltsi, much of the territory is a protected natural area. Due to the quality of soils, biodiversity and ecosystems are in good condition. Furthermore, due to the reduction in the number of livestock farms, many pastures and meadows are in a state of natural reforestation. The changes in the agricultural crops grown in Ugarchin, where cereal crops dominate at the expense of traditional crops (fruit and vegetables), negatively impact pollinators' conservation.

Some of the territories in the PR do not have sufficient sanitation infrastructure. In Apriltsi, which is 22 km long and spread over a mountainous area, only a small proportion of the houses are connected to the central sewerage system. The cost of building a new sewerage system is so high that the municipality has been unable to obtain funding from European funds due to the small number of inhabitants. The region's mountainous topography means that its electricity supply is sometimes interrupted. Therefore, households and businesses are forced to find individual solutions to these common structural problems. The other two municipalities (Troyan and Ugarchin) have their own sewerage systems. Water supply is relatively regular, and the quality of the water is good. However, many households prefer to buy bottled drinking water, as they do not believe in the quality of centrally supplied water. The forests are almost well maintained because most are in protected areas. The water supply is relatively good thanks to the stable rainfall, which compensates for the reduced snowfall in recent years. The heating systems in these municipalities rely on solid fuel and electricity. The region has a total of 15,347 megawatt hours of electricity generation capacity from various renewable sources, with the largest shares in Ugarchin (solar parks) and Apriltsi (hydroelectric).

Transitions

Table 4 Characteristics of transitions in the TAU Pilot region

Socio-economic and demographic	Climate and environmental	Digital
Depopulation	Natural reforestation	Lower levels of digital skills
Lacking workforce, low wages, and grey economy	Water scarcity (emerging challenge)	Underdeveloped e-governance
Missing or complex regulations for seasonal and local foods and small-scale production	Air pollution due to industrial waste incineration and solid fuel heating	
Unrealised potential of local resources, both cultural and natural	Some illegal landfills	

Socio-economic and demographic	Climate and environmental	Digital
Lack of linkages between local vocational schools and business opportunities		
The working age population in the area is just over 50%		

Socio-economic and Demographic Transitions

Depopulation is the most challenging aspect of rural life in Bulgaria, and the PR is no exception. However, depopulation is the result of other ongoing processes in the pilot region discussed above, related to the informal economy, the nature of jobs, and ethnic segregation. Furthermore, each municipality has its own specific problems and profile. The data collected during the first cycle of the Living Lab's work showed that the common development potential for all three is food related. The food sector has the potential to retain youth through entrepreneurial initiatives, a better appreciation of the share and role of home-produced food, and the development of policies to reduce informal practices related to food production. Food can also promote cooperation between local economic actors. However, local production, especially of seasonal and fresh foods, is of limited quantity. The quality, quantity, and importance of the domestic production of food for the local economy are also unknown. Most of the small-scale producers of foods and beverages operate primarily in informal ways and remain unable to enter the market (as this would require large one-time investments with little to no proof of increased future benefit). Therefore, they are compelled to remain at a limited production scale. These conditions pose a unique challenge in the region. The region is rich in natural resources and produce. However, it is unable to capitalise on these or employ the necessary scale for them to become a resource for economic development (tourism and new entrepreneurial activities) and social revival (retention of locals and attraction for visitors). A further complication is related to the high costs of local food production, as the production scale is small and requires qualified work. As a result, local production comprises high-quality seasonal, fresh, and healthy foods, which are usually sold outside of the region to people who can afford them. Therefore, local food production is not currently well established and does not improve consumption practices at a local scale.

The Bulgarian partners have chosen to focus on economic and socio-demographic transitions because they pose the most significant challenges to the region but also hold the most potential for revival. More specifically, they are seeking ways to foster rural food systems and collaboration opportunities between vocational schools and local food- and tourism-related businesses. They wish to identify ways to boost access to quality food for locals and visitors and encourage rural entrepreneurship and business collaboration.

Climate and Environmental Transitions

The economic and socio-demographic challenges in the PR have an overwhelming influence on how locals perceive and approach their daily lives, practical challenges, and coping strategies. Although inherently linked, the consequences of climate change appear to be overshadowed by these. Local stakeholders outlined some emerging problems during RUSTIK's cycle 1 fieldwork. For example, natural reforestation was highlighted as harming the quality and potential of local natural resources (especially in Apriltsi), as the 'wild' fauna hinders farmers' attempts to benefit from the land. Furthermore, as they are neither attractive nor accessible, local people cannot

utilise naturally reforested territories for tourism purposes. In Troyan, unregulated and illegal landfills were highlighted as an issue, as they are a source of pollution. Local actors assumed that these emerged due to the high number of registered waste management entities (large and medium-scale producers in the area), which are not supported by the required regulatory mechanisms. Due to outdated infrastructure, the local population has frequently experienced water and electricity supply interruptions. Electricity infrastructure depends entirely on the private operator's maintenance, and its interruption is due to renovations. However, this is not the case for water. One of the three municipalities (Troyan) created its own enterprise responsible for sewerage system maintenance and water supply. This helps to improve the quality of the service and to keep water prices down. Water supply and sewerage services in the other municipalities (Ugarchin and Apriltsi) are part of a large holdings functioning at NUTS 3 level. The centralised governance of the water supply service has increased the price and decreased the quality of the service.

Digital Transition

Like the entire country, the quality of broadband and the accessibility of the network are in good condition in the PR. Some mountainous regions are still not entirely connected; however, household internet consumption is at the expected level. There are three emerging digital transition challenges in the area. Locals' levels of digital and informational skills remain lower than the average for the EU. This is usually explained by the large number of elderly residents in the area, especially outside municipal centres. Due to the low digital skill rates, online practices have not been entirely incorporated into the daily lives of the general population in the PR and have not led to the development of productive and adaptable e-government in the area. Public administration remains dependent on traditional communication and exchange. When linked to production, developing a strong ICT sector remains a challenge. The expectations that the pandemic will drive people away from urban centres were not realised, and digitalisation has not yet emerged as a pathway for rural demographic and economic revival.

Living Lab Cycle 1: Planning Possibilities

Setting up the Living Lab

The first step in setting up the Living Lab in TAU PR was establishing good cooperation between the Living Lab coordination (USOFIA) and the PR partner, the LAG-TAU. As both partners have distinct expertise and their work consists of different tasks, creating the space for mutual learning and collaboration has been the key to the optimal completion of the project tasks and goals. This objective has been achieved by designing a collaborative flow between the two partners. It was important that everybody understood the daily activities and aspirations of each organisation to highlight each other's competencies and contributions to the living lab and, ultimately, to the PR. This was set in motion by a day-long warm-up workshop, which took place within the first two months of the project (following regular communication via telephone and emails among partners) at the university. Within this workshop, participative techniques were used to encourage partners to 1) share insights and create an up-to-date mutually agreed picture of how the region should be perceived and understood and 2) agree upon responsibilities per partner based upon competencies and potentials. Following this in-person workshop, regular online meetings were set up to discuss and work on current project tasks. Furthermore, five additional in-person meetings (excluding the general RUSTIK project meetings) were conducted. Some coincided with fieldwork in the region, and others took place at the university and followed the established

workshop format. Therefore, the collaborative work among partners was structured around in-person (once every two months), online meetings (once per month), and continuous e-mail and telephone exchanges. The so-called 'inner or initiating circle of LL partners' was established, comprising members of both partners – three people from USOFIA and four people from LAG-TAU (seven members). One of the key outcomes of the work performed by this inner circle was the engagement of local stakeholders to form the so-called 'deliberative circle' of the Living Lab, composed of 25 local stakeholders representing different sectors and territories of the PR. The role of the deliberative circle is to discuss data and possible solutions identified by the inner circle and create scenarios for possible data experiments alongside the members of both circles.

Collaborative Methods

The second step in setting the LL in motion included gathering insights from key regional local actors. This was achieved mainly through in-depth interviews and focus-group discussions.

In December 2022, USOFIA partners conducted in-depth interviews with representatives of municipal administrations in the PR to explore rural areas' transition challenges and functions as locals perceive them. These interviews were also used to introduce the project and engage local stakeholders. In March 2023, the USOFIA team conducted three focus group discussions with representatives of public and private key actors in each of the municipalities in the PR. Participant selection in the focus groups reflected the socio-demographic and economic profile of the region. It was developed and outlined through statistical data that was analysed and gathered for WP1. For example, high-ranking representatives were involved in Troyan, as its economy holds the largest share of industrial production. As Troyan and Apriltsi have strong crafting traditions, craftswomen were involved in both focus groups. As Ugarchin has a large Roma population, health mediators from the municipality were included in the focus group, alongside cultural actors from the community centre (the most active local institution). As the municipality was the strongest public actor in all three places, town council representatives were included in all three focus groups. During the initial interviews and focus group discussions, the USOFIA team found that the selected local stakeholders forming the Living Lab's deliberative circle lacked representatives of emigrants (those who had left the region but then returned or were considering returning). This may be due to the high levels of out-migration that contribute to the depopulation of the region. Representatives of foreigners who settled in the region were also missing. This necessitated two sets of in-depth interviews with representatives of these groups. The interviews were conducted by the USOFIA team between June and August. Thus, 18 residents of the area with an immigrant trajectory (both out- and in-migration) were added to the already established deliberative circle of the Living Lab. Three of them were foreigners (two from Israel and one from the Netherlands) who had settled in the area, and 15 were natives of the region who had left at various times to work abroad but returned after a certain number of years or had plans to return. The same guide focused on the three transition challenges, and three types of functions (production, consumption, and ecosystem functions) were used. LAG-TAU members facilitated these three rounds of fieldwork and attended some of the interviews and focus groups.

Participants and Stakeholders

In total, 21 in-depth interviews and three focus groups with 25 participants (total for the three focus groups) were conducted. All participants are considered members of the deliberative circle of the Living Lab. The structure of the Living Lab participants is visualised in Figure 4 TAU Living Lab .

Data Collection Methods

Two types of data were collected: 1) qualitative data collected from focus groups and in-depth interviews and qualitative data extracted through desk research about policies applied in the PR; 2) Quantitative data was collected from publicly available sources like the National Statistical Institute, EUROSTAT, and different national registers publishing publicly available data about various topics. Quantitative data are now being processed to be provided to MCRIT (a RUSTIK partner) for the development of the RUSTIK Information System.

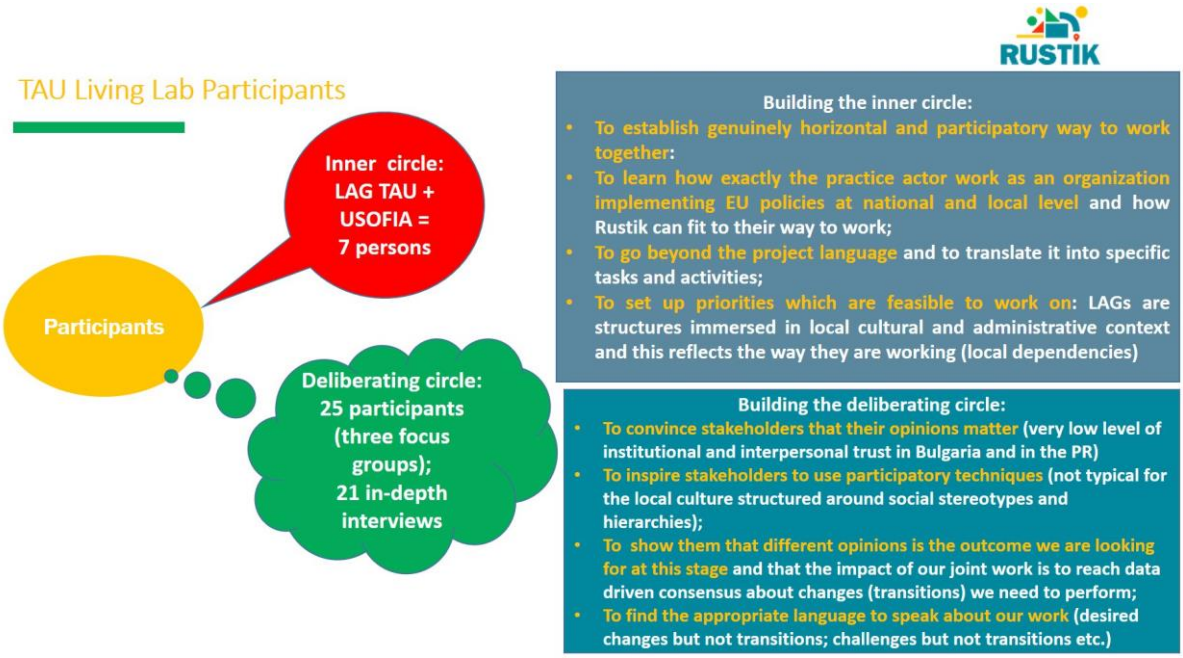

Figure 4 TAU Living Lab structure.

Living Lab Activities in 2023

During Cycle 1 of RUSTIK project, partners form USOFIA and LAG-TAU (the inner circle) performed different activities and tasks. These are summarised in Table 5 Activities, tasks, and outputs performed by the TAU Living Lab. These were undertaken alongside representatives of the deliberative circle in the Living Lab. The most important outcome from this year's work is the definition of the specific transitions (socio-economic and demographic) and challenge (rural food system) on which the Living Lab is focused.

Table 5 Activities, tasks, and outputs performed by the TAU Living Lab

Activities	Research tasks	Interim outputs
Establishment of a collaborative working method within inner and deliberative circles of the Living Lab	Data analysis of preliminary/baseline data to know the PR region (reports and deliverables completed)	Setting up the LL; Identification of members of deliberative circle and their engagement through shared knowledge.

Data gathering through desk research (quantitative data and policy relevant data)	Stakeholder mapping and power-relations establishment (stakeholder mapping T. 4.1.1 and analysis of quantitative data); Identification of data availability, data gaps, and partners needs in terms of data training and competences	Identifying existing policy priorities already existing in the PR and key policy actors; Identification of existing data sources and data gaps
Data gathering through fieldwork (qualitative data through focus groups and interviews)	Identification of functions and challenges (T 1.2); Policy mapping and assessment (T. 4.2)	Building of data-driven challenges scenarios and Selection of key transition challenge.

The implementation of these activities and tasks was evenly distributed throughout the first year of the project development, and the implementation of field activities was tailored to the dynamics of life in the pilot region. Living Lab activities are represented on the timeline in Figure 5 TAU Living Lab .

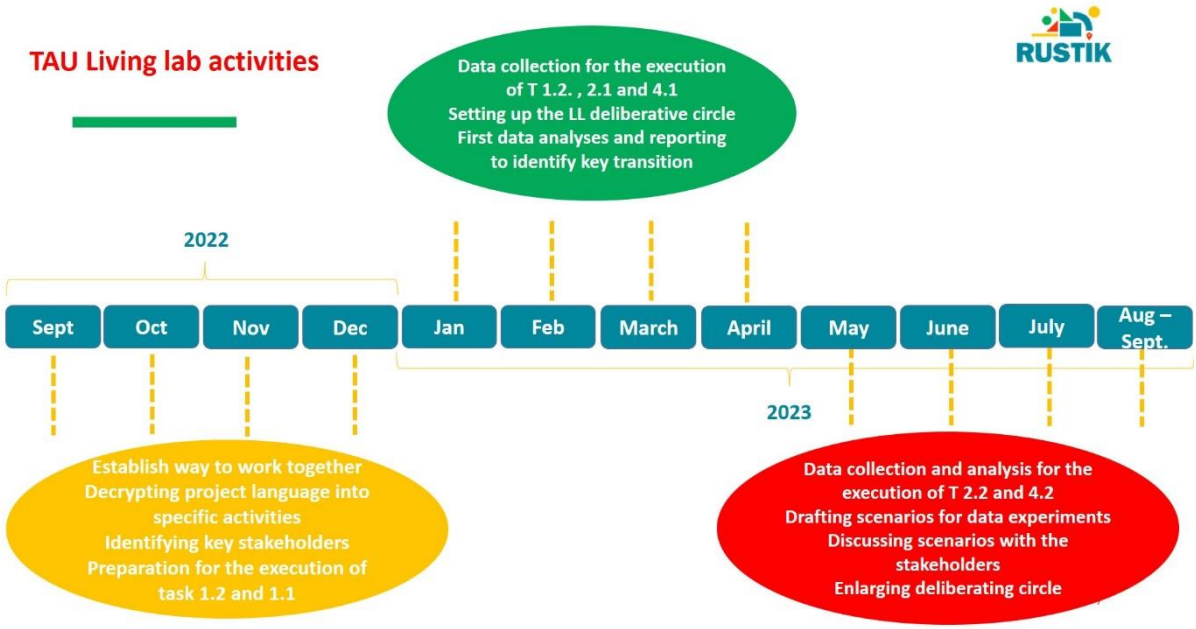

Figure 5 TAU Living Lab activities.

Reflections from Cycle 1

Lessons learnt from the first project year (cycle 1) can be summarised as follows:

1) It was crucial to establish productive dynamics among Living Lab participants (both inner and deliberative circles) and to acquire shared knowledge among all participants. The distribution of tasks and activities among members of the two circles was also vital. Living Lab RUSTIK partners (the inner circle) have specific responsibilities, and everybody knew what was expected, as it was

already outlined in the Grant Agreement. The responsibilities of the members of the deliberative circle were to share knowledge, reflect on it, and facilitate networking in the PR area.

2) Conducting fieldwork, analysing data and reflecting on it required knowing the region and the involvement of as many stakeholders' perspectives (locals, immigrants, public and private, industry and tourism, Bulgarian and Roma) and as many methods (discussions, informal and in-depth interviews, focus groups) as possible. Each method illuminated an important aspect of the region, which would otherwise have remained hidden. The additional quantitative data and policy analysis (structured by WP leads and project deliverables) allowed for a productive triangulation. This process led to the emergence of local food production and access to seasonal and local food (and how it could relate to entrepreneurship and the rural way of life) as the key transition challenge to be investigated by partners.

3) The 'external presence' of the USOFIA team in the pilot region generated new LAG-TAU participants (such as foreign immigrants), enriching the partners' local network even further.

4) Deciding on a priority challenge – the decision about the most relevant transition challenge for the region was the culmination of a year of intensive work and engagement. The decision to work on rural food systems was taken after three rounds of discussions within the inner circle of the Living Lab. The results of data analysis from the focus groups and interviews, scenarios, and participatory techniques facilitated these discussions. RUSTIK aims to be useful, productive, and meet the region's needs. Therefore, it had to be linked to a relevant issue and potential resources for these issues to be resolved in a policy-related sustainable manner through the project's available data-oriented resources. This process was hindered by the challenging identification of a key issue, the limited access to the region's policy-related tools, and the difficulty elaborating the potential of data-oriented tools and resources as useful for the region and its people. Firstly, the local economic and demographic situation was complex, and there were several potential key issues from different social fields (e.g., education, healthcare, and the grey economy). The pictures painted by various stakeholders also provided conflicting interpretations of this complexity. They placed 'blame' on other involved parties, thus setting the trap of 'choosing a side' in locally defined oppositions (between industry and tourism, between political interests, etc.). The three municipalities in the PR have different priorities and profiles, and there was a need to find an overarching issue shared by the whole PR. For these issues to be resolved, the usability and resilience of the project outcomes had to become the basic argument for challenge selection. Secondly, the most obvious policy tool to secure the project's sustainability would have been the LAG's future strategy for 2023–2028. However, the drafting of this strategy was stalled by national-level political gridlocks. Therefore, RUSTIK's timeline did not allow the project team to fully use this opportunity. Thirdly, locals lacked awareness about how data and data-generating tools could be used to address and support local rural development. For this gap to be bridged, time, effort and resources were specifically delegated in USOFIA's work with the LAG and with local key actors to build awareness around the potential use of data as more than information – a source of locally constructed knowledge. These efforts must continue for the project's products to apply to future regional needs.

5) Tackling the 'outsiders' positionality' – as representatives of a tertiary education institution and 'messengers of project work', USOFIA had to convince locals that the approaches and methods of RUSTIK hold the potential to generate useful outcomes for the region now and in the future. In cycle 2, the work on establishing this belief needs to continue so that project deliverables can be

produced, and local stakeholders can be convinced to benefit from the knowledge and tools produced by the project team.

6) Seeking ways for policy mainstreaming of the project results remains the biggest challenge for the Living Lab partners in Bulgaria, as the policy gaps on local level (created by how broader EU and national policies have been 'adapted' to serve the local level) continue to be a hindrance. Therefore, it is vital to identify 'spaces' for innovation and interpretation.

Cycle 1 Results

The three primary objectives in the TAU Living Lab for the first cycle of RUSTIK were: 1) to establish a productive working relationship with both circles of participants (inner and deliberative); 2) to design data-driven research scenarios based on which to identify a specific challenge; 3) to identify the possible policy pathway to test the experiment and its direct and indirect impacts at the local level.

The selection process of Living Lab participants showed that there was a need for a discussion at the local level about the priorities of the region. This is because local and regional policies continue to be created from the top down in a centralised manner. The priorities of local communities do not share much common ground with political strategies and solutions. Therefore, the main challenge for the coordinators of TAU Living Lab was not to engage local stakeholders but to demonstrate how data-driven solutions and proposals can be put into practice and become policy priorities.

Thanks to the data collected, partners have identified three possible research scenarios that systematise the needs of local participants regarding the socio-demographic transition and have the potential to achieve local policy impacts. We have named these three scenarios "Rural food systems", "Rural entrepreneurship", and "Pilot region tourist brand". We have learned that to address the socio-demographic transition and, in particular, the depopulation problem, we need to identify a topic with the potential to create opportunities for locals and to attract visitors and immigrants who want to build a second home in the PR or to settle there permanently. Depopulation in the region is primarily the result of outmigration and can be addressed by creating business opportunities and taking advantage of the region's natural and cultural assets. Based on the data collected, we identified that food seemed to have the greatest potential to challenge negative dynamics in the PR. We also found that a very large proportion of the local population living in the pilot region does not have access to fresh, seasonal, and locally produced food. They mostly consume mass-produced, processed, and packaged food from supermarkets and grocery chains. It became evident that there are significant socio-economic inequalities in the region regarding access to food and its quality. The commonly held belief that rural areas are food producers and that people in rural areas have easier and cheaper access to fresh, seasonal, and local food does not appear to be true at this stage and requires further research.

The partners found that, in Bulgaria, regional and local policies (including LEADER) are top-down, highly centralised and dependent on national-level decisions. The municipalities in the region and the LAG already have initial experience with implementing food-related interventions at the local level. The experiment that RUSTIK will conduct in Cycle 2 will aim to support these local actors in developing data-driven integrated food-related interventions and policies.

Part 2: Challenge and Next Steps

Living Lab Challenges

Rationale

The challenges surrounding the rural food system will be developed in the PR to address the socio-economic and demographic transitions. Mapping, understanding, and proofing rural food systems can reduce social inequalities between households and their access to fresh, seasonal, and local food, promote rural entrepreneurship, and build bridges between vocational schools and local agri-food and tourism-oriented businesses. This rural food system experiment can also increase cooperation between local agri-food businesses and help them extract 'relational rents' (Cao and Zhang, 2011) from their cooperation.

The reasons for this choice can be summarised in the following way: Food is an important topic for the three municipalities comprising the TAU pilot region and allows them to go beyond their differences and identify new ways for territorial cooperation. Food is a topic that allows us to scrutinise practices related to both public (schools) and private sectors (households and companies) and is also relevant to locals and visitors to the region. An important data gap related to food was identified with a relative lack of policy support. Finally, food allows us to better assess inequalities, sustainable practices, and cooperation in the PR. These four arguments were highlighted during the discussions between LAG-TAU and USOFIA partners and have shaped the decision to work on food systems. These data-driven arguments led Living Labs partners to consider Cycle 2, which focuses on the challenge of understanding local food as a resource for entrepreneurship, collaboration, and rural way of life. By focusing on the challenge of food, the Living Lab addresses a central aspect of rural life and the local economy. It also allows a focus on the potential links to solutions for countering depopulation. Food is often an integral part of a region's culture and heritage. By choosing food systems as a specific focus, the PR partner will have the opportunity to create its local food initiatives and interventions and link them to other food-related initiatives led by the municipal administrations and other actors in the PR. The local partner, LAG-TAU, will also integrate the acquired knowledge into implementing its current local strategy. For example, when defining selection criteria for beneficiaries, announcing specific calls for tenders, designing ‘designer measures’, and organising training activities for local communities. Practical outcomes will include the design of 'relational rents' business maps to encourage local businesses to collaborate and create something new together based on local food; the development of a policy strategy surrounding how to support the local economy and household food production by reducing local taxes; the development of a geo-map of family gardens in the PR based on cadastral data. An additional practical outcome will be the elaboration of pathways of transition from vocational schools to food-related jobs and entrepreneurial opportunities.

Knowledge to Date

Currently, we know very little about the role of food as a business opportunity in the PR beyond the available data on the number of farmers working in the pilot region and the number of producers with a direct selling licence. We do not know anything about the local population’s access to fresh, seasonal, and local food in the pilot region, nor about their diets and consumption

habits. We know nothing about how agri-food entrepreneurs and farmers work together in the PR. These data simply do not exist. We do not know about the lack or existence of cooperation between vocational schools in tourism and local agri-food businesses. There is no data about visitors' habits and preferences. No information is available about the role that family gardens play in the household economy, maintaining local food traditions and diets, and sustaining family budgets. In terms of home gardens, we only have data on the amount of irrigation water used by households. In short, there is a significant lack of knowledge about food as a source of rural development in terms of jobs, business opportunities, domestic economies, retaining youth, and attracting new audiences. Currently, food knowledge as a potential for development in Bulgaria has been explored through the prism of the opportunities and constraints created by EU funds for the development of agri-food businesses (Petrov and Petrova, 2018). The second line of research is more focused on Bulgarian 'food icons', such as yoghurt (Stoilova, 2014). The third research direction has been food in the context of festival culture (Medarov, Marinov, 2022), which takes a critical stance towards the over-symbolisation of small localities that cannot be saved by festival culture without a working local business (such as those that have been taken away in the context of privatisation, deindustrialisation, and globalisation). Finally, a more theoretical line of food studies has examined the philosophy of eating as an everyday experience (Pozharliev, 2013). This RUSTIK experiment aims to create a new research line of enquiry in the direction of food studies – namely, that of demographic change and social inequalities. In designing the experiment at the beginning of Cycle 2, literature in global databases on rural food systems and their potential for the socio-economic and demographic development of the region will be further explored.

Research Question/s

- How does the rural food system function and contribute to boosting local entrepreneurship in the PR, and what impact does this have on depopulation trends?
- What is the impact of the local food system on socio-economic inequalities in the PR? What is the impact of family gardens and domestic food production on local economies and vice-versa?
- How do rural food systems in the PR interact with urban economies? Which urban economies have the strongest impact on the rural food system in the PR and interact with them?
- To what extent does the preservation of local food traditions and cultural practices serve as a means of community resilience in the face of depopulation, and what role does it play in maintaining a sense of identity and belonging to the PR territory?
- What economic and cultural factors make the local food sector attractive for incomers and tourists, and how can these factors be leveraged to counter depopulation or at least to boost further local economies in a sustainable way?
- How sustainable is the local food system, and what is its impact on the environment? Does it have the potential to attract environmentally conscious residents and businesses?
- How does access to locally produced, fresh food effect the overall quality of life and well-being of residents, and how might this be a key factor in encouraging people to remain in or move to these rural regions?

Policy Relevance

Rural food policy as a governance instrument does not exist in the PR. The RUSTIK experiment aims to provide the necessary knowledge, data, and models to develop it. We found that some local, regional, and national interventions could have a direct impact on food development. For example, the municipal garden initiative in Troyan, which supplies fresh and seasonal food to social kitchens, and the festivals of traditional food organised by the LAG are municipal interventions that could promote their territories as tourist brands. All these policy interventions must be further developed as part of an integral food policy to make the transition from temporary to regular activities. This will allow them to become subject to governance and could boost local economies and deliver impact. The identified rural food system challenge aligns with regional and local policies related to rural development. Potential policy implications might address the specific concerns of depopulation in rural areas and the need for strategies that promote sustainable economic growth through food-related initiatives. Other policy implications will stimulate focus on household food production and its potential to reduce inequalities when suggesting measures to support family gardens. The challenge's peripheral focus on sustainable food practices aligns with broader European objectives that encourage organic farming, waste reduction, and responsible sourcing of ingredients and circular economies based on food waste.

To gain input and share learning with institutional networks, the following actions can be taken: 1) Establish communication channels with local and regional government bodies and regional development agencies to regularly present findings and research updates and gather input on future work and policy implications; 2) collaborate with businesses and non-governmental organisations to provide expertise and networking opportunities; 3) participate in conferences related to rural development, food systems, and cultural heritage preservation to present the Living Lab's findings and connect with policymakers and stakeholders. However, the final contribution will be to deliver an integrated rural food policy that links and builds on existing policy interventions at the local and regional levels.

Emerging Data Needs

The need for data in the rural food system challenge began with its identification. This was done to formulate specific research questions and hypotheses and identify missing information, potential data sources, and applicable data collection methods. The creation of a new integrated rural food policy must be informed by existing data. The lack of existing data was a significant problem, as food and nutrition policies provide an opportunity for reducing inequalities, the development of entrepreneurship, and youth empowerment. However, they have never been the focus of interest in a systematic way before in the PR.

Data Availability

As noted above, much of the data we need to design the experiment is unavailable.
Furthermore, some of the available data described in Table 6 Available data sources to conduct rural food system are restricted in use.

Table 6 Available data sources to conduct rural food system experiment.

Available data sources			
Type of data	**Scale availability**	**Source type**	**Data owner**
Data on registered farmers and farmers produce	Available at municipal level	Not public	MAFF
Data on farmers with licence for direct sales	Available at municipal level	Public register	Food Safety Agency
Data on food processing enterprises	Available at municipal level	Statistical data	NSI
Register of social kitchens including school and kindergarten kitchens	Available at municipal level	Public register	Municipality
Register of restaurants and fresh food producers	Available at municipal level	Public register	Food Safety Agency

Limitations

Access to data sources listed in Table 4 Characteristics of transitions in the TAU Pilot region is seriously hampered in some cases because they are not available in a machine-readable format or do not allow direct access. Many of these registers are only available by prior request. The most serious problem is access to the farmers' register (MAFF), as it is not public. This prevents analysis at the farm and farm production levels. The lack of public access to this register also makes it impossible to analyse the degree of the sustainability of farming practices and of the produce. There is a complete lack of a register of family gardens, preventing municipalities from measuring the proportion of home-grown food and the impact of gardens on rural economies. One goal of the rural food system experiment will be to access data that will allow us to fill these identified gaps through other proxy sources.

Capacities

Partners who will develop the rural food system experiment have competencies to deal with source identification, data collection, processing and analysis and the overall design, planning and conduct of the experiment. For some of the operations, such as the creation of a geolocated map of home gardens within the pilot region, the team will need to be supported with additional capacity. The partner in the pilot region (LAG-TAU) has the means to hire additional experts for this purpose.

Next Steps

The next steps that the partners are currently working on include designing the experiment, planning the experiment, and implementing the experiment (data collection). Communication with local communities about the conduct of the experiment will also be included as a separate activity.

The design of the experiment includes 1) operationalising the research questions for specific target groups and their activities in relation to the food to be studied (households, entrepreneurs, farmers, users of municipal services, food delivery services, vocational school students); 2) selecting methods to reach these target groups; 3) developing toolkits to apply the different methods; 4) testing the toolkits. The design also includes a preliminary analysis of publicly available structured and unstructured data collected from available public registers and other sources. This preliminary analysis is essential to select other methods and data sources to fill the identified gaps.

The planning of the experiment includes selecting the period for conducting the actual surveys with the identified target groups, accessing them, and preliminarily communicating the objectives of the experiment.

The implementation of the experiment includes registering the data, processing the data, and producing subsequent analyses and reflections.

The experiment will be adequately communicated to the local communities and stakeholders during all of its steps through the mobilisation of representatives of both the inner and deliberative circles. They will be involved as 'rural food challenge ambassadors' to reach representatives of different target groups. This will be done in phase 4 when the toolkits are tested.

The analysis of the data from the experiment, alongside feeding the data into the RUSTIK information system, should allow the development of a strategy or policy pathway for future rural food policy.

The steps described above will be implemented following discussions with members of the inner and deliberative circles. A meeting with both circles will be arranged in January 2024 to discuss the initial research design, which will guide the experiment. Discussion and participatory methods will also be used to develop a way of communicating the experiment to local communities.

From the end of February to mid-March, the different tools will be developed and tested. From the end of March to mid-September, various types of data will be collected from different target groups. The analysis of this data will form the basis for developing the rural food policy and the pathway to apply it in the TAU PR.

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Finland: North Karelia

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Summary and overview

North Karelia, situated in eastern Finland, stands as the easternmost region within the continental EU, positioned approximately 450 km away from the capital city, Helsinki. With a population of 162,540 individuals, North Karelia has a sparse population density of 7.1 inhabitants per km^2. About 50% of North Karelia's population resides in rural areas, highlighting the region's predominantly rural character.

Living Lab achievements

The key activities in the North Karelian Living Lab in 2023 have involved establishing good working relations between the Pilot region partner Regional Council of North Karelia and the Living Lab Coordinator Karelian Institute, organising focus group workshops for regional stakeholders and developing content for several RUSTIK tasks such as the Pilot Region report, Institutional Mapping, Policy Panorama, and different surveys. After selecting the Living Lab transition challenge, the main task in the Living Lab has been to network with the most important regional stakeholders to define the research questions for the Cycle 2 data experiment.

Key learning to date

In the focus group discussions, the most important transition challenges of the region were identified to be:

- population decline.
- ageing of population.
- high unemployment.
- availability of skilled labour.
- decline in the provision of basic services.
- decreasing accessibility of the region.
- availability of renewable energy.
- burden of the demands of the green transition on the agriculture and forestry sectors.

Immigration was considered being both an opportunity and a challenge. The region is lacking skilled labour, so work- and education-based migration is needed. North Karelia is suffering from domestic migration loss, but it receives immigration gain from abroad. The region is attracting especially foreign students, which is a great asset for the labour market. The challenge is the immigrant retention: people with a foreign background are overrepresented in the domestic migration loss figures. This means that many people with a foreign background that move to North Karelia do not stay but migrate to other regions of Finland. The focus groups identified data gaps in attractiveness and retention factors of the region. Regarding the immigration, there was a request for deeper understanding of the phenomenon: who the people with foreign background who move to the region are and what are their reasons to move to North Karelia and to move out from the region. In general, a need for more qualitative data on rural people's wellbeing and satisfaction in services and living conditions was identified to be important. This was found to be especially important considering minorities such as people with foreign background who live in rural areas.

Living Lab challenge

The selected challenge in the North Karelian Living Lab is the immigrant retention. The population of North Karelia is decreasing. The fertility rate is low, and the population is ageing, which increases the dependency ratio. There is a lack of skilled workers in many fields such as in the

health care and in the service sectors. The region receives immigration gain, which helps to balance the population loss. At the same time, the region suffers from low population retention and immigrants are overrepresented in domestic migration loss figures. North Karelia must find ways to improve its retention together with the settlement and integration of immigrants so that more people who move to the region would stay and work for the benefit of the region in long term.

According to the Act on the Promotion of Immigrant Integration, immigrant refers to a person who has moved to Finland, is staying in the country with a permit other than for tourism or comparable short-term stays, or whose right of residence has been registered, or who has been granted a residence card. Every person who moves to Finland will have an official address, which means their residence is registered in one of the Finnish municipalities. According to the Act, integration refers to the individual process of an immigrant, occurring through interaction with society, during which the immigrant's equality and equity in society, as well as participation in the working and business life, education, organisational activities, or other societal functions, deepens and diversifies. Integration promotion on the other hand involves supporting the immigrant in their integration by offering services, supporting their opportunities to maintain their own language and culture, and fostering society's receptiveness.

In our Living Lab, we will investigate the integration promotion services provided by the North Karelian municipalities and the wellbeing and experiences of immigrants living in the North Karelian municipalities. By immigrants we refer to people with foreign background whose right of residence has been registered in one of the North Karelian municipalities. As we are especially interested in the integration promotion services and population retention in the North Karelian municipalities, we exclude from our study refugees, asylum seekers and people under temporary protection that are currently benefitting from reception centre services in North Karelia as their residence has not been registered and they are not under the integration promotion services of the municipalities.

Emerging data needs

Finland is currently going through a comprehensive reform of the Act on the Promotion of Immigrant Integration (the Integration Act), which supports the integration and employment of immigrants and promotes equality, wellbeing, and good relations between population groups. The reform will enter into force on 1.1.2025 and it will increase the municipal responsibility for promoting integration services to immigrants. In Cycle 2, the North Karelian Living Lab will generate new data to offer the North Karelian municipalities information on immigration and integration promotion so that the municipalities can design better integration promotion services for effective target-oriented integration promotion work to improve the population retention of the region.

Next steps

The next step in the North Karelian Living Lab is to organise meetings with the most important stakeholders. Once networks with these stakeholders have been set and there is a clear plan for what will be done in Cycle 2, it is important to inform the municipalities about the project and the support and services the project can offer them. The Living Lab aims to use the Maptionnaire tool to collect data from immigrants and it must prepare the survey and translate it to several languages before launching the data experiment.

Figure 6 North Karelia is a sparsely populated region covered by forest and water.

Part 1: Progress Review

Pilot Region introduction

North Karelia is a NUTS3 region located in eastern Finland, 450 km from the capital city Helsinki. It has a total area of 22,903 km^2. North Karelia has a 300 km frontier with Russia, and it is the easternmost region of the continental EU.

The population of North Karelia was 162,540 as of 31.12.2022. North Karelia consists of 13 municipalities. Joensuu is the regional centre and a university town with a population of 77,513 (48 % of the regional population). All the other municipalities are considered rural according to the DEGURBA classification. There are three sub-regions in North Karelia: Joensuu region (Joensuu, Liperi, Heinävesi, Outokumpu, Polvijärvi, Juuka, Kontiolahti, Ilomantsi), Central Karelia (Kitee, Rääkkylä, Tohmajärvi) and Pielinen Karelia (Lieksa and Nurmes). North Karelia is a sparsely populated region with the population density of 7,1 inhabitants per km2 (Finland's average is 14,2 inhabitants per km^2). According to the DEGURBA classification, 52 % of the North Karelian population live in rural areas.

According to the European Union Rural Observatory data, forests cover 75 % of North Karelia, 18 % of the region is covered by water bodies and 4.1 % by farmland. The bedrock of North Karelia is one of the areas of Finland with the most potential ore resources. The climate of North Karelia is cold continental with warm summers and snowy winters.

Pilot Region Partner

The Regional Council of North Karelia (RCNK) is a politically guided, municipal coalition for the development and interest supervision of the North Karelian region. It is responsible for regional planning and general coordination of regional development programs related to national and EU structural funds. RCNK oversees the interests of people, municipalities, organisations, and enterprises of the region and speaks on their behalf. The Regional Council outlines regional development targets, key projects and measures through the regional planning system that consists of the Regional Development Plan, the Regional Strategic Programme, and the Regional Land Use Plan.

Living Lab Coordinator

The research partner is the Karelian Institute, which is part of the University of Eastern Finland in Joensuu. The Karelian Institute engages in basic and applied multidisciplinary research in the humanities and social sciences. Within the framework of project activities, the Karelian Institute supports the supervision of postgraduate studies and researcher training and participates in undergraduate teaching. Commissioned research related to the university's societal service mission is also carried out at the institute. The thematic areas in research are: Regional and Rural Studies, Ethnicity and Culture, and Borders and Russia. The Karelian Institute was founded in 1971.

The Living Lab Coordinator team members are Petri Kahila (Research director), Juha Halme (Postdoctoral researcher), Aura Liski (Project manager) and Antti Tiilikainen (Early-stage researcher).

Functions and transitions

Functions

North Karelia has extensive forest and water resources and forest bioeconomy related functions from forestry to wood manufacturing industries, research and tourism are important for the region. Thanks to the forest resources, North Karelia has reached high levels of renewable energy consumption and energy self-sufficiency. Some other important functions of North Karelia are technology industry, education, mining, agriculture and food production and culture.

Production functions

Forest bioeconomy plays an important role in North Karelia's economy. A large part of North Karelia is covered by forests and over 50% of the forests are in private ownership. North Karelia's agriculture is specialized in grass-based farming for livestock production. Challenging production conditions and high production costs combined with limited and concentrated markets are challenges for the competitive and profitable production in the area. In the municipalities of Outokumpu and Juuka there are significant mining clusters.

North Karelia's industry structure is relatively diverse and a few successful export companies have created significant clusters and value chains around them. For example, the photonics ecosystem in the region is internationally unique. Still, most of the companies are micro-enterprises, which poses a challenge to growth and innovation-driven activities.

Consumption functions

There are several education and research institutions in North Karelia. These include the University of Eastern Finland, the Karelia University of Applied Sciences and the North Karelia Municipal Education and Training Consortium Riveria. The proportion of students in the population is one of the highest in comparison between regions in Finland. The education institutions support the main industries of the region. The region has well-regarded education and research institutions connected to forest research and expertise, photonics, and the mining industry.

In North Karelia, the public healthcare, social welfare, and rescue services are organised by the wellbeing services county Siun sote. Currently, there is at least one health station in each municipality and the residents of the region can use services of any health station of the region. The North Karelia Central Hospital in Joensuu serves the whole region. In addition to the public health care services, there are also private medical clinics in the region.

The region has a lot of potential in tourism based on clean nature and nature-based welfare services. The region is famous for its natural attractions such as its four national parks. There is a UNESCO Biosphere Reserve in North Karelia. The region also has a lot of potential in culture and creative sectors such as festivals and sports events.

Ecosystem services

North Karelia has extensive forest and water resources. There are approximately 2,200 lakes in North Karelia; 93% of the lakes and 83% of the rivers have good or excellent ecological status. The region’s share of renewable energy in the total energy consumption was 71% in 2020. This is largely based on bioenergy as around 50% of the energy consumed in North Karelia is produced with wood biomass.

Transitions

The North Karelian Living Lab will concentrate on the socio-economic and demographic transition. This is because decreasing and ageing population poses a serious challenge to the region and there is a need for new strategies, plans and policies to manage the demographic change.

Socio-economic and demographic transition

Key challenges identified are the decreasing and ageing population, lack of skilled labour, long-term unemployment, immigrant retention and accessibility of the region. The population decrease concerns especially the rural areas of North Karelia, as the population concentrates in the regional centre Joensuu. This endangers the provision of basic services such as health care, public transportation, and infrastructure. Ageing affects the availability of skilled labour, as there are more people retiring from work than entering the labour market. This results in lower tax revenues, which endanger the provision of public services. At the same time, North Karelia has a national top position in low-income and long-term unemployment, which is a challenge for well-being and inclusion. The availability of skilled labour is already a critical issue in the health care sector, which suffers from labour shortage in the whole country and therefore, labour force from abroad is needed. Since COVID-19, multilocal working has become popular in Finland. North Karelia is attractive for its leisure possibilities and the region could benefit if remote work enables people to move to distant rural areas. The accessibility of the region has had lots of setbacks recently: the number of regional flights has been cut, the Saimaa Canal Sea connection is closed, and the condition of roads and railways is decreasing.

Climate and environmental transition

The agriculture sector is under pressure partly due to profitability challenges and partly due to the demands of the green transition such as the nature restoration law that affects land use. Also, the funding of the agriculture sector (CAP) has been steadily decreasing. Forestry is an important sector in North Karelia but also forestry and its related functions are under pressure due to the demands of the green transition. There are still lots of unresolved issues regarding the production of renewable energy. Currently, it is not possible to build wind power in large parts of the region due to the requirements of the Finnish Defence Forces.

Digital transition

There is a digital gap in the region both in infrastructure and in skills. The construction of digital infrastructure has been lagging, and only some parts of the region have a broadband connection. There is also a gap in the level of digital skills, and especially skills of the older population are lagging.

Living Lab Cycle 1: Planning Possibilities

Setting up the Living Lab

The Pilot region partner RCNK and the Living Lab Coordinator Karelian Institute met in the beginning of 2023 to discuss coming tasks and common working methods. RCNK and the Karelian Institute have met regularly in 2023 both in Teams and in person. They have also established a Microsoft Teams discussion channel, which enables timely and informal exchange of information. The RCNK RUSTIK Project Manager is regularly updating the organisation on RUSTIK progress. The Project Manager also consults regularly with other staff members of the organisation when needing advice such as data input into project related tasks.

Setting up the Living Lab on a regional level is still in process. In the Living Lab Cycle 1, the activities conducted under the RUSTIK project in North Karelia included a wide range of stakeholders representing sectors under different transitions. Now, when the transition challenge and the research questions have been identified, the group of Living Lab stakeholders will narrow down to a more specific stakeholder group.

Collaborative methods

The collaborative methods used until now are hybrid focus group workshops, live meetings, phone meetings and online meetings.

Participants and stakeholders

By now, 27 stakeholders have participated in the Living Lab activities. Most of these stakeholders participated in the focus group workshops organised in spring 2023. Key stakeholders to the project include the Regional Development Director, Regional Development Specialist, Welfare and Education Specialist, Information Service Specialist, and the Land Use Specialist of RCNK, the Employment and Skills Unit of the North Karelia Centre for Economic Development, Transport and the Environment and International House Joensuu.

Data collection methods

By now, the data collection methods have included desk studies, focus group interviews, in-person interviews and statistical analyses.

Living Lab activities in 2023

In January-February 2023, the Pilot region partner RCNK and the Living Lab Coordinator Karelian Institute met several times to discuss project tasks and common working methods. In February, they also participated in a project meeting in Barcelona.

In March 2023, Living Lab partners participated in *Good life in North Karelia* seminar organised by the Rural Policy Council. The seminar gathered the most important regional stakeholders under rural development, and it helped to identify the most important stakeholders to invite to the RUSTIK focus group workshops.

In April 2023, RCNK organised two focus group workshops to collect information on what the regional stakeholders find the most important transition challenges and opportunities and where they find the biggest data gaps. Altogether, 30 regional stakeholders were invited to the focus group workshops. The invitees represented public sector, private sector and third sector organisations. The first focus group had 7 participants and the second focus group had 9 participants in addition to the Pilot Region Partner and Living Lab Coordination representatives. The results of the workshops were reflected in the Task 1.2. Pilot Region report.

In April-May 2023, the Living Lab partners compiled content to the Task 4.1 desk-based overview of the operational use of data, indicators and evidence in the design and implementation of policies responding to the key transitions at the national level.

In June-July 2023, RCNK held internal meetings with the Information Service Specialist and with the Land Use Specialist to collect statistical data of the Pilot Region and to find answers to the Task 2.2 surveys 1 and 2.

In August, September, and October 2023, the Living Lab partners compiled data to the Tasks 4.2 Institutional mapping and Policy panorama. They also participated in a project meeting in Parma

in October. In November-December 2023, the Living Lab partners worked on the Task 3.1 First Living Lab Report and Task 4.2 Transition narrative.

To define the transition challenge and the research questions in more detail, the Living Lab partners held meetings with the RCNK Regional Development Director, the Regional Development Specialist and the Welfare and Education Specialist in September, October, and December 2023. To gain a wider acceptance to the selected transition challenge, the partners organised meetings with the Employment and Skills Unit of the Centre for Economic Development, Transport, and the Environment in September and in December and with the International House Joensuu (immigration services of the city of Joensuu) in October. The partners also participated in the regional meeting regarding the Integration Act reform in November.

Reflections from Cycle 1

In the North Karelian Living Lab, the RCNK RUSTIK Project Manager works also part-time at the Karelian Institute, which enables flexible exchange of information and active communication between the Living Lab organisations. This has proven to be a good practice to enable easy cooperation of the Pilot Region Partner and the Living Lab Coordinator during Cycle 1.

The most difficult part of the Cycle 1 was that the transition focus and the transition challenge were selected relatively late, only in the last part of 2023. Until the transition challenge was selected, several project tasks had a general nature, which made the analysis difficult but also questioned the reason to conduct these tasks. For example, the Institutional mapping and the Policy panorama tasks became meaningful only after the transition challenge was selected. Now, when the transition challenge has been selected, these tasks give a possibility to reflect the most important stakeholder organisations and policies under the selected topic, which is helpful when setting up the Living Lab and designing the data experiment in more detail.

Cycle 1 results

Cycle 1 brought the North Karelian Living Lab from a general analysis of different transitions to a detailed analysis of one selected transition challenge. In the beginning of Cycle 1, different transitions were discussed with a wide range of regional stakeholders. At an early stage, the North Karelian Living Lab decided to focus on themes under the socio-economic and demographic transition as these have received less attention in the work of RCNK compared to the climate-environmental and digital transitions.

In the focus group discussions, the most important transition challenges of the region were identified to be the population decline, the ageing of population, high unemployment but also the availability of skilled labour, decline in the provision of basic services, decreasing accessibility of the region, availability of renewable energy and burden of the demands of the green transition especially on the agriculture and forest sectors.

On the other hand, the increase in multilocal working was considered to be an opportunity for the region as more flexible working conditions could attract people to live in North Karelia. Immigration was considered as both an opportunity and a challenge. The region is lacking skilled labour, so work- and education-based immigration is needed. The challenge is the immigrant retention: people with a foreign background are overrepresented in the domestic migration loss figures.

The most important data gaps identified considered the demographic transition. The focus groups identified data gaps in attractiveness factors of the region: why do people move to North Karelia and what makes them stay. Regarding the immigration, there was a request for deeper understanding of the phenomenon: who the immigrants are and what are their reasons to come and leave. In general, a need for more qualitative data on people's wellbeing and satisfaction in services and living conditions was identified to be important. On the other hand, it was requested that the impact of different transitions on different groups of people such as minorities living in rural areas should be studied to better understand the diversity of people, to harness their potential and to better ensure inclusiveness and well-being of the rural population. Altogether, the focus groups emphasized that more qualitative data is needed to be applied in the political decision-making.

When conducting different tasks during the Cycle 1, it was understood that the North Karelian Living Lab has good access to information. The Statistics Finland offers comprehensive access to timely national, NUTS 3 and NUTS 2 level data. The Living Lab has also good organisational skills in data management and for example RCNK has three different staff members working with data analysis in the organisation. What is a challenge is the excessive amount of scattered data available. According to the focus groups, there is a need for easier access to information, someone to collect information from different sources and to produce a synthesis on different phenomena relevant to the development of the region. Therefore, in Cycle 2, the North Karelian Living Lab aims to provide its stakeholders with accessible data and analysis that will help them to design better policies to tackle the selected transition challenge.

Part 2: Challenge and next steps

Living Lab challenge

The selected transition challenge of the North Karelian Living Lab is immigrant retention. Currently, there is a clear consensus among national and regional stakeholders that decreasing population and lack of skilled workforce are serious challenges and therefore settlement and integration of immigrants living in North Karelia should be improved. Several national and regional policies and initiatives support this effort. For example, in the *North Karelia 2040 strategy,* internationalisation and education- and work-based immigration are identified as means to secure the sufficiency of skilled workforce in the region. The strategy sets the attractiveness of the region, employment of international students graduating from regional education institutions and different support forms for employment both for the immigrants and the employers as objectives.

Rationale

RCNK represents the 13 municipalities of North Karelia. Municipalities have an important role in the immigrants' integration promotion in Finland. Finland is currently going through a comprehensive reform of the Integration Act), which supports the integration and employment of immigrants and promotes equality, wellbeing, and good relations between population groups. The reform will enter into force on 1.1.2025 and it will increase the municipal responsibility for integration promotion. The purpose of the Integration Act is to promote integration, employment, and entrepreneurship, working life skills, equality, inclusion, welfare and health of immigrants, good population relations and society's receptivity, availability of necessary and high-quality integration-promoting services and multidisciplinary cooperation between actors.

According to Integration Act, the municipalities will have the general and coordination responsibility for the planning, development, and monitoring of the integration promotion at the local level. When planning integration promotion, the municipalities must set at least goals regarding immigrants' employment, education, well-being and health, housing, inclusion, equality, the possibilities of maintaining one's own language and culture, and the promotion of good population relations. The municipalities must set measures, responsible parties, cooperation and monitoring to support the integration promotion work.

A recent report on the planning, practical implementation, and monitoring of the integration programmes of the Finnish municipalities by the Ministry of Economic Affairs and Employment of Finland (2022) showed that the municipal integration programmes are currently not of high quality when it comes to knowledge based and target oriented strategy work. The report shows that although the preparation of the integration programme is statutory under the current Act, there are significant differences in the content, preparation processes, uses and monitoring methods of the programmes. The content and purpose of municipal programmes differ. In programmes that include objectives, their setting and monitoring focus on measures rather than on outcomes and impacts. In many municipalities, measuring the progress of integration promotion is not at a sufficiently concrete level, or there is not even an attempt to monitor and assess the effectiveness of different measures. Currently, only less than a third of the municipalities use indicators for monitoring integration promotion and for evaluating the

effectiveness of different measures. The report also shows that municipalities have challenges in acquiring, using, and managing data, which makes high-quality program work difficult.

The lack of knowledge based and target oriented strategy work is a clear limitation when it comes to effective integration promotion in the municipalities. Now when the reformed Integration Act will increase the municipal responsibility for promoting integration, it is more important than ever that the municipalities are able to plan, develop and monitor their work to promote efficient integration services and to improve the settlement of immigrants in North Karelia. The practical benefits of the RUSTIK project can be to offer the North Karelian municipalities up-to-date and easy-to-use data on immigration and integration promotion together with comparable and easy-to-use indicators so that the municipalities can design better integration programmes for effective target-oriented integration promotion work.

Knowledge to date

The population of North Karelia is steadily decreasing, and the demographic structure of the region is ageing. The number of births in relation to the number of deaths taxes the population by more than 900 people annually. According to Statistics Finland's autumn 2021 population projection, the population of North Karelia would decrease by almost 10 % by 2040, even if the net migration were positive during the entire forecast period. Since 2010, North Karelia has received mostly migration gain, which helps to balance the natural population loss. The improved migration figures have been influenced by immigration: in the last years, North Karelia has received approximately 400 net immigration surplus annually. Nevertheless, many of the immigrants that move to the region do not settle 58 % of North Karelian internal migration loss between 2010 and 2021 were people with a foreign background.

The population decline is a challenge that causes labour shortage in many sectors. The domestic supply of labour will not be enough to cover the needs in the future. Also, many sectors such as health care suffer from labour shortage in all Finland, which means that domestic migration is not a solution. It has been estimated that already between 2020 and 2025, North Karelia will lose 5100 working age people. This requires measures to secure the availability of skilled labour. According to a recent study, North Karelia would require 1335 immigrants annually to ensure that the number of working aged people remains the same in 2035 than in 2022. Therefore, the North Karelian municipalities must put a greater emphasis on not only to ensure effective settlement and integration of immigrants but to also actively attract immigrants to move to the region.

Research questions

- What is the status of immigration and integration promotion in the North Karelian municipalities?
- How can the introduction of new forms of data into the policy process support targeted integration promotion in the municipalities?

Policy relevance

The challenge and the research questions are relevant to several national and regional policies. On a national level there are several policies promoting work and education-based immigration including the *Roadmap for Education-based and Work-based Immigration 2035* by the Finnish Government (2021), the Programme of Prime Minister Petteri Orpo's Government *A strong and committed Finland* (2023), *A New Direction for Eastern Finland Vision and Action* by the Ministry

of Economic Affairs and Employment of Finland (2023) and the new *Integration Act (681/2023)*, which will enter into force 1.1.2025. On a regional level, several policies promote work- and education-based immigration: *North Karelia 2040 Strategy, Regional Strategic Programme for North Karelia 2022-2025,* and *Roadmap for International Activities in North Karelia (2023)*. On the municipal level, the most important policies are the municipal integration promotion programmes and other municipal strategies and programs addressing integration promotion.

It is important to develop networks with the most important regional stakeholders that work with immigration and integration promotion services: the North Karelian municipalities, the North Karelia Centre for Economic Development, Transport and the Environment, International House Joensuu (integration services for municipalities), the North Karelia Public Employment and Business services, educational institutions, civil society organisations that represent and support immigrants in North Karelia and immigrants themselves.

Emerging data needs

In Cycle 2, the objective of the North Karelian Living Lab is to generate comprehensive, up-to-date data on immigration and integration promotion together with comparable and easy-to-use indicators so that the municipalities can design better integration promotion programmes for effective target-oriented integration promotion services.

First, it is important to study the current status of immigration and their integration in the North Karelian municipalities to provide the municipalities with background information on municipality specific trends of population, number of working-age people, number of jobs by sector, numbers and background of immigrants, future immigration trends and comparisons between citizens with Finnish and foreign backgrounds regarding different aspects of integration such as work, housing, participation, health and well-being. This data set could work as a starting point for knowledge-based integration management and goal setting when developing new integration promotion programmes in the municipalities.

Second, it is important to investigate the current status of the integration promotion work in the North Karelian municipalities especially from the point of view of knowledge-based and target oriented integration promotion. The Living Lab will develop an analysis of the North Karelian municipalities' current integration promotion programmes and services. The Living Lab will also benchmark different integration promotion programme models, goals, and monitoring methods from Finland and abroad that could be used to develop more effective integration programmes in the North Karelian municipalities.

Third, there is a need to collect data on the experiences of immigrants living in North Karelia. This was one of the outcomes of the focus group workshops in Cycle 1. The Living Lab will use the Maptionnaire tool to conduct a survey on the experiences of immigrants living in North Karelia. The data will give us information on the wellbeing of the immigrants, their challenges and needs and their experiences in different services. The data will enable the Living Lab to investigate different narratives when it comes to the process of integration and settlement of people with different backgrounds. This information will be used to improve the integration services of the municipalities.

Data availability

For the research question on status of immigration and integration promotion work in the North Karelian municipalities, we will mainly use national quantitative data sources such as the Statistics Finland, Digital and Population Data Services Agency, the Centre for Economic Development and Transport and the Environment, the Ministry of Economic Affairs and Employment of Finland, the Finnish institute for health and welfare and the Finnish Immigration Service. The Living Lab partners have access to these public data sets.

We will also conduct a desk study on the current integration promotion programmes of the North Karelian municipalities from the point of view of knowledge-based and target oriented integration promotion. We will also interview people responsible for integration promotion in the municipalities to understand how integration promotion work is managed and what are the biggest challenges from the point of view of the municipalities. We will also benchmark different integration promotion programme models from Finland and abroad to investigate what type of goal setting and monitoring measures are in use in different municipalities. The municipal integration promotion programmes are publicly available on internet, or they can be requested for.

We will also study the experiences of immigrants living in North Karelia by conducting a Maptionnaire survey. We will spread the survey through several stakeholders such as educational institutions, civil society organisations and employers working with immigrants in North Karelia.

Limitations

We have a good chance to obtain the data we plan to collect. Some statistical data may be chargeable, but we have received budget for purchase costs if needed. The Living Lab partners have good working relations with the municipalities so collecting data from the municipalities should not be a problem. The data on immigrants' experiences will be more difficult to collect and the survey must be translated into several languages. There is also a need to build trust among the immigrants so that they are motivated to answer the survey. There is also a need to build trust with several stakeholders such as educational institutions, civil society organisations and employers, which are the key stakeholders to disseminate the survey among immigrants.

Capacities

The Living Lab partners have good capacities for accessing, using, generating, and analysing both quantitative and qualitative data. In RCNK, there are staff members that are specialised in accessing and providing data for different needs including geospatial data.

Additional support will be needed to set up the Maptionnaire survey and to translate the survey into various languages spoken by immigrants in North Karelia.

Next steps

The next step in the North Karelian Living Lab is to organise meetings with the most important stakeholders, especially the North Karelia Centre for Economic Development, Transport and the Environment and the International House Joensuu. The North Karelia Centre for Economic Development, Transport and the Environment is an important stakeholder as it is the state organisation responsible for the regional coordination, development, and monitoring of integration. International House Joensuu on the other hand compiles services of the immigration services of Joensuu, the city's development company Business Joensuu, the employment services

of Joensuu and the educational institutions in the region. It offers guidance and advice in questions related to immigration and integration to the municipalities of the region and acts as a policy maker for integration work in North Karelia and Finland. The purpose of the meetings is to share ideas of the RUSTIK Living Lab data experiment and to gain feedback from the stakeholders who work with immigration and integration promotion in North Karelia.

There is a new group project under development in North Karelia called *Work in North Karelia* (WiNK), which aims to boost international recruitment in the region. International House Joensuu is responsible for one of the sub-projects under WiNK called immigrant settlement and integration services in municipalities. In the sub-project, International House Joensuu will support the North Karelian municipalities in preparing for the reform of the Integration Act and to develop integration promotion services in the municipalities. If the project receives funding, it will start in the end of 2024. It has been discussed that data collected in RUSTIK Cycle 2 could be used as a content in the WiNK municipality training sessions organised by International House Joensuu between 2025 and 2026.

Other important stakeholders to meet are the educational institutions of North Karelia: University of Eastern Finland, Karelia University of Applied Sciences and the North Karelia Municipal Education and Training Consortium Riveria. These institutions participate both in the WiNK project but also in another group project called *Talent Hub Eastern Finland* (2023-2027) that supports international students in finding employment and employers in finding and hiring international workforce. Other important stakeholders to meet are community colleges offering education services to immigrants and civil society organisations that represent and support immigrants in the region.

Once networks with these stakeholders have been set and there is a clear plan for what will be done in Cycle 2, it is important to inform the municipalities about the project and the support and services the project can offer. It is also a good practice to inform the stakeholders that participated in the RUSTIK focus group workshops in 2023 about the future activities of the project.

Before launching the data experiment, the Maptionnaire survey must be prepared. This will require familiarizing with literature, meeting with several stakeholders and coming up with a set of questions to collect data on the experiences of immigrants living in North Karelia. The questionnaire should be tested with immigrants and once it is ready, it should be translated into several languages. There is also a need to meet and to build-trust with different stakeholders that are in positions to disseminate the survey after its launch such as educational institutions, civil society organisations and employers working with immigrants.

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Germany: Rhein-Hunsrück

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Summary and overview

The pilot region **Rhein-Hunsrück** is a predominantly rural district of 99,107 ha with a population density of 107.3 inhabitants/km² in the state of Rhineland-Palatinate, in the west of Germany. The population is ageing rapidly, indicated by a severe increase in the Ageing Index from 2000 to 2021. The district is home to 64,568 enterprises, of which the majority - just under 4,430 - are small and very small businesses with fewer than 50 employees; only 21 businesses employ more than 250 people.

Living Lab achievements

The central activities in the first cycle can be summarised as follows:

1. A **partnership and collaboration structure** was established between the Living Lab Coordinator (LLC) and the Pilot Region Partner (PRP). The central instrument of cooperation is the monthly Jour Fix.
2. Key opportunities and challenges the region is facing were identified from data and literature research. In focus group workshops, the **transition challenge** for the Living Lab Rhein-Hunsrück was identified together with regional stakeholders. Writing the pilot region report as part of work package (WP) 1.2 was helpful in this regard.
3. **Data gaps** and initial ideas for new data collection methods were identified from the above-mentioned activities. The surveys on data gaps in the course of the activities of WP 2 also helped here.
4. An analysis of stakeholder structures (institutional mapping) and a **policy analysis** (policy panorama) helped to integrate the identified challenges into the policy context (WP 4 activities).

Key learning to date

The Living Lab Rhein-Hunsrück benefits significantly from the **extensive partner network** of the PRP and its role as an economic development agency within the LEADER framework. This ensures alignment with regional objectives and facilitates access to relevant stakeholders. While early identification of the overarching topic facilitated stakeholder involvement, establishing effective cooperation structures takes time, especially across diverse stakeholder groups. Defining a transition challenge aligned with PRP's work, practical stakeholder needs, and local activities proved more complex than anticipated. While the shortage of labour and trainees in various sectors is seen as a major challenge for the region, there was also a desire to use the Living Lab for the district's goal of creating an 'attractive region for young people'. Data analyses on these challenges revealed various data gaps. The lack of centralized data repositories and difficulties in sharing and integrating data pose challenges for evidence-based decision-making in regional development. Additionally, there is a notable demand for qualitative data, emphasizing the need for improved data availability and accessibility.

Living Lab challenge

The Living Lab Rhein-Hunsrück will focus on the challenge that there are a variety of job and training vacancies in the region that small and medium-sized enterprises (SMEs) are unable to fill. At the same time, findings from the work of the PRP and from the focus groups show that there are young people who want to live and work in the region. However, for reasons yet to explore, **young people and local SMEs 'do not come together'**. It is precisely this 'mismatching problem' that will be investigated in the Living Lab. One of the main objectives will be to find out

and better understand the requirements and wishes of SMEs on the one hand and different groups of young people on the other, with the practical aim of strengthening the links between the different target groups.

Emerging data needs

Statistical data that describes the situation with regard to job and apprenticeship markets as well as demographics and migration is available, but not in all cases in sufficient detail at the relevant spatial scale (NUTS 3 or LAU). Data directly from both enterprises and young people as (potential) job and apprenticeship seekers are needed to better understand the dynamics underlying the situation and arrive at possible courses of action. To date, there is little systematic knowledge about the specific actors in the region. Pertinent topics include recruitment and training activities as well as needs regarding employees and apprentices of SMEs, and education and job plans as well as expectations of young people.

Next steps

Next steps include identifying stakeholder and target groups to further involve as well as finding ways to reach and formats to engage them. We will also deepen our statistical data analysis and seek cooperation with stakeholders to get access to more data and expertise. A further step is the joint planning and design of the data experiment, in which otherwise unavailable data on the challenge will be collected and analysed. Furthermore, we will intensify communication and public relations work.

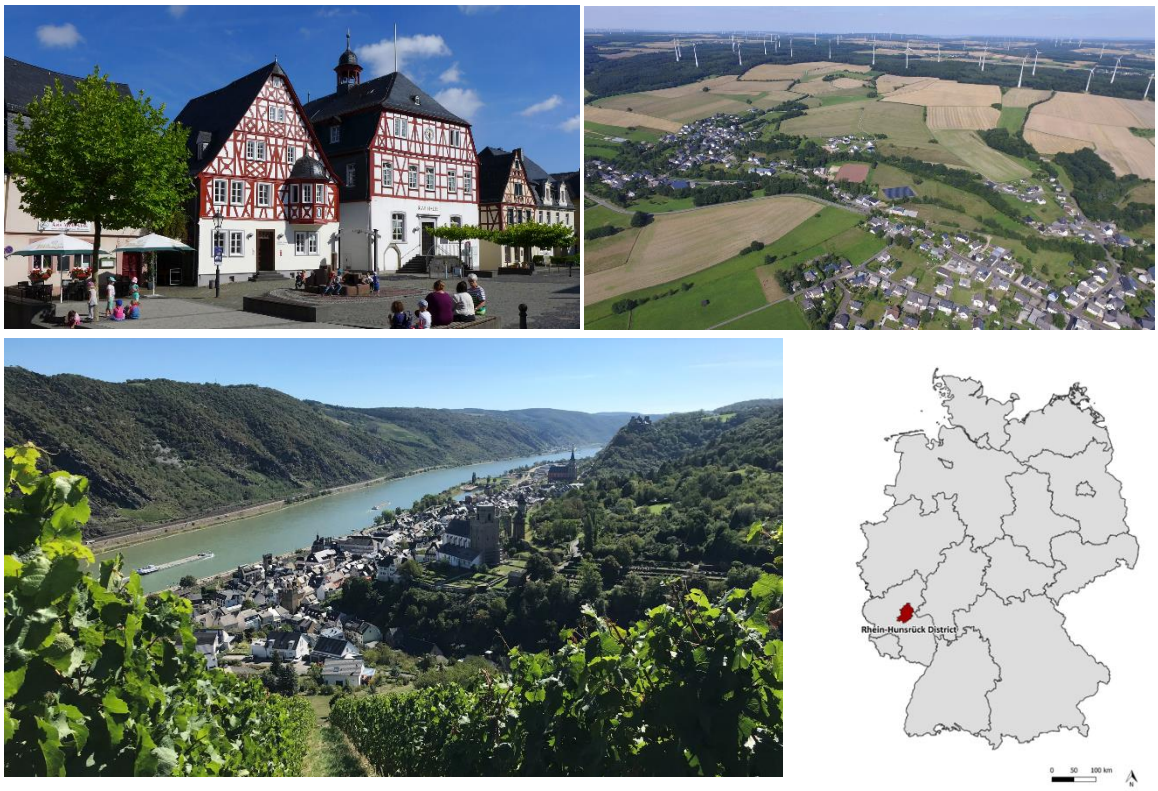

Figure 7 : Photos from the Rhein-Hunsrück region and location in Germany © Regionalrat Rhein-Hunsrück & IfLS

Part 1: Progress Review

Pilot Region introduction

Located in the federal state of Rhineland-Palatinate, the Rhein-Hunsrück district lies between Luxembourg and the metropolitan area of Frankfurt. It reaches from the Upper Middle Rhine Valley as its eastern border to the Hunsrück upland in the west. With its 105,566 inhabitants and only three towns between 5,000 and 20,000, the region is sparsely populated and rural in character. Traditionally, forestry has been an important branch of local economy, especially in the uplands. Today, the Rhein-Hunsrück district hosts mainly small and medium sized businesses. Relevant branches with regard to employment are manufacturing, processing and construction industries, handicrafts, public service and education, as well as trade and tourism. During the last decade, population development has been stable and is expected to decrease only very slightly in the next two decades. Nevertheless, the region is confronted with challenges of demographic change. For example, the region is affected by a significant ageing population. This has effects on the workforce and hence regional value creation. A shortage of skilled workers is already evident in some occupational groups and is presenting employers with rising challenges to close these gaps. The Rhein-Hunsrück district is largely located in the area of the Local Action Group (LAG) Hunsrück, which has been addressing these issues through its LEADER Local integrated rural development strategy (short: LILE) for years. In accordance with the strategy's title 'Sustainable Region', the strategy focusses on further improving the quality of life, sustainable development of the regional economy and the preservation of cultural diversity. In addition, greater attention is paid to children and young adults as well as volunteers. The other part of the region belongs to the LAG World Heritage Upper Middle Rhine Valley. Its strategy provides for sustainable development as a living space for all generations. The strategy's goal is to make the region more attractive and to protect and sustainably develop the cultural landscape. The aim is also to enhance regional identity.

The Hunsrück region hosts a unique recreational area, in which parts of the Soonwald-Nahe and Saar-Hunsrück nature parks are located. The region is also home to numerous culturally and historically significant testimonies from the time of the Celts and Romans, which attest to the common historical development of the region, and which are still seen as connecting and identity-forming. The Middle Rhine Valley is well known for an ancient cultural landscape, characterised by small towns on the riverbanks, the steep slopes with their vineyards and the numerous castles and ruins. The Rhine River itself is on the one hand Europe's most important waterway, and on the other hand a source of common regional and even German identity. Furthermore, the territory has a well-preserved cultural landscape. Numerous contiguous forests, meadows and arable land areas provide habitats for extensive wildlife populations. Extensive parts of the region are protected areas.

Conflict potentials arise from a coexistence of agriculture and nature conservation. Moreover, the region is not omitted from the effects of climate change on agriculture and forests as well as the Rhine. While environmental protection and addressing climate change are only tangentially addressed through the LILE, the Rhein-Hunsrück district has had a climate protection concept since 2011 that focuses on energy production, efficiency and saving. Today the area produces more than 300 % of its own energy needs through renewables (mostly wind and solar, but also biogas), making the region a pioneer in the energy transition.

Pilot Region Partner

The Regionalrat Wirtschaft Rhein-Hunsrück e.V. (translation: Regional Council for Economic Affairs) is the central institution for economic and regional development in the Rhein-Hunsrück district. Founded in 1995, the association acts as a contact point for companies, institutions, and municipalities with current challenges. In particular, it offers support for companies, maintains a large network and actively pursues regional development. The Regionalrat is also responsible for promoting the location and image of the Rhein-Hunsrück district. The focus is on the image and skilled workers campaign 'GELOBTES LAND' (translation: 'PROMISED LAND'), the training and career orientation campaign 'WILDWUCHS' and the promotion of rural areas with funds from the European LEADER approach.

Over 220 members from industry, trade, crafts, banks, restaurateurs, farmers, and public administration make the association an important regional partner for all relevant institutions in politics, government, economy, and society. The most important goal is to increase and publicize the attractiveness of the Rhein-Hunsrück district in economic, social, cultural, and other areas. The association is financed by public funds from the EU, the state of Rhineland-Palatinate, municipalities, and private companies. The General Assembly decides on the activities of the association, at which all members have equal voting rights. The board, as a governing body, consists of representatives from local authorities and companies in the region.

Living Lab Coordinator

The German research partner Institute for Rural Development Research (IfLS) is a research institute in the field of sustainable development of rural areas. IfLS has long-standing experience as a coordinator and partner in international research. Different projects focus on how rural areas are shaped by relevant policies, especially agricultural and food policy as well as structural, regional, and environmental policy. Furthermore, monitoring and evaluating the effectiveness of policy instruments in the second pillar of the CAP are core tasks of the IfLS. The main focus is on measures for the environment friendly development of agriculture and the promotion of rural development.

The Living Lab Coordinator team is made up of Svea Thietje (human geographer with a research focus on rural areas), who is closely supported by her colleagues Simone Sterly (Agricultural scientist and project manager of the RUSTIK project), Sarah Peter (Sociologist) and Carla Wember (Agricultural Sociologist). The RUSTIK project is coordinated by the IfLS team (WP 1 lead).

Functions and transitions

Functions

The central functions of the Rhein-Hunsrück region are summarized below (*Table 7 Overview of the main functions identified for the Pilot Region Rhein-Hunsrück*) and then explained in more detail.

Table 7 Overview of the main functions identified for the Pilot Region Rhein-Hunsrück

Production	Consumption	Ecosystem services
Favourable location between various large centres	Availability of residential properties and building land at affordable prices	Well-preserved cultural landscape (e.g., orchards, cattle pastures, field margins, groves)
Large number of innovative SMEs	High number of building permits	Many protected areas in the region
Well-developed regional road infrastructure	Middle Rhine Valley as rich cultural heritage from Celtic and Roman times (towns, vineyards, and castles)	Climate change challenges: Region grapples with ongoing climate change stressors, including heat waves, droughts, and floods
Energy exporter due to expansion of wind power plants in the northern region	Nationally recognized hiking destination and certified trails, also gaining appeal for mountain bikers	Exemplary actor in the German energy transition towards renewable energies, energy efficiency and energy saving (wind farms, local heating networks)

Production functions

In recent years, the region has been able to develop a positive economic dynamic, which has led to a comparatively strong supply of jobs. In terms of economic indicators such as GVA, GDP and disposable income of local households, the Rhein-Hunsrück district has seen a stable development over the last two decades. At present, the region exceeds state averages with regards to GDP and disposable income. The GVA is mainly generated in the services sector. Unemployment is below the state average (Statistisches Landesamt Rheinland-Pfalz, StaLa RLP 2023). The business landscape is heavily influenced by small and medium sized enterprises (SMEs), especially small companies, which made up 96.8 % of all registered businesses in 2020 (StaLa RLP 2021a). Another special feature is the wind power plants (see also ecosystem services), which are particularly visible in the northern part of the region, and which have not only made the region an energy exporter for the past 10 years but have also opened up financial scope for action (LAG Hunsrück 2022). Agricultural and forestry functions are also of great importance, as forest and farmland account for a very high proportion of the region's area. Notably, a high share of forest area (>80 %) is in the hands of municipalities (Landesforsten RLP 2021). Among agricultural activities, arable farming dominates the region (especially wheat, winter barley, spring barley, rape), even more so than compared to Rhineland-Palatinate. However, small farms are in decline (StaLA RLP 2021b).

Consumption functions

The housing market in the Rhein-Hunsrück district is dynamic. Residential properties and building land are still available at rather favourable prices. There has been a high number of building permits in recent years compared to other German districts and cities. Furthermore, the number of vacant properties in most of the villages and towns in the region has decreased significantly (LILE LAG-Hunsrück 2022). The Rhein-Hunsrück district is part of the UNESCO World Heritage Middle Rhine Valley and therefore known for its diverse nature and landscape. The region is rich in culturally and historically significant artefacts from Celtic and Roman times. The Middle Rhine

Valley is known for its ancient cultural landscape. The Hunsrück region, centrally positioned in Rhineland-Palatinate, enjoys easy accessibility from major cities as well as proximity to tourist destinations. With attractions like the Geierlay suspension bridge and certified hiking trails, it has gained national recognition as a hiking destination, while also emerging as an appealing region for mountain bikers. Despite a decline in accommodation figures in recent years, the region once again attracted more visitors with overnight stays in 2021 (StaLa RLP 2023).

Ecosystem services

The region is characterised by a temperate Western European climate, providing favourable summer conditions despite being warmer than other German regions, yet it is characterised by significant heterogeneity in precipitation and temperature due to topological features like valleys and ridges. The region also faces the challenge of climate change such as heat waves, droughts, and floods. With regards to flood handling, the municipalities have increasingly pursued protective measures during the last years (LAG Hunsrück 2022). Both protected areas and cultural landscapes make up the region's diverse and extensive ecological capital. Parts of the Soonwald-Nahe and Saar-Hunsrück nature parks lie in the area, as well as several 'Natura 2000 protected areas'. Starting in 2011, the Rhein-Hunsrück district has heavily focused on renewable energy production, including the promotion of wind farms on municipality-owned land. Today, these efforts led to the district producing more than 300 % of its own energy needs through renewables and exporting the rest (BUND 2020). Local heating networks based on renewable energies have been emerging in many villages for several years. The region is also currently developing concepts to use excess, renewable electricity to produce hydrogen and to build the corresponding infrastructure.

Transitions

Socio-economic and demographic transition

Even though it is in a good economic position the region faces a shortage of skilled workers across various industries, with the additional challenge of unfilled training and apprenticeship positions. Risks in essential services, particularly in medical and nursing care, pose concerns. The proportion of highly qualified jobs in the region is below the national average. The demographic shift anticipates a significant aging population and outmigration of young individuals, posing a challenge to attract or bring back people to the region, especially for training purposes. Moreover, voluntary engagement, a crucial pillar for securing essential services, is declining, and becoming increasingly strained.

Climate and environmental transition

The region is already feeling the pronounced effects of climate change, including low precipitation levels, particularly in the eastern Hunsrück, leading to dry summers and water shortages. The forest, heavily stressed by environmental pollution and climate change, is experiencing tree die-offs, especially among firs, pines, birches, and beeches, along with infestations of bark beetles. There are declining groundwater levels in parts of the district, coupled with an increase in flood events. Conflicts arise between environmental conservation and various land use practices such as agriculture and energy. Additionally, different wildlife and plant populations have experienced decreasing numbers in recent decades.

Digital transition

The region (like many other rural areas in Rhineland-Palatine) is falling behind in terms of digital infrastructure, particularly in the areas of broadband and mobile networks. Broadband is only

available in 10-50% of households and businesses in the region. More than half do not have access to high-speed internet (Federal Network Agency 2023). Additionally, many individuals in the region still lack digital competencies and solutions, indicating a gap in the adoption and popularity of digital technologies.

Chosen transition

During the preliminary work and preliminary discussions, it was determined that the RUSTIK project is best suited to study socio-economic transition processes in the Rhein-Hunsrück area. The reason for this is that the PRP works in the field of economic development and therefore works closely with a large network of companies and other stakeholders. The PRP is familiar with the key regional challenges in this area and has an influence on potential interventions. Discussions in the focus group also revealed, that a large number of other players are already active in the ecological field and solutions are already in development, meaning that further activities are not seen, as necessary.

Living Lab Cycle 1: Planning Possibilities

Setting up the Living Lab

As the Living Lab Coordinator (LLC) and the Pilot Region Partner (PRP) have only worked together on a few projects so far, an important step in setting up the Living Lab (LL) was building a good partnership between them. In a joint kick-off meeting in January 2023, responsibilities, expectations and wishes for the project were discussed and further cooperation was clarified. The Living Lab Coordinator is responsible for ensuring embedding in the overall project, for example, through contributions to the other Work Packages (WPs). The prepared reports were communicated to and supplemented by the PRP. The task of communicating with the regional stakeholders and inviting them to the LL events was taken on by the PRP, which has a very good regional network and knows who the key stakeholders are. It was also decided to organise a monthly Jour Fixe (online via Teams) for mutual updates to ensure efficient collaboration.

In addition to administrative issues, other important initial steps involved identifying the transition area to be addressed in the forthcoming process and the identification of key stakeholders for LL-activities. An inventory and data analysis as well as the exchange of experience with the PRP and other regional stakeholders were important steps in this regard. During the preliminary work and preliminary discussions, it was determined that the RUSTIK project is best suited to study socio-economic / demographic transition processes in the Rhein-Hunsrück district. This was also agreed at the PRPs' board meeting. In addition, the PRP wished to combine the work in the Living Lab with the rather new objective of focusing more strongly on young people in the region which was defined as a central task in the new LEADER strategy 2023-2027 of the LAG Hunsrück.

Collaborative methods

To identify the transition challenge, focus group meetings with key stakeholders were organized. While the first meeting was about discussing challenges in the socio-economic transition and how new data and information can help us understand these challenges, the second meeting was focused on refining the research questions. In order to make the focus groups participatory, they were conducted as collaborative workshops and appropriate methods were used. In addition, the LLC and the PRP always worked collaboratively on reports and tasks. Formats such as online meetings and document sharing (joint work on documents via Teams) were used for this purpose.

Presentations, for example, at LL-meetings in Barcelona and Parma, were prepared and given jointly.

Participants and stakeholders

The PRP and LLC currently form the core of the Living Lab. However, a total of almost 30 people were involved in the focus groups. These included stakeholders from (local) politics and administration, representatives of the district and the LAGs as well as stakeholders from the fields of business, economic development, education and training, tourism/culture, and integration. Furthermore, youth representatives were specifically invited to the focus groups in order to include the needs of young people in the discussions (see Part 2). In addition, the Board of the Regionalrat Wirtschaft is informed about the project and involved in setting topics at the quarterly meetings. The same applies to the General Assembly of the association. The progress of the project was also communicated in the Pilot Region Partner network via the electronic newsletter. A presentation and discussion in the meetings of the two LAGs located in the area is also planned.

Data collection methods

In addition to the activities mentioned above, the data collection methods included detailed data analysis and literature research on our topic. For example, we have set up a regional database with relevant datasets and indicators to address our topic that will be continuously updated over the course of the project.

Figure 8 Focus group workshops in Simmern © Svea Thietje, IfLS & Hannah Wagner, RWRH

Living Lab activities in 2023

The main activities carried out in the Living Lab Rhein-Hunsrück are summarised in *Table 8 Main activities in the Living Lab Rhein-Hunsrück*.

Table 8 Main activities in the Living Lab Rhein-Hunsrück

Date	Activity	Description
January 2023	Kick-off meeting (LLC & PRP)	Discussion of responsibilities, expectations and wishes for LL
19.-22.02.2023	LL Kick-off Event (LLC & PRP)	Participation in LL kick-off event in Barcelona and presentation of our LL
Feb. - May 2023	Data analysis (LLC with help of PRP)	Desk study & statistical analysis (Task 1.2 Report)
04.05.2023	Focus Group Workshop (see stakeholder above)	1st Focus Group Meeting discussing socio-economic/demographic transition challenges
June 2023	Exchange on data availability (LLC & PRP)	Find answers to the Task 2.2 surveys 1 and 2
25.07.2023	Bilateral meeting WP3 lead (LLC)	Exchange on LL progress and transition challenge
May - October 2023	Regional data base development (LLC)	In-depth data analysis / database development
July – October 2023	Actor and Policy analysis (LLC & PRP)	Institutional Mapping and Policy panorama (Task 4.2)
16.-19.10.2023	2nd LL Event (LLC & PRP)	Participation in LL event in Parma and presentation or our transition challenge
06.11.2023	Focus Group Workshop (see stakeholder above)	Refine the transition challenge and gather first ideas for data experiment
Monthly	LLC & PRP Jour Fix	Updates and agreement on upcoming tasks
Weekly	IfLS RUSTIK Jour Fix	Updates, exchange on upcoming tasks

Reflections from Cycle 1

A major advantage in setting up the Living Lab and identifying the transition challenge was the PRP's large partner network. The PRP's role as an economic development agency and regional manager in the context of LEADER was also a great help. This ensures that the activities planned as part of the Living Lab are in line with the regions' objectives, projects, and policies. Access to the relevant stakeholders could and can thus be guaranteed. In addition, the regular exchange meetings between the PRP and the LLC have proven to be very helpful, especially when it comes to working together and coordinating on reports and tasks. As the overarching topic that we want to address in the Living Lab was identified relatively early on, it was possible to involve interested stakeholders from the outset and achieve their identification and commitment with the topic. The stakeholders involved in the focus groups are very motivated and contribute important expertise to the project.

However, we have also noticed that new cooperation structures need time to establish themselves. Especially when you work together with many different stakeholder groups (in our case, stakeholders from business/politics/administration but also young people), you need a 'common language' to communicate complicated content, particularly at events and workshops. The precise definition of a transition challenge that fits into the work of the PRP, meets the practical needs of the stakeholders involved, can be linked to local activities and fits into the framework conditions of RUSTIK turned out to be more complicated than originally thought. In future, it will therefore be necessary to make cooperation structures even more efficient (when do I involve which stakeholder groups?) and to continuously scrutinize and evaluate activities.

Cycle 1 results

The activities in Cycle 1 helped the Living Lab Rhein-Hunsrück to define a specific transition challenge that is of interest to various stakeholders in the region. We have already started the LL with the decision to focus on the socio-economic and demographic transition, because the great importance of finding solutions for the challenges mentioned in 1.2.2 was already recognised in 2022 in course of the extensive participation processes in the two LEADER regions located in the pilot region. Nevertheless, our specific question was not clear for a long time. LL stakeholders agreed that the shortage of (skilled) labour and the large number of unfilled apprenticeships and jobs is one of the key challenges in the Rhein-Hunsrück district. However, there was a great desire among the LL-participants to address the issue of creating a region worth living in for young people in the Living Lab. Questions we therefore initially addressed were:

- How can young people be motivated to stay in / return to / move to the region?
- What is really needed in the region in order to ensure quality of life and thus also make the region attractive to young people?

Both the literature research carried out on these questions and the findings of our second workshop, in which young people also took part, made it clear that job opportunities and training, apprenticeship and further education opportunities in particular play a crucial role. From this, we recognised a potential link to unfilled jobs and training places, which we took as an opportunity to define our transition challenge (see Part 2).

Cycle 1 also provided important insights with regard to data availability. The analysis of regionally available data showed that although data is available for some demographic and socio-economic indicators, there are still many data gaps (see also 2.1.2 and 2.2.1). Most of the data is only available at the district level (NUTS 3) or even only at NUTS 2 or NUTS 1 level, which makes statistical analyses of differences within the district difficult. Another big problem is the data fragmentation across different organisations, departments, and institutions. The lack of centralized data repositories or difficulties in data sharing and integration results in information gaps and hinders a holistic understanding of what happens in the district. Furthermore, there is a need for updated and detailed socio-economic data, particularly in terms of population dynamics, employment trends, and social structures. This information would support evidence-based decision-making processes related to regional development, infrastructure planning, and social welfare initiatives. In addition, interviews, discussions, and workshops held in the course of Cycle 1 have shown how high the need for qualitative data is. This also applies to the work on our transition challenge in Cycle 2.

Part 2: Challenge and next steps

Living Lab challenge

The selected transition challenge is derived from one of the main objectives of the LAG Hunsrück, namely making the region an attractive place to live and work for young people, and the long-standing challenge of unfilled jobs and apprenticeships in the region. Our findings to date show that a.) there are job and training openings in the region that small and medium-sized enterprises (SMEs) are unable to fill, and b.) there are young people who want to stay in the region. However, the experiences of the Pilot Region Partner, for example from discussions with regional SMEs, as well as discussions in the focus group suggest **that young people and local companies 'do not come together'**. The observations of employers as well as the economic development institutions are supported by the data and experiences of the locally responsible Federal Employment Agency. We would like to analyse this 'mismatching problem' in more detail with the ultimate aim of **strengthening the links** between the different target groups. One of the main objectives will be to find out and better understand the requirements and wishes of SMEs on the one hand and different groups of young people on the other (see research questions in 2.1.3). It is important to note that when talking about young people, not only high school graduates are one of our target groups. We also want to pay particular attention to marginalized groups (e.g., young immigrants, refugees, school dropouts) and how they gain access to the labour market. These marginalized groups are often overlooked and not considered in surveys and statistics. On the one hand, of course, we see this as an innovative issue (which has rarely been considered in other research projects to date), but on the other hand we also see it as an opportunity for the region to connect target groups that previously had nothing to do with each other and to **initiate new networks**.

Rationale

As working with local companies is part of the PRP's core business, it has long been recognized that there is an apparent missing interlinkage between companies and young people. This was confirmed in the discussion with local stakeholders and in the focus groups and it was identified as a challenge where the background is still largely unknown, and data is lacking. Most of the companies do not succeed in making known the training opportunities and the characteristics of the offered jobs, particularly of training in the dual system, and thus recommend themselves as attractive training companies. Since the baby boomers will gradually retire in the coming years, the need for young skilled workers will continue to increase. We are not aware of the concrete needs, challenges, and opportunities of regional companies when it comes to filling jobs and training positions, nor do we know the job requirements of the different groups of young people in the region. As economic development is part of the PRP's work and the topic of creating an attractive living and working environment for young people is becoming increasingly important, especially in the context of LEADER, the above-mentioned challenge represents a link between two of the most pressing topics the Pilot Region Partner is currently working on. More well-founded information and data on this topic could bring great added value for different regional stakeholders (e.g. SMEs, high school graduates, trainees, vocational schools, other players in training and further education or marginalized groups) and could serve as an impetus for the establishment of new network structures in the region and project ideas for better matching between training companies and trainees.

Knowledge to date

From day-to-day work with SMEs in the region, the PRP Regionalrat Wirtschaft has been aware of **difficulties in finding personnel**. This is confirmed by statistical data from the employment agency. Although this data does not capture the entire picture (for the limitations, see 2.2.1), it permits some further insights. The data suggests that open positions are mainly for skilled workers. There are however also open positions for unqualified persons and those with higher qualifications. In December 2022, 921 openings for skilled workers were known to the employment agency, 322 for unqualified workers and 264 requiring higher qualifications (BA 2023a). A deeper look into the numbers of open positions shows a very heterogenous situation, depending on industry. The need to fill these positions in the future is crucial to the continued prosperity of the region and points to people who could be employed in the future: First of all, younger people, but also other groups that may be underemployed, such as women, immigrants, refugees, people with handicaps. Regarding the employment situation of women, we know the pilot region has the second highest part-time employment rate of the districts in the federal state; 56 % of women here work part-time, compared to 49 % on the national average (Statistische Ämter des Bundes und der Länder, StaBuL 2023). The situation with **apprenticeships** is already similar to the job market, in that **a high proportion of positions remain vacant**. 745 open apprenticeship positions were listed with the employment agency in the last statistical year (October 2022 - September 2023) in Rhein-Hunsrück district. This mainly concerns apprenticeships in the areas of sales, trade, administration, metalworking, and mechanical engineering. On the other hand, 413 persons were registered as seeking apprenticeships in that time (BA 2023a). While especially the number of applicants is probably higher in reality (see 2.2.1), this ratio near 2:1 shows an imbalance that can be substantiated by comparison with the nation-wide numbers for the same time, which are subject to similar systematic distortions: 545,040 open positions and 422,060 applicants (BA 2023a), a far less skewed ratio.

One fundamental condition for filling apprenticeship and job vacancies with younger people is their presence in the region. While external **migration balance** of the pilot region in 2020 was net positive, there was severe net emigration in the age group 18 - 24. The likely reason is seeking tertiary education, as no universities are located in the pilot region, although commuting to several universities in neighbouring regions is possible, depending on exact location and means of transport. In higher age groups, clear gender differences in migration add up to far higher immigration of women than of men (see Figure 9 Migration balance of RHK in 2020, by gender and age groups. Own figure based on data from StaBuL (2023).). There is no exodus of young women like in eastern federal states of Germany and rural regions elsewhere (although it is possible that young women and men have different motivations for moving away). Most immigration is in the age group 30 - 49, indicating that people already move to the region to work and start families. Questions remain, i.e., on the reasons of young people leaving – who specifically are they, why are they leaving, (under what conditions) are they planning to return? Which young people stay? We know very little about how these young people relate to the vacant positions. A first question would be whether the positions are of no interest to them due to the nature of the work or because they want to leave the region for other reasons.

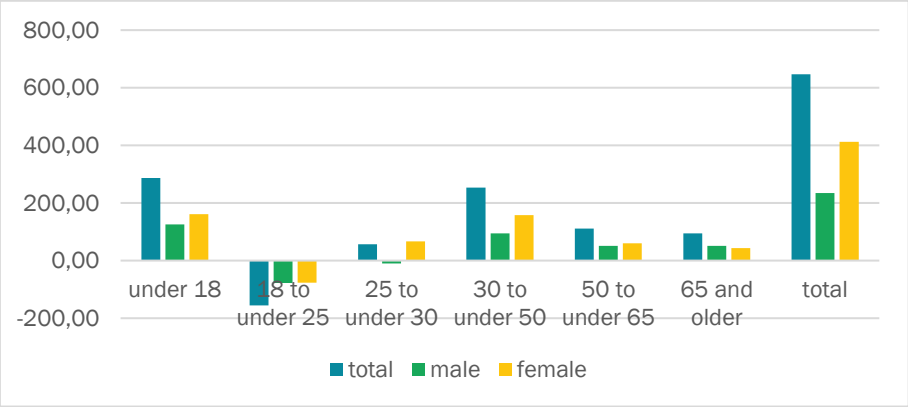

Figure 9 Migration balance of RHK in 2020, by gender and age groups. Own figure based on data from StaBuL (2023).

Research question/s

Based on the challenge described above we have developed the following research questions. These are to be regarded as preliminary research questions and can be slightly adapted in the course of the upcoming work (see 2.3).

- What challenges do the SMEs in the Rhein-Hunsrück district face when filling training and job vacancies? What are their requirements and offers to potential applicants and how are the target groups addressed?
- What requirements do young people in the region have for their training, further education and for an apprenticeship and/or employment? What factors outside the influence of SMEs impact young people's decisions about certain training occupations or employers?
- How can the introduction of new data help to better match training/education/labour supply and demand in the region (through new or improved networks / projects / policies)?

Policy relevance

On the federal state level, there are two strategies of special importance to our transition challenge. One is the third Rhineland-Palatinate strategy for skilled workers for the period 2022 to 2026 (Staatskanzlei Rheinland-Pfalz 2022). It was co-developed by political and administrative actors, chambers of commerce industry associations and trade unions and covers seven goals and 63 action points how the shortage of skilled workers in Rhineland-Palatinate can be addressed. Attention is paid to the important fact that the continuing transformations of the economy will continue to require constant adaptation as demands on the labour market evolve. Demographic change is addressed by the Demography Strategy for Rhineland-Palatinate (MASTD 2023). The strategy in its current form is a collection of programmes and initiatives aimed at different issues addressing demographic change and adaptation to it. Topics in focus in the strategy that strongly relate to the challenge are skilled workers, attractive regions and health and care. This also demonstrates that the need to think about these interconnected issues holistically is gaining acceptance in the state government.

The LAG Hunsrück, that encompasses a majority of the pilot region, has been addressing i.e., the attractiveness of the region for younger people in their LEADER Local integrated rural development strategy (LAG Hunsrück 2022). The PRP Regionalrat Wirtschaft is also the regional manager of the LAG. The Regional Wirtschaft also leads the image and skilled workers campaign

'GELOBTES LAND' and the training and career orientation campaigns 'WILDWUCHS'. Thus, knowledge transfer to and from the Living Lab is simple and synergies are already developing.

The PRP is in close contact with the district administration of the Rhein-Hunsrück district and is currently involved in the making of a new district development concept, into which the findings of the Living Lab will be incorporated.

In the course of the Living Lab work, we will explore possibilities of cooperation with actors including the employment agency, chamber of commerce, crafts associations, (vocational) schools, and integrative organisations working with refugees or the handicapped. Ideally, all involved stakeholders will learn something and establish new cooperations that will outlast the Living Lab activities and will be able to better target their policies and measures to improve attractiveness for young people and others and help SMEs fill job and apprenticeship vacancies.

Emerging data needs

Data availability

The availability of data and the level at which it is available is summarized in *Table 9 Available statistical data on the LL challenge*. The opportunities and challenges with regard to emerging data needs addressing our transition challenge are presented below.

Table 9 Available statistical data on the LL challenge

Description	Highest spatial resolution	Temporal resolution and latest data	Source, notes
Data on apprenticeships, both applicants and registered open positions	NUTS 3	Monthly, full year published each October	BA 2023a
Job openings registered with the employment agency, by field and qualification	NUTS 3	Monthly, published the following month	BA 2023b
Job openings registered with the employment agency, by field and qualification	NUTS 2	yearly, 2022	BA 2023c; not available for download as a single file
Unemployed, by profession, age groups	NUTS 2	yearly, 2022	BA 2023c; not available for download as a single file
Unemployed, by age groups, nationality, gender	NUTS 3	Monthly, published the following month	BA 2023d
Analysis of labour shortages ('Fachkräftengpassanalyse')	NUTS 1	Yearly, 2022	BA 2023e
Comparison of employed and unemployed persons by qualifications and characteristics such as gender or age	NUTS 1	Yearly, 2022	BA 2023f

Description	Highest spatial resolution	Temporal resolution and latest data	Source, notes
Female labour force participation rate	LAU	Yearly, 2021	Bertelsmann Stiftung 2021
Part-time rates by gender	LAU	Yearly, 2022	Can be calculated from available data from StaBuL (2023)
Secondary school graduates by degrees	LAU	Yearly, 2021	Bertelsmann Stiftung 2021
Various demographic data	NUTS 3 - LAU	Yearly, 2021	Bertelsmann Stiftung 2021, STaBuL 2023
Migration (balance) by age groups, gender, nationality, handicaps	NUTS 3	Yearly, 2021	Balance can be calculated from available data from StaBuL (2023)
SOEP and ALLBUS – Survey data on e.g., migration, careers, aspirations and values, labour market integration of refugees etc.	NUTS 1 (higher resolutions with restrictions, not useful at NUTS 3)	Yearly or less, depending on topic	gesis 2021, DIW 2023

Possibilities and Limitations

Data on people seeking jobs and apprenticeships as well as on open positions are crucial. Such data are available from the employment agencies. There are however some limitations. Data on **apprenticeships,** both applicants and registered open positions, is available at NUTS 3 level. Data on **job seekers by profession** (BA 2023c) are largely only available at NUTS 2 level – probably due to anonymity concerns, as district and profession can sometimes be enough to identify individuals. Data on **open positions** are available at NUTS 3 level (BA 2023b), in a monthly temporal resolution, requiring aggregation for easier reading and smoothing out seasonal effects. At NUTS 2 level, yearly aggregations are available (BA 2023c), but these cannot be downloaded in a single file. With the existing data, linking information on open positions and job seekers is therefore possible, but only for the administrative region (NUTS 2) rather the district (NUTS 3, i.e., the pilot region). The statistical division of the employment agency objects to contrasting these numbers at a spatial scale as low as NUTS 3, as random variations have large effect at smaller scales and cross-regional flows affect these phenomena (BA 2023b); in practical terms: employees commute beyond the district. On the other hand, including the neighbouring regions would dilute the picture for the pilot region. The employment agencies also conduct and publish analyses of labour market shortages (BA 2023e). These are, however, only available for each federal state as the highest spatial resolution. Methodologically these analyses might constitute good examples.

While the employment agencies can be expected to have fairly accurate knowledge of unemployment, as job seekers must register to get benefits, not all open job listings come to their attention – businesses that expect to fill them themselves will not necessarily register with the agencies. The same holds true for open apprenticeship positions. Especially regarding

apprenticeship seekers, the agencies have only limited knowledge of the numbers – there is little incentive to register with the agency unless one has difficulty finding an apprenticeship.

The availability of **demographic data** is fairly good. We can tell who lives in the region in terms of age groups, gender, nationality, and people with handicaps, as well as migration of these groups into and out of the region (StaBuL 2023, Bertelsmann Stiftung 2021). These data are useful to describe and understand who lives, who leaves and moves into the region, which points to needs and potentials. The statistical agencies do not provide further information from the registration offices which would permit linking data on migration into and out of the region with further information on the individuals, such as profession, education, or exact previous places of residency (which would be necessary to find out, e.g., how many individuals who leave the region for tertiary education return later).

In principle, **survey data** could allow for insights, e.g., into needs and motivations of young people in the region. The large ALLBUS and SOEP panels (see Table 9 Available statistical data on the LL challenge) contain data on, i.e., migration, careers, aspirations and values, labour market integration of refugees, down to NUTS 3 and LAU resolution. They are, however, rarely representative at these levels. Due to anonymity concerns, access to these localised survey data may only be obtained upon submission of documentation including a data protection concept; with the most sensitive data, the study data providers only allow researchers to work under strict conditions in their facilities (gesis 2021, DIW 2023).

Due to all the previously mentioned restrictions, data directly from both enterprises and young people (potential) job and apprenticeship seekers are needed to answer the questions outlined in 2.1.3. Qualitative data is particularly important here. Qualitative studies on the above-mentioned challenges have not yet been conducted. This is why qualitative data collection methods will form an important part of the planned data experiment.

Capacities

As a research institute in the socio-economic field, qualitative research methods are part of the daily work of the IfLS. In particular, this includes conducting, analysing and evaluating qualitative expert interviews. IfLS also designs, conducts and analyses (smaller) quantitative surveys. For larger quantitative surveys and data analyses, we could benefit from the expertise of a data company.

2.3. Next steps

As already outlined in the description of our challenge, the involvement of different target groups and stakeholders at various points is central to answering our research questions. Although different actors have already been identified through the stakeholder analysis in the course of WP4 activities and some stakeholders have already been involved through the focus group, the next step is to identify which stakeholder groups we involve through which formats. It will also be important for our future work to identify how we can reach certain target groups (especially marginalized groups). For this reason, but also to develop and coordinate the materials for the data experiment (e. g. questionnaires), expert interviews with key stakeholders from the education and training sector are planned for January/February 2024.

We will also deepen our statistical data analysis and ask key labour market players such as chambers of industry and commerce, training centres or chambers of crafts about the availability

and possibility of using existing (but not publicly available) labour market data (see mentioned limitations in 2.2.1). Also, the cooperation with employment agencies could provide for better access to labour and apprenticeship data and expertise in their processing.

Another important step is the planning and design of the upcoming data experiment in spring 2024. A joint working meeting between the Living Lab Coordinator and the Pilot Region Partner is planned for this. It has not yet been decided whether we will invite other key stakeholder to this meeting or plan a separate meeting with them at which we can present and discuss our ideas together. Initial ideas for data collection in the course of the data experiment include:

- an online survey with SMEs on recruitment and training activities as well as needs regarding employees and apprentices,
- a survey with students at schools of general education and vocational schools on education and job plans as well as expectations of young people and the motivations for staying in the region (is work and education an important factor in the first place?),
- additional qualitative interviews with key stakeholders.

Short surveys, e.g., with SMEs on 'hard factors' such as the number of training places and unfilled vacancies, can be placed before the data experiment, especially if no new data results from the above-mentioned collaborations. As the Pilot Region Partner maintains good and close contact with regional SMEs, it is possible to contact them at short notice.

In addition to these activities, there are also plans to intensify committee involvement, communication, and public relations work. For example, the planned activities in the Living Lab are to be presented at the upcoming board meeting of the Regional Council. A presentation and discussion at the meetings of the two LAGs is also planned.

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Italy: Garfagnana

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Summary and overview

The Pilot Region represents the entire territory of LAG Montagnappennino, which runs the LEADER programme in the area. The region is located in the northern part of Tuscany and corresponds to the territory of Garfagnana, Media Valle del Serchio, Alta Versilia and Appennino Pistoiese, part of the provinces of Lucca and Pistoia in the north-western part of Tuscany, for a total territory of 2110 km2 (1872 mountainous) and including 27 municipalities.

The total population in the pilot region in 2020 was 88,343, while in 2001 it was 96,556. The demographic data confirms the steady trend of **population decrease**. From 2011 to 2020 there was an overall decrease in the area's total population of -7.58%, data as of 2019 on population structure show that in the area, the population over the age of 65 accounts for 29% of the total. As far as civil society is concerned, the Pilot Region has always been a place of intense and innovative **community initiatives**.

Figure 10 Image of the village of Pruno (photo property of Montagnappennino Archive)

The territory of LAG MontagnAppennino is almost **entirely covered by forest** (88%, 2020 data), the majority of which are mature forests (86%), and the analysis of data indicate that forest area is continuing to grow over the past years (+15% between 2013 and 2020). Woodland in the LAG area has multiple functions beyond forestry, such as touristic-recreational function, energetic function (production of firewood), productive function (wood used for processing), food production function (chestnut groves), social function (civic use), landscape and soil protection function.

Living Lab achievements

Both CREA and LAG Montagnappennino teams, together with a network of local stakeholders, are applying the Living Lab approach to the territory of the pilot region. The overall objective was to identify a specific challenge to explore the key transitions in the region. The transitions have been explored through two thematic meetings focusing the attention on two main transitions: ***demographic transition and community approach*** to involve local population and ***forest resources management*** as testing ground useful to promote new sustainable production and meet climate and environmental challenges. Key actors and local networks have been identified, as well as transition challenges and opportunities pinpointed. The team has managed to actively engage the local community in the works of the Living Lab. In 2023, 2 focus group meetings were organised online, and several animation activities were carried out during the summer.

Key learning to date

Cycle 1 allowed us to develop a comprehensive overview of the transitions and challenges facing the area and the economic and political context in which the LAG operates. It has highlighted the vital role played by local communities in maintaining/preserving biodiversity and conserving the landscape while using the forest for their livelihood and sustenance. The participants to the focus group evidenced that it is highly important to consider not only the ecological/environmental dynamics, but also the economic, historical, and cultural functions for local population, and that the forest management does not imply only its utilisation but also the maintenance of the territory.

Living Lab challenge

Cycle 1 of the Living Lab allowed us to identify the socio-economic transition and climate change transition as the most relevant for our Pilot Region. All focus group participants agreed that the transition challenges in the area are interlinked. **Forests** plays a relevant role mainly in two of the three transitions, the climatic/environmental and socio-economic ones, and indirectly affects also demographic transition. We chose two transitions linked to opportunities about social capital and forestry. Civic uses could be a great opportunity to develop multifunctional forest use models and ensure a close link with the other goal of socio-economic transition through local community regeneration projects.

Emerging data needs

There is inadequate knowledge about the forest stock in terms of both forest type and ownership structure. There is a wide spread of collectively owned forests (civic uses) but even on this there is little knowledge about management plans.

There is hence a need to acquire in-depth information on the qualitative-quantitative characteristics of forest resources, their ability to provide different mixes of ecosystem services (regulation, production, cultural) in different territorial contexts in order to then proceed with planned participatory planning.

Considering that the territory of the pilot area is 88 percent covered by forests, any strategy for transition can only start from a thorough understanding of one of the main components of the land heritage.

The socioeconomic transition is based, fundamentally, on the need to develop **community regeneration projects**. In this sense, the socioeconomic data must be aimed at identifying the quality of social and relational capital present within the territory. Very important, from this point of view, is the monitoring of data on immigration in general and new residents in particular (to figure out how to find it because there are no official statistics on this) and, especially on policies (incentive, tax, etc.) oriented to attract new residents. It would also be very important to set up a data collection involving the so-called third sector, these types of actors on the ground are very active so it would be necessary to set up a data collection on their projects and the results they have and their socioeconomic impacts.

Next steps

Our next step will be to identify the key groups that should be involved in the experiment (based on desk mapping of relevant groups and organisations done by the Pilot Region Partner) and begin planning interviews and workshops with individuals from these groups. During Cycle 2, the Living Lab will initiate an information gathering experiment using a quantitative and a qualitative approach, using existing reports for community regeneration projects and interviews with local stakeholders, respectively.

Part 1: Progress Review

Pilot Region introduction

The local action group (LAG) Montagnappennino is based in the territory of Garfagnana, Media Valle del Serchio, Alta Versilia and Appennino Pistoiese. Four geographical areas are part of the provinces of Lucca and Pistoia in north-western Tuscany, for a total territory of 2110 km2 (1872 mountainous) and including 27 municipalities.

Morphologically, the Garfagnana and Media Valle del Serchio areas (central part of the territory) are structured around the Serchio river system and the mountain systems that flow into it, namely the Apuan and Apennine systems, which are characterized, in turn, by deep transverse valleys. The Alta Versilia area is composed by 2 municipalities in the Apuan Alps (western part) and the Montagna Pistoiese area by 4 municipalities in the Appennine (eastern part). The area offers a wide variety of landscapes, starting with an impervious and unspoiled mountainous belt, rocky in the Apuan Alps, meadowy and a gentler slope in the Apennines, which transforms at the lower altitudes into a hillside rich in meadows and cultivated fields of particular scenic beauty. The course of the Serchio River with a wide pebbly shore everywhere marks the centre of the valley's slope.

Figure 11 Map of the area

The highest peak in Tuscany, Mount Prado (2054 m), lies on the border between Garfagnana and Emilia-Romagna, while the highest peak of the Apuan Alps, Mount Pisanino (1947 m), is located entirely in upper Garfagnana.

The area called Montagna pistoiese is located north and northwest of Pistoia, on the southern ridge of the Tuscan-Emilian Apennines and extends from Alpe delle Tre Potenze (1940 m), which dominates the Val di Luce and part of the Abetone ski area, to the eastern slopes of Mount La Croce (1318 m), near the Acquerino Forest. Bordered to the northwest by the province of Modena and to the north by that of Bologna, it has some differences between the markedly alpine western part and the morphologically gentler eastern part, typically Apennine and characterized by elevations of no more than 1300 mt., separated by the Reno valley.

Major challenges for the pilot region are population decline, a population density of half the regional average, and a high age and dependency ratio of 57% of the population. The total population in the area in 2020 was 88,343, while in 2001 it was 96,556. The demographic data confirms the steady trend of population decrease. From 2011 to 2020, there was an overall decrease in the area's total population of -7.58%, with a difference between the Lucchese area.

Data as of 2019 on population structure show that in the area, the population over the age of 65 accounts for 29 per cent of the total, up more than one percentage point from 2014, where it stood at 27.81 per cent. This value marks a consistent deterioration from the figure eight years earlier, in 2001, where the percentage was 24.8 per cent. In 2019, the population over the age of 85 represented 5 per cent of the total in the province of Lucca and 6.74 per cent in the province of Pistoia, still up from the 2014 data where some municipalities already had even higher percentages.

Pilot Region Partner

The LAG Montagnappennino is an entity (formally a consortium company) composed in its turn of other partner entities, both public and private, such as municipalities, trade unions, businesses, forestry associations, foundations, and civil society associations. LAG Montagnappennino consists of the assembly of members (which includes all the entities, both institutional and private, that participate in the LAG), the board of directors (which is vested with all the broadest powers of ordinary and extraordinary administration and disposition, with the exception of those reserved by law to other corporate bodies) and a board of auditors (or auditing auditor).

The role of LAG Montagnappennino in the area is to plan, foster and encourage development in rural areas through the use of European Structural Funds such as the EAFRD (European Agricultural Fund for Rural Development). The local development strategy is a policy to be approved by the LAG's Members' Assembly by which the objectives for the sustainability of the area are identified, as well as the individual actions to be carried out by the various public and private actors in order to achieve the set objectives. The aim is to achieve an increasing level of quality of life and greater sustainability of economic and social development processes. To do all this, the LAG uses funds under the community initiative program called LEADER.

Living Lab Coordinator.

CREA Policy and Bioeconomy is a public research institute working in the field of rural and regional development and policy evaluation, notably the Common Agricultural Policy and Regional Policy. CREA has also developed a huge experience in supporting local development projects and animating rural partnerships, deriving from twenty-three years of activities in coordinating the national LEADER network and, more recently, Inner Areas Strategy.

Francesco Mantino is senior economist at CREA, with research interests in local development processes and policy evaluation at territorial level, and with experiences in animating the design and implementation of strategies of local development and participative approaches. Barbara Forcina is researcher at CREA, with research interests in participative approaches and analysis of supply chains in agri-food sector.

Functions and transitions

Functions

Production functions

Among the various sectors of activity, around 12% of local business units are in agriculture, 30% in industry and 58% in other activities. Within these, the trade sector weighs almost half and in the total number of local units, it accounts for 26%. Agriculture has a higher percentage incidence in the province of Pistoia (16% of local units) than in the province of Lucca (11% of local units).

Regarding small and medium businesses sector the data confirm the continuation of the long wave of the economic crisis that began in 2008 and has manifested itself with alternating phases until today.

A significant part of the Pilot Area is covered by forest; therefore, local economy is mainly rooted in this natural heritage. Forest and chestnut grove management is relevant in the area for the economy of the region and the production of chestnut flour has a particular relevance.

Consumption functions

From the point of view of the consumption function, the area is characterized more by a tourism function, on which stakeholders focus a lot, especially recreational activities related to tourism and related to the cultural heritage of the area. Relevant element is residential, which strongly characterizes the lower valleys, while an interesting element that is emerging is the SGI of forest areas, or provision of services of general interest: healthcare (forest therapy), educational and social activities.

Ecosystem services

Concerning biodiversity and landscape, the Pilot Region has been represented as a model of sustainable production in a rural/mountain environment and it has been underlined that please also pay attention to the numbering. Forest and chestnut grove management is relevant also for protection of soil and natural resources.

Figure 12 Image of a typical chestnut grove in the area (photo property of Montagnappennino Archive)

Woodland in the LAG area has multiple functions beyond forestry, such as touristic-recreational function, energetic function (production of firewood), productive function (wood used for

processing), food production function (chestnut groves), social function (civic use), landscape and soil protection function. This breakdown is functional to understand the multi-faceted nature of the forest, and mainly to pinpoint how all these services are interlinked and with which rules and structures they are managed.

Transitions

Socio-economic and demographic transition

Social challenge: community regeneration through specific initiatives

The main problem common to all inland and mountainous areas, and found also in all LAG areas, is depopulation.

Major critical issues:

- uneven territorial distribution of commercial services especially to the detriment of historic centres and villages,
- poor generational renewal in entrepreneurial realities due to demographic fragility,
- reduced attractiveness of the territorial context to new investments,
- degradation of historic centres, villages, and the landscape context,
- distance from services for residents in noncapital centres,
- reduced level of entrepreneurship in the social sector, strong criticality in the transfer of good practices to support young entrepreneurs and innovation in companies.

The strengths remain in the structural elements of the area i.e. history-environment-culture-traditions-agri-livestock and gastronomic specialties. Strengths are a link between artisanal productions, agri-food, and local knowledge, historical-architectural, landscape, naturalistic context of good quality to support the quality of residency and tourist attractiveness; availability of real estate assets in historic centres for residential use and tourist accommodation activities; widespread presence of an associative and voluntary vocation; presence of socio-cultural experiences as potential elements of contamination and inclusion.

In the pilot region, the MontagnAppennino LAG has functioned as an element of social cohesion. In the summer of 2022, the LAG issued an innovative call for proposals, for the implementation of ***community re-generation projects***, jointly designed and implemented by local partnerships. These projects are a tool to conceive new ideas of development, shared paths, participatory planning for the enhancement of common goods and to create goods and services considered fundamental for improving the quality of life in rural territories.

The initiatives Activate civil society (private farms, farmers organisations and trade associations, civic associations, entrepreneurs) to mix different policies such as regional health policies and rural development policies to promote bottom-up strategies and co-design community projects. In this framework of demographic and social change, the LAG translated all these local needs into a call for tender promoting community regeneration projects with the purpose of trying to overcome sectoral interventions that have proved to be scarcely effective. It is a new experiment at local level, it promotes bottom-up strategies and aggregates community around some concrete initiatives aimed at facilitating access to services or setting up small economic activities. The key approach to shrinking population is linked to the creation of social capital (or the increase of existing social relations) necessary to keep vital the local communities remaining in the area.

Climate and environmental transition

Climate challenge: valorisation of the multifunctional role of forests

In the territory of the LAG area, there are two park areas (the National Park of the Tuscan-Emilian Apennines and the Regional Park of the Apuan Alps) with a total area of 1,946 hectares and 13,758 hectares respectively. In addition, there are 8 State Reserves (4 in the territory of the province of Lucca and 4 in the territory of the province of Pistoia) with a total area of 2,227 hectares. A recent element that further characterizes the environmental-landscape context is the recognition as a UNESCO MaB Reserve of the territories of the National Park of the Tuscan-Emilian Apennines. This represents a remarkable opportunity in that the territory will be able to enter the process of developing the branding of Biosphere Reserves applied to high-quality food products and their use in gastronomy.

The strengths are good structuring of the local nature network (parks, protected areas, hiking trails...), high and widespread agricultural biodiversity (ancient varieties) that can allow their recovery and valorisation for the creation of "niche" markets with high added value, high know-how for the conservation of germplasm of ancient breeds and varieties (Regional Germplasm Bank Nursery La Piana). Weaknesses are the sharp contraction of Agricultural Land Area due to widespread abandonment and denaturalization phenomena, a reduction in the number of people employed in agriculture.

The potential represented by plant and animal biodiversity, a consolidated culture and action of local, national, and transnational experiences, recovery and conservation of animal and plant species, their introduction in the open field, and the quality of primary and processed products related to them, can be a starting point from which to overcome the shortage of agricultural land and the difficulties inherent in the geomorphological structure of our territory.

Nowadays it is even more vital to promote the **sustainable use of forest** for productive purposes and as food source by local communities, not only to support local livelihood but also to defend the area from the alarming visible and uncontrolled spread of the forest due to abandonment.

Concerning forests sustainability, the first issue raised by the private and public forest bodies participating to the focus group relates to a basic anthropological issue: the need to take a wide-ranging approach to forestry when considering the protection and the sustainability of woodland. Understanding the people who live and work in these areas and their modes of thought is a precondition, since decision makers and local populations have different perceptions of the mountain world.

There is a high demand for forest products and ecosystem services, but we need to develop a real entrepreneurial culture like local forest cooperatives (woodland cooperatives).

Living Lab Cycle 1: Planning Possibilities

Setting up the Living Lab

The preparation works within the Living Lab started with a bilateral meeting of the LL Coordinator and the Pilot Region Partner. The issues discussed at the meeting concerned formal matters of collaboration as well as the essence of the work. After a phase of scouting of data needs and availability, meetings with living-lab coordinator and external experts, functional to preparation of

the PR report we involved a list of actors: major stakeholders in the forestry sector and community regeneration project leaders and partners were contacted.

The transitions have been explored through two thematic meetings focusing the attention on two main transitions: demographic transition and community approach to involve local population and forest resources management as testing ground useful to promote new sustainable production and meet climate and environmental challenges.

Collaborative methods

Many online meetings were organised with CREA colleagues on the data needs to be collected. This focus group explored the key challenges and opportunities in the area and their relationship to the data and the results of the two focus groups organised with area stakeholders. The results contributed to the Pilot Region Report: Garfagnana (Italy).

Participants and stakeholders

In our Living Lab activities, we have involved a wide range of actors, from public agencies, agricultural and forestry enterprises, commercial, tourism and craft enterprises, third sector entities and other associations, educational institutions, community cooperatives and citizens.

The area of the LAG includes four Unions of Mountain Municipalities: 1) Garfagnana; 2) Media Valle del Serchio; 3) Appennino Pistoiese; 4) Alta Versilia, these are our main interlocutors as far as public bodies are concerned and have participated in all the animation activities that have been carried out in 2023. Territorial animation consists in initiatives that enable the involvement of civil society, entities, institutions, and businesses in innovative forms of development consistent with local vocations. Territorial animation is implemented through the promotion and organisation of meetings, workshops, thematic and/or territorial tables, spaces for listening and confrontation, pooling experiences and skills to strengthening the design capacities of communities.

In this project we also involved the main actors of forestry activities in the area, namely the three Forestry Consortia, voluntary private law associations of owners of private plots of land and forest-related businesses that are in charge of the associated management of members' forestry resources: 1) the Forestry Consortium of Villa Basilica operating between Lucca (Villa Basilica, Capannori) and Pistoia (Pescia) managing around 400 hectares of forest; 2) the Agroforestry Consortium of Colline Lucchesi operating in the area of Lucca (Pescaglia and Borgo a Mozzano); 3) the Forestry Consortium of Cerbaie, operating between Pisa and Florence (from Altopascio to Fucecchio).

In particular, in the two online focus groups that were organised together with CREA as part of the Living Lab activities, representatives of the community regeneration projects that were funded and actors directly involved in forest management were involved: people from forestry consortiums, farm unions, voluntary associations, public agencies, community cooperatives, social enterprises, consultants and planners.

Community projects have led to the emergence of ideas for repopulating and activating rural villages, for instance, through encouraging new forms of tourism aimed at getting to know the area (slow and conscious tourism). Collaboration between private and public actors:

- Mountain unions/municipalities
- Cooperatives of services

- Local health services
- Schools and university
- LAG's role is important in accompanying these projects to their implementation.

Data collection methods

Socioeconomic data collection was done, predominantly, using national and regional databases that collect data down to the administrative unit of the municipality.

In addition to this, Tuscany Region also has an archive of geographic data (https://www502.regione.toscana.it/geoscopio/cartoteca.html) rich in information also of natural environmental and landscape nature that allows a very in-depth territorial framing.

At the same time, it is necessary to emphasize that for some aspects related, for example, to socioeconomic transition, it would also be important to adopt more specific data collection of a qualitative nature to delve into the evolving dynamics of social capital, needs and expectations especially where community regeneration projects will be carried out.

Living Lab activities in 2023

Table 10 List of activities completed in cycle 1.

Date of the meeting	Subject of the meeting	Participants
April-June 2023 Scouting of data needs and availability	Meetings with living-lab coordinator and external experts, functional to preparation of the PR report	LAG Montagnappennino CREA
19th April ONLINE FOCUS GROUP "Forest resources management"	The role of the multifunctional forest in the LAG area. Focus group with representatives of forestry consortia and civic uses, chestnuts producer associations, Union of Municipalities representatives.	LAG Montagnappennino CREA 10 participants
26th April ONLINE FOCUS GROUP "demographic transition and community approach"	The role of community cooperation in the LAG area. Focus group with participants to *community re-generation projects.* The impact of the project on the community.	LAG Montagnappennino CREA 10 participants
April to now Discussion with local stakeholders within the LDS design	Animation activity within the frame of the new programming phase 2023-27, concerning community projects and forest chain activities.	LAG Montagnappennino 10 meetings About 250 participants

Reflections from Cycle 1

Overall, we believe that Cycle 1 worked satisfactorily. Coordination between the Pilot Region partner and the Living Lab coordinator has been generally smooth, as we could build upon a previous long-term relationship of cooperation in different projects.

The involvement of stakeholders who participated in the first focus group regarding forestation was more difficult, given the wide variety of actors on the ground, while regarding the second focus group we directly involved project beneficiaries who responded more readily.

Most tasks related to the project have been completed in due time and with what we believe are useful results, but we are aware that we are under time pressure from the LAG and that this situation is likely to continue. To ensure that this does not create difficulties in Cycle 2, we will try to organise ourselves better to ensure a timely response to CREA and RUSTIK deadlines.

Cycle 1 results

Overall, Cycle 1 of the Living Lab allowed us to identify the socio-economic transition and climate change as the most relevant for our Pilot Region. All focus group participants agreed that the transition challenges in the area are interlinked.

The focus groups were very useful. Concerning forests sustainability, the first issue raised by the private and public forest bodies participating to the focus group relates to a basic anthropological issue: the need to take a wide-ranging approach to forestry when considering the protection and the sustainability of woodland. To sum up, it emerged that local stakeholders consider the local and regional policies may not be effective in supporting the resilience of local communities unless decisions at all levels are taken the closest possible to citizens and to the before mentioned specific local conditions and needs concerning the use of forest. A particular relevance is given to training and generational changeover and more political measures are required to improve skills and knowledge and to promote and reinforce the presence of young generations in chestnut/forest-related activities.

On the other hand, community project co-design allows individual actors to understand that what they are doing makes sense and that their actions will be amplified within the general context. One point to focus on is, in fact, that co-design is a complex process that needs a precise technical and methodological approach that brings people together and makes them stay together. The participatory approach is very useful; however, it must be led by professionals who support its facilitation and by planners who can hook financial resources and intercept calls for proposals. Certainly, planners play a delicate role: they must step back, not force the project to make it successful, but rather help the community achieve its goals.

Part 2: Challenge and next steps

Living Lab challenge

Rationale

The challenge chosen during cycle 1 are socio economic transition and climate change and environment transition.

Socio economic transition

The COVID 19 emergency has made the critical issues of our territory's socio-economic system even more evident. The need for new responses and new models clearly emerged. The need for a new approach also affected the LAG's way of operating, which proposed to the territory, according to the bottom-up model, to develop community projects where the different actors of the local socio-economic realities come together to share the project of their future. The LAG requested and supported that the community projects be the result of a participatory and inclusive process involving all community actors. The implementation of these projects is currently ongoing; monitoring their development and highlighting strengths and weaknesses is crucial to adjust the community projects tool in the future.

Climate change and environment

The high forest cover of the LAG's territory can be both a strength and a weakness. The extent of state forests and civic uses, represent an element that brings in factors of multifunctionality and especially public function. The potential of forest areas is not limited to timber production but performs and can develop even more recreational and climate change mitigation functions. Chestnut groves areas not only represent productive factors but also have historical-cultural and landscape value. Uses-costumes-landscape and economy-are identity factors of the chestnut forest. The first existing experiences of enhancing the ecosystem service of forest areas through the sale of carbon credits of public forests represents a first element of response to the demand for recognition of the ecosystem services represented by the forest and chestnut grove with respect to urban-metropolitan areas. Developing the multifunctionality of the forest by taking care of its impact on local communities is the goal of this living lab. In general, according to the above, at the root of it all is the need to implement the Forest Land Use Plans (PFITs).

Knowledge to date

CLIMATE CHANGE AND ENVIRONMENT

Regarding the transition to models oriented toward limiting the effects of climate change and conserving environmental heritage, rural and mountain areas are of fundamental importance being the territories where the production/reproduction of fundamental services (water, CO2 storage, food, biodiversity, etc.) for both contiguous and distant urban areas is concentrated. If, as in our case, we focus on the forest heritage present in the territory, it is necessary to fill the knowledge gap with respect to its functions: local communities think, predominantly, of a sustainable use of the forest for productive purposes and/or as a source of food but not of the other multiple functions of regulating the ecosystem and providing cultural and recreational services. The knowledge gap we currently see is on the need to identify and assess not only in qualitative terms, but also in quantitative terms, the extent of these functions using, for example,

the Ecosystem Services assessment approach. Such an assessment could then also allow for the creation of new governance models geared toward recognizing and rewarding the production of these services according to PES (Payment for Ecosystem Services) mechanisms, also extending experiences already in place on the ground such as that of the Apennine National Park.

SOCIO ECONOMIC TRANSITION

In an area prone to depopulation, especially in the youngest component of the population, initiating a socioeconomic transition based on the development of community regeneration projects is a very high and ambitious challenge because it aims to make people rediscover a model of organising social life that was widely used in the past in this area but that has been progressively side-lined by the regulatory mechanisms of the market on the one hand and the state on the other.

Community-based systems (e.g., cooperatives) enhance the centrality of human capital through participation and involvement, co-design, and subsequent co-management. From this point of view, therefore, the work to be done is geared toward intensifying the territorial animation activities that GAL MontagnAppennino has always carried out in the area in order to bridge the knowledge gaps of local realities on these new models of production and consumption of goods and services.

Research question/s

See the previous section, where we focus the relevant issues to be deepened.

- How to promote the sustainable use of forest for productive and environmental purposes, in order to support local added value and reduce uncontrolled spread of the forest due to abandonment?
- What role can have the community projects in fostering cooperation, strengthening social capital, and building synergies between local initiatives promoted by rural population?

Policy relevance

The upcoming LEADER programming, and the National Strategy for Inner Areas in which the LAG territory is involved, represent a great opportunity to concretize and support pilot experiences resulting from the two focus groups. Acquiring data and information is essential to guide ongoing processes and to adapt future processes and actions to support projects inherent to the themes of the two living labs.

Being able to provide local political-administrative realities with data and analysis to feedback processes affecting the themes of the two living labs lays an objective foundation for the governance choices that local actors are called upon to make in the near future.

Having third-party data and analysis available, with respect to the LAG's point of observation, is beyond crucial in the interlocution with the regional authorities that control and supervise the outcomes and results of the two mentioned programs. The same applies to the process of self-evaluation that the LAG must do regarding its functional activities to demonstrate the effectiveness of its actions vis-à-vis the European Union.

Emerging data needs

Data availability

CLIMATE CHANGE AND ENVIRONMENT

As we mentioned earlier, the challenge of the transition for climate change and the environment passes the construction of a cognitive framework on the qualitative-quantitative characteristics of the forest heritage to then propose a "design framework" at the territorial scale with a zoning of the prevailing functions of the forest heritage (protective, naturalistic, productive, social, cultural, etc.).

At present, the data necessary to build the cognitive framework are available at the regional and national level and with a good scale of detail that can also allow the assessment of the flow of the main ecosystem services through the use of specific software (e.g., INVEST) as was done with the research "Mountains, ecosystem services and governance tools in Tuscany" promoted by ANCI and funded by the Tuscany Region (Marino, Poli and Rovai, 2023). To this we must also add the reconstruction of the planning framework in place in the territory.

SOCIOECONOMIC TRANSITION

In this case, the availability of data is not so easy to find because it is to explore mainly qualitative dimensions (social capital, quality of relationships, trust between people, reciprocity, etc.) and, therefore, the idea is to focus on a few case studies of "community regeneration" with a special data collection plan of both quantitative and qualitative nature in the project's inception phase and, then, with monitoring during the course of project implementation.

Lack of up-to-date picture to date population and industry census data on a municipal basis (we are still in 2011) a key entity to interact with could be IRPET, which has a lot of socioeconomic, demographic, and public expenditure data that it could provide.

Capacities

With regard to data collection and the preparation of any specific collections, questionnaires, surveys etc., the LAG Montagnappennino has prepared a specific agreement with the University of Pisa. On the other hand, with regard to the transposition of data and their interpretation the LAG internally uses the expertise of the staff. It has specific skills in the field of forestation, territorial animation, participatory processes, and the issues that are addressed within the living lab. The LAG is already working on community regeneration projects and to deepen the issues of forestation and is already employing its staff in these activities.

In addition, there will be the need for identifying the most effective forms of communicating the results of data processing. This is one of the challenges faced by the LAG, which, through the presentation of data, will have to stimulate participants' thinking and, above all, gather useful information to generate new knowledge useful for implementing effective transition policies/actions for the Living Lab.

Next steps

→ There is a series of initiatives within the programme of LL to be implemented by March 2024. These initiatives will be prepared in early January with CREA and can be summarised as it follows:

a) Refining the collection of data on forest functions and characteristics, and on initiatives and operators working in the area
b) Focusing on the two transition challenges with previous participants to focus groups and new subjects as possible innovators (and future beneficiaries of LAG support)
c) Identifying some projects funded by LAG as possible incubators of initiatives on the two transition challenges and their inclusion in a special monitoring activity within the current LAG monitoring.
d) Identifying specific lines of financing projects regarding the transition challenges within the future Local Development Strategy 2023-27 of Montagnappennino

→ This planning framework with a systematic collection of current and future "ideas and projects" of stakeholders. will be developed in parallel with the LAG's Local Development Strategy, which envisages promoting specific calls for application on community projects in 2024 and forest investment projects in 2025. Consequently, the data experiment to be conducted in 2024 is functionally linked to the implementing phase of the Local Development Strategy.

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Italy: Parma, Piacenza & Ferrara

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Summary and overview

The pilot region is composed of three provinces of the Emilia-Romagna region, characterized by the relevance of production of processing tomatoes. Italy is the third largest world producer of tomatoes for processing, and the biggest exporter of processed tomato products, globally. The tomato processing chain is well organized under the coordination of the Interbranch Organization (IBO) for tomato processing of Northern Italy, with its headquarters in Parma, representing more than 50% of the Italian tomato processing chain.

Living Lab achievements

Three key transitions, affecting the tomato processing chain and the territory in the pilot region, have been identified and three focus groups with stakeholders were organized to discuss these issues: (1) effects of demographic transition on labour market; (2) climatic transition, with specific emphasis on water management issues; (3) digital transition with specific attention to the diffusion of technological infrastructure for precision agriculture. The results of these focus groups were useful to further deepen findings from the desk analysis and both have been used to complete the document of task 1.2.

The Living Lab team also led the organization of the RUSTIK Living Labs' meeting held in Parma in October 2023.

Key learning to date

While the climate transition was already under scrutiny by the stakeholders, the two other transitions that have been identified were not fully clear at the beginning of the research, neither for stakeholders nor for the IBO. The discussion between members of the research team and stakeholders has been very useful to identify the transition affecting the labour market and the technological issues affecting precision farming. The key lesson has been that organising a discussion group between stakeholders and researchers can be very useful to identify and better define key challenges for the processing chain and the territory.

Living Lab challenge

All issues addressed by the three focus groups are relevant, but the most urgent and critical is the issue of water management (the climate and environmental transition). Water for irrigation is critically important for the crop and very dry seasons are becoming more frequent in this area. Since water is a common good, water management at the local level requires quite a complex governance structure. Some of the management elements are already present in the area but the governance issue, as well as an appropriate monitoring system, are key problems to be faced in the future.

Emerging data needs

Water management at the local level requires managing a large amount of data: information about changes over time, on a daily and hourly basis, of weather conditions (e.g. temperature, amount of rain) and additional technical information about the water needs of different crops, with tomatoes among these (e.g. evapotranspiration). This data is needed to develop appropriate models to estimate water needs and to plan water distribution in different areas of the region, according to productivity potential. The actual monitoring systems need to be coordinated and models developed: to move in this direction, new and existing data are needed, and new governance of these data must be developed and implemented.

Next steps

Focusing on the identified challenge, the Living Lab plans to present results of the first year of activity to all stakeholders of the IBO, to facilitate an exchange of views and plan the activities of the experiment to be developed. The experiment will try to address at least one of two different issues connected with the challenge: (1) how to develop an integrated monitoring system for geographical data about water needs in the area; and (2) how to improve the local water management system in order to improve the effectiveness of water management in the area, considering all needs of different stakeholders, not only farmers.

List of abbreviations

IBO	Inter-Branch Organization (of processing tomato Industry of Northern Italy).
PR	Pilot Region
PO(s)	Producer Organization(s)
APO	Association of Producer Organizations
ANICAV	National Association of Fruit and Vegetable Processing Industries (Associazione Nazionale Industriali Conserve Alimentari Vegetali)

Part 1: Progress Review

Pilot Region introduction

The pilot region (PR) includes three NUTS3 regions of Emilia-Romagna (Northern Italy): the provinces of Piacenza and Parma, in the Western part of the region, and the province of Ferrara in the North-Eastern part. This PR is located in the Po Valley and between Lombardy, Piedmont, Liguria, Tuscany, Marche, and Veneto regions and the Adriatic Sea. Most of the area of the PR is flat: Ferrara is all in the plain, while in Piacenza and Parma the relevant area also has some hills and mountains.

The area is densely populated: at the beginning of 2022 the total resident population in the PR was 1,071,924 while in the whole of Emilia-Romagna, the population is over 4 million. The most populous province is Parma with 448,916 residents followed by Ferrara with 339,573 and Piacenza with 283,435. (ISTAT, resident population on 1st January 2022).

Pilot Region Partner

The processing tomato supply chain in Northern Italy is inter-regional (it includes Emilia-Romagna - where 60% of the production is based - Lombardy, Piedmont, and Veneto) and is characterised by widespread and longstanding aggregation within and between the production and processing phases. Tomato supply is very concentrated and aggregated and producers' bargaining power is particularly high. This sector represents a unique case in Italy: almost all farmers (about 95%) producing processing tomatoes in this area are members of a PO; therefore, they do not sell their own products alone, on individual basis, but they can negotiate prices with processing companies through a number of large POs. Processing tomatoes are sourced from about 2,000 producers that cultivate 36,000 hectares of land but they are grouped into only 12 POs (private or cooperative) and one Association of Producers' Organisations (APO), the Inter-regional Consortium of Fruit and Vegetable Producers (Consorzio Interregionale Ortofrutticoli – CIO), that associates two POs (AINPO and Consorzio Casalasco del Pomodoro). On the other hand, tomato processing is carried out in 25 processing plants owned by 20 companies, mainly associated within the National Association of Fruit and Vegetable Processing Industries (Associazione Nazionale Industriali Conserve Alimentari Vegetali – ANICAV). Therefore, the sector has a quite limited number of players on both sides of the supply chain and in both sides the leading 3-4 players represent a high share of the market. The market is therefore concentrated but still very competitive.

The tomato processing supply chain is coordinated by an overarching inter-regional Interbranch Organisation (IBO) based in Parma, that brings together all actors involved in the supply chain and is the Pilot Region Partner for RUSTIK. The IBO associates almost the totality of the producers and processors, to whom is guaranteed equitable representation and voting power (50% agricultural part, 50% industrial part). Producers and processors are ordinary members of the IBO, they belong to first and/or second level organisations and cooperate within the IBO on the base of common shared rules. The IBO agrees framework contracts, fixing for each tomato season quality, quantity, and price standards. Chambers of commerce and research centres are advisory members of the IBO and are involved from time to time in discussing and defining specific enhancement and development plans and goals.

The IBO plays a prominent support and coordination role between all these actors. It is, in fact, vital for the effective and efficient operation of the supply chain. In particular, the IBO oversees collection, processing and dissemination of production and processing data, verifies the compliance and consistency of bilateral business contracts with the commitments provided for in framework contracts, carries out delivery and quality controls in processing plants through a specially appointed committee of technical experts, supports the supply chain in managing production planning and harmonising regional integrated production guidelines for industrial tomatoes, and manages (on behalf of its members) development and research projects financed by its own and public financial resources. Furthermore, the IBO promotes and coordinates the participation of key local actors in several research and innovation projects and partnerships aimed at enhancing the sustainability and competitiveness of the supply chain, in terms of plant health and phenological development, field and satellite-supported decision tools, quality certification, production methods, processes and costs.

Formal cooperation exists also between local economic stakeholders and public authorities in charge of the supervision and management of regional water resources and hydrological networks. Direct coordination with Producer Organisations and individual farms (especially farms of substantial size) is carried out regularly, before and during the irrigation season. Years with very low winter and spring rainfall (e.g. 2021 and 2022) create a high risk of water shortage for irrigation during summer. Consequently, processing companies, producers' association, and the IBO itself, often organize meetings with representatives of Consorzi di Bonifica (water distribution authorities) and with the regional ministry of Agriculture, to discuss how to improve water availability and how to optimize water management during the cropping season.

Living Lab Coordinator

CREA-Policy and Bioeconomy is a public research institute working in the field of rural and regional development and policy evaluation, notably on the Common Agricultural Policy and Regional Policy. CREA has also developed considerable experience in supporting local development projects and animating rural partnerships, deriving from twenty-three years of activities in coordinating the national LEADER network and, more recently, Italy's Inner Areas Strategy.

Francesco Mantino is senior economist at CREA, with research interests in local development processes and policy evaluation at territorial level, and with experience in animating the design and implementation of strategies of local development and participatory approaches.

Barbara Forcina is researcher at CREA, with research interests in participatory approaches and analysis of supply chains in the agri-food sector.

Functions and transitions

Functions

Piacenza boasts over 4,300 enterprises. Approximately 2,400 operating units are located in urban and peri-urban areas. Noteworthy players in this domain engage in non-hazardous waste treatment and disposal (Iren S.p.A.), motor vehicle manufacturing, and the food sector. Development-challenged areas in Piacenza, as defined by the regional government of Emilia-Romagna, are the locations for around 110 operating units, predominantly involved in machinery

and equipment production, electrical equipment manufacturing, construction, grape cultivation, and animal farming.

Half of Parma's enterprises are found in urban and peri-urban zones, concentrated in the municipality of Parma itself, totalling over 2,500 enterprises. Key sectors in this domain encompass credit services, pharmaceuticals, food and food processing, construction, and logistics. Rural businesses also contribute significantly, constituting almost a third of total enterprises. Companies engaged in food processing, such as Parmalat S.p.A., Mutti S.p.A., Annoni S.p.A., and Sassi S.p.A., are prominent players in these areas.

In Ferrara, the majority of enterprises, numbering 1,600, are located in the urban and peri-urban areas around the main city. These operating units are predominantly active in sectors such as the collection, storage, and distribution of fruits and vegetables, the service industry, and the production of plastics, ceramics, and computer equipment.

The area is substantially characterized by tomato processing, and in 2022 the three provinces of Piacenza, Parma and Ferrara harvested 83% of the total regional product. Considering other main crops, the high presence of forage and protein crops (i.e., corn, alfalfa, permanent grassland), as well as pastures, is linked to the important animal breeding and dairy sectors in the area, especially in the provinces of Piacenza (where Grana Padano PDO is produced) and Parma (noted for the production of Parmigiano Reggiano PDO). Concerning the dairy sector, almost 50% of the region's dairy cattle are farmed in the Pilot Region, totalling 234,600 head on a total of 1,413 farms, in 2022. Most of the dairy cattle are reared in the province of Parma (148,800 head in 2022) and Piacenza (80,300 head), while in Ferrara beef cattle have greater importance compared to the other two provinces. There are some differences also in the pig sector, considering that Piacenza and Parma have important high-quality products also in the cured meat sector. Among the recognised protected designations, Prosciutto di Parma PDO, Culatello di Zibello PDO, Coppa di Parma PGI and Coppa Piacentina PDO, are notable. In 2022 there were 300,000 pigs reared in the Pilot Region, accounting almost for a third of the regional total. Piacenza and Parma together represent 84% of this number, while the pig population in Ferrara was 49,200.

As a result of several geographical indication certifications, the food industry is an important contributor to the Pilot Region's economy. Active enterprises in the food industry reached almost 1,200 in 2021, with a total of 21,300 employees. Industrial activities have great importance for the Pilot Region economy and, including the food industry, they generated added value of 7.8 billion Euros in 2020.

Another important part of the Pilot Region economy is the service industry, with an added value of 20.2 billion Euros in 2020. The wholesale and retail trade sectors have great importance within the service industry, together with the repair of motor vehicles and motorcycles, transportation and storage services and accommodation and catering services. These activities involved 19,700 enterprises and 75,100 employees in 2021.

Transitions

Three transitions have been identified in the region, one in each of the main areas: (1) demographic transition and effects on the local labour market; (2) climate and environmental transition, with a specific focus on water availability and management; (3) digital transition with a

focus on technological infrastructures that are needed (and not yet available) to support the most advanced precision farming technologies.

Socio-economic and demographic transition

The demographic trend has been a declining population both due to falling fertility rate with a sharp reduction in youngest age classes, and population ageing. This trend has reduced the number of young people entering the local labour market, leading to shortages particularly in the peak seasons of demand (during the harvest season). Further factors explaining the recent shortage of immigrant workers are to be found in a contradictory and unstable labour policy at national level. Rules on fiscal policy are extremely variable due to changes of government, causing instability for firms' management and long-term strategies. Social issues also include the efforts to curb illegal hiring (*caporalato*) in the labour market. In this regard, the IBO established a protocol of intent with the Ministry of Agriculture aimed at providing labour opportunities within the agri-food chain to victims of illegal hiring.

More broadly, the focus group highlighted the need for a series of collective actions to address the consequences of demographic shrinking and labour market mismatch: planning of labour needs, effective training programmes, and more comprehensive welfare measures (e.g. transportation services, housing, basic education for immigrants).

Climate and environmental transition

The Pilot Region is characterised, on one hand, by a high demand for water for different productive activities, including intensive livestock farming and irrigated cultivations and, on the other hand, by increasingly frequent and prolonged droughts. These factors exacerbate water demand, especially in summer, thereby endangering the ripening cycle of tomatoes, but also in spring by putting the process of crop transplanting at risk. Global warming is altering natural water distribution patterns, repeatedly producing extreme events that cause considerable damage. Drought causes land degradation through increased soil erosion, which in turn increases hydrogeological instability that makes flooding and landslides more likely in the event of abundant rainfall, as has recently occurred.

All local actors in the tomato supply chain are taking relevant steps to adapt to the new challenges and changing circumstances and needs concerning climate change and water management, doing their utmost to also consider the diversity of the different core geographical areas of the tomato supply chain in Emilia-Romagna.

The combined effects of climate change and water stress are pushing farms and processors towards technological innovation and supply chain integration to enhance their capability to respond rapidly and more efficiently to these threats.

Digital transition

Stakeholders argue that there is a good diffusion of digital solutions being applied by farm enterprises, even though there are no precise data on their diffusion. The most important issue is the lack of a public RTK (Real-Time Kinematics) network. Therefore, innovative digital technologies applied to farm machinery cannot be used everywhere with transferable precision. Since one of the most widespread digital products is autonomous driving machines, a public regional network is considered to be very important for disseminating new technologies.

While mobile and fixed internet generally offers an adequate connectivity speed, there are still some, especially rural, areas without coverage, which require improvements.

For the management of different agricultural supply chains and different crop operations, producers of 4.0 machinery, and tools for agriculture (i.e. tools for precision farming, GPS, etc.) have implemented IT services using proprietary languages. The presence of many different reference portals, and the challenge of enabling different tools to communicate with each other for the automation of operations and processes is a significant limitation that requires a solution.

Living Lab Cycle 1: Planning Possibilities

Setting up the Living Lab

The Living Lab was established first by organizing meetings among representatives of the IBO, the research group, and the researchers from the consulting company Vsafe involved in IBO activity. These meetings informed a first analysis of the potential transitions affecting the region. Subsequently, open interviews with selected stakeholders were used to gather information and ideas about how they perceived the impacts of different transitions. Then, three focus groups were held (corresponding to the three transition challenges) with selected stakeholders to discuss potential transition challenges. Finally, the working group shared responsibilities for writing and refining the documents for task 1.2.

Collaborative methods

The research group of CREA, Vsafe and IBO representatives had several online meetings to share the reporting activities for the various WPs. Additional meetings were organized with representatives of the IBO to discuss the key aspects concerning issues to be analysed.

Participants and stakeholders

About 30 persons participated in the three focus groups, coming from producer organizations (farmers and agronomists), tomato processing companies, experts in digital technology, researchers, and technicians from water management institutions (Consorzi di Bonifica). They were interviewed before the focus group and then participated in the specific focus group, as outlined above. We plan to discuss with them the main results of this activity at the beginning of 2024.

Data collection methods

Data collection has been desk-based, to date. Besides official data and statistics, qualitative information about technological infrastructure to support precision farming has been gathered through interviews with some experts in the field of digital technologies.

Living Lab activities in 2023

The following activities were undertaken as part of the Living Lab:

- Meetings among researchers from CREA, Vsafe and IBO to share information about available data for the region and to identify potential transitions to be analysed.
- Direct open interviews with selected stakeholders to have a preliminary discussion about the potential transitions.
- Meeting to organise the three focus groups.
- Three focus groups: climate change and water management, demographic change and labour market, digital transition and infrastructures for precision farming.

- Meeting among researchers to work jointly on the report for task 1.2.
- Finalization of the document.
- Meeting to organize the Living Lab meeting in Parma for the whole project.
- Planning presentation and discussion of our main results with all stakeholders of the IBO.
- Discussion and planning of activities for year two, and definition of the challenge and the experiment.

Reflections from Cycle 1

In Cycle 1 we have started to work together and to understand better the objectives of the overall project and the Living Lab. The identification of the three key transitions and the discussions with the stakeholders involved in the focus groups and in some interviews has been very interesting and it is also promising for future activities.

However, improved planning of all the activities must be developed with a view across all the activities to be performed over the year. A second issue is securing the involvement of more members of the IBO, at least in the process of sharing information.

More detailed planning with reference to both these important issues, will follow at the beginning of 2024. This will consider how best to improve the efficiency of the research group and the effectiveness of the Living Lab, in respect of its potential impact within the region.

Cycle 1 results

During 2023, a study was made to identify the main transitions affecting the tomato processing chain, and the territory of the pilot region. This combined the results of desk analysis with interviews of key stakeholders. Three key transitions were identified and three focus groups with stakeholders were organized to discuss: (1) effects of demographic transition on labour market, (2) climate transition, with specific emphasis on water management issues, (3) digital transition with specific attention to diffusion of technological infrastructure for precision agriculture.

The main results of these focus groups have been useful to further deepen the desk analysis and have been used to complete the task 1.2 report. This document was presented and discussed with selected stakeholders to identify the topic for the experiment.

While the climate transition was already under scrutiny by the stakeholders, the two other transitions identified were less clear at the beginning of the research, neither for stakeholder nor for the IBO members. The discussion among the research group and with stakeholders has been very useful to identify the transitions affecting the labour market and the technological issues affecting precision farming. This has been already a positive result for stakeholders and the IBO.

The choice of the main challenge was made by considering the very high relevance of this issue in the evolution of the processing tomato chain. The challenge was perceived as highly significant by the different stakeholders in the IBO. Water shortage is clearly the most critical issue for all stakeholders. Being able to manage this shortage successfully during the last two years has been very important to retain market presence while other producers were affected by drought. Even if the next step of the project is focused on the climatic change challenges, the two other topics addressed by the focus groups will still be addressed with by the IBO. This is already a valuable result for the Living Lab in the region.

Part 2: Challenge and next steps

Living Lab challenge

The challenge selected, namely climate change and its implication with specific reference to water availability and management for irrigation and production, is the urgent for the region and for the IBO of the tomato processing chain.

Rationale

The most urgent and critical issue among those identified and analysed in the focus group of Cycle 1 is the one of water management (climate and environmental transition). Water for irrigation is critically important for the crop, and very dry seasons are becoming more and more frequent in this area. Since water is a common good, water management at the local level requires complex governance structures. Some of these governance structures are already present in the area but governance as a whole, as well as an appropriate monitoring system, are key problems to be faced in the future.

Knowledge to date

Water management at the local level requires managing a large amount of data: information about the evolution over time, on a daily and hourly basis, of weather conditions (e.g. temperature, rainfall) and other technical information about the water requirements of different crops, and especially tomatoes (e.g. considering evapotranspiration). Some of this data is available from different sources, but they are not analysed together.

Such combined data is also needed to develop appropriate models to estimate water need and to plan water distribution in different areas of the region, according to productivity potential.

In the region there is already a well-developed network of weather stations, but the actual monitoring systems need to be coordinated and integrated. Additionally, some models have been developed in recent years to study and monitor the evolution of crops using, for example, satellite data, but these models need to be evaluated and integrated into a tool that could be applied for management purposes.

Research question/s

The main research questions are the following:

(1) how to develop an integrated monitoring system for geographical data about water availability and needs in the area to assess how supply and demand can be matched over the growing season.

(2) how to improve the local water management system in order to increase the effectiveness of water management in the area, considering all needs of different stakeholders, not only farmers.

These two questions need to be answered not only to improve water management in the near future, but also to forecast the effectiveness and efficiency of future policy choices, for example with reference to the creation of new water basins.

Policy relevance

This challenge is critically relevant for the whole processing tomato chain of the region but also for the region itself, since water availability must meet all the needs of the population in the area, not only the needs of farmers.

This topic is already under scrutiny by local stakeholders as well as local and regional institutions, and the IBO has been working on policy documents and projects to support a rational development of solutions.

Emerging data needs

To face climate change, and in particular dry summers, it is crucial to develop a timely tool that is able to inform stakeholders about daily water availability in water basins, rivers and groundwater, and to match it with water demand by different crops and other civil and industrial uses.

Data availability

With respect to water availability and water demand for farming, much data is already available in the region. Recently, data and models have been developed using EU research funds, to model crop development and production using satellite data.

Limitations

Existing and new data must be analysed, processed, and integrated to enable it to be useful in practice, and to allow improved management of water scarcity.

Capacities

The IBO has the basic skills and knowledge to access and use these data. However, for a full integration of all the relevant information and data a specific project would be needed. There is the possibility that regional funds could become available for specific projects in this field. That way, the Living Lab could work to scope, test, and promote the new project and thereby pave the way for its funding and implementation.

Next steps

Focusing on the identified challenge, the Living Lab plans to present the results of its first year of activity to all stakeholders of the IBO in order to share these views and plan the activities of the experiment to be developed and conducted. The experiment will try to address at least one of the two different issues connected with the challenge:

(1) how to develop a monitoring system for geographical data about water needs in the area.

(2) how to develop an integrated system about potential water needs and water availability to improve the local water management system to improve the effectiveness of water management for irrigation in the area.

A meeting of the research group of the Living Lab will be organized in January 2024 to plan the meeting with IBO stakeholders and all further activities for the year.

The next step will be to combine all the information available and to develop an action plan about the issue that will be addressed in the challenge.

A further meeting will be organised with representatives from stakeholders and local and regional institutions, in order to better understand not only what is already available in terms of data and resources (models), but also to plan the co-development of the activity of the Living Lab.

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Poland: Mazowieckie voivodeship - Szydłowiecki powiat

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Summary and overview

The Szydłowiecki powiat (district) is located in the south-west of the NUTS 1 Mazowiecki voivodeship (macro-region). It consists of five municipalities, including the urban-rural municipalities of Szydłowiec and Jastrząb and the rural municipalities of Chlewiska, Mirów, and Orońsko. The district is strategically located on the S7 express road, which runs from Warsaw through Radom to Kraków, making it easily accessible. With an area of 450 square kilometres, Szydłowiecki powiat covers 1.27 per cent of the Mazowieckie voivodeship and has a population of over 40,000.

The Szydłowiecki district faces several development challenges, including transitioning its economic base, addressing structural unemployment, and improving technical infrastructure. Despite being predominantly rural, the district's five municipalities have development potential due to their proximity to urban areas and good transportation connections. The region can benefit from using natural resources, such as sandstone, iron ore, and chocolate flint, which are extracted in the Orońsko municipality and can contribute to the area's economic and social development.

Living Lab achievements

The Mazowieckie Living Lab results from a productive partnership between the Foundation for the Development of Polish Agriculture (FDPA) and the Institute of Geography and Spatial Organization of the Polish Academy of Sciences (IGSO PAS). In 2023, the team identified key actors and local networks and pinpointed transition challenges and opportunities. They actively engaged the local community in the Living Lab through three focus group meetings. The first meeting focused on local development potential and challenges, the second centred around entrepreneurship and included a brainstorming exercise to elaborate an economic development potential index, and the third was a field-trip workshop to collect best practices and solutions to be tested locally.

Key learning to date

The first Living Lab work cycle built on existing knowledge of the region's economic base and economic performance from secondary data sources such as official databases, strategic documents, reports, and scientific publications. This was extended via individual and focus group meetings and surveys designed for the project's needs. The work unveiled knowledge gaps due to deficiencies in public statistics collection, especially the availability of detailed, up-to-date data on the functional structure of the Pilot Region. Whereas the macro-region level data is usually accessible, LAU 1 and LAU 2 level data is rarely shared. The work also uncovered some local knowledge deficiencies and conflicts of interest between stakeholders.

Living Lab challenge

The main challenge identified in the Pilot Region is related to the socio-economic transition: the functional transformation of the rural area from a farming-based economy to a production and consumption-oriented economy and the increase of spatial mobility. The area's development is hampered by unemployment, specifically, a lack of job positions for the well-educated population and deficiencies in technical infrastructure. In line with the challenge, the Living Lab will explore an opportunity for trend reversal through developing entrepreneurship, specifically through using the area's natural resources, supported by local cultural heritage and traditions, and strengthening local ties and networks between and within rural populations.

Emerging data needs

Access to diverse data sources such as surveys, interviews, observations, experiments, documents, databases, and local-level data needs to be enabled to fill existing data gaps. This data could be analysed and interpreted to find patterns, trends, relationships, and insights related to entrepreneurial development dynamics. Information and data can be collected by generating and evaluating possible solutions, such as identifying simple indicators that reflect challenges and opportunities. With the help of data, macro- and micro (firm)-level business plans can be created based on simulations, for example, a business opportunity analysis, an experiment with business strategies, designing and launching new products to the market, and managing the entire product life cycle. Using data for educational training can promote place branding.

Next steps

The region aims to stimulate new enterprise creation and expand existing businesses utilising natural resources as a marketing tool. This is expected to help reduce unemployment and make the region more attractive to residents and tourists. The next step for Mazowieckie Living Lab is to hold an educational workshop to present tools for promoting regional products. One potential idea is for local schools to organise competitions and activities to promote regional products, with budget support from municipalities. Another idea is to implement a local business plan as a policy on a macro-scale and as a practical arrangement on a micro-scale for individual firms.

Figure 13 2nd LL workshop, Szydłowiec district office (Photo: Ewa Korcelli-Olejniczak)

Part 1: Progress Review

Pilot Region introduction

Szydłowiecki powiat is a NUTS4 level district situated in the NUTS3 level Radomski subregion within the NUTS2 Mazowieckie Regionalny region, which belongs to the NUTS1 Mazowiecki macro-region. Szydłowiecki powiat is located in the southwestern corner of the region and is adjacent to the Swiętokrzyskie voivodeship. The district is predominantly rural, partly peri-urban, with its northern sections oriented towards the city of Radom. It is characterised by a considerably multifunctional economic profile and the availability of both natural and cultural resources. Administratively, Szydłowiecki is composed of five municipalities: the urban-rural municipalities of Szydłowiec and Jastrząb and the rural municipalities of Chlewiska, Mirów, and Orońsko. The geographical location of the area is very beneficial as it lies on the S7 express road running from Warsaw through Radom to Kraków. With its 450 square kilometres, the Pilot Region comprises 1,27 per cent of the Mazowieckie voivodeship and is home to a population of over 40,000.

Table 11 Basic characteristics of the municipalities in the Pilot Region. Own elaboration based on LDB and Eurostat data.

Municipality	Population	Type of area	Type of area according to DEGURBA classification
Szydłowiec	17701	urban-rural	2
Orońsko	5941	rural	3
Chlewiska	5816	rural	3
Jastrząb	5152	urban-rural	3
Mirów	3845	rural	3

The region has diverse landforms – the mountainous Kielce-Sandomierz upland in the south and the Radom plain in the north, with numerous nature reserves and protected landscape areas. An interesting and rich cultural heritage also characterises the area. Szydłowiecki powiat holds potential for multifunctional development, including sustainable agriculture and activities related to acquiring and using mineral resources and agricultural produce (land-based resources).

At the same time, Szydłowiecki powiat is situated in one of the most challenging subregions of the voivodeship, characterised by a loss of economic functions and an outflow of younger, well-educated population groups. According to a study by Śleszyński (2017), the GDP per capita of the Radom subregion, as a share of the macro-regions average, had been falling since 2001, reaching 45 per cent in 2012, which was the smallest among all subregions in Poland. This was a symptom of the Radom subregion's economic decline compared to the economically prosperous

central subregion of Warsaw. The unemployment rate of the Szydłowiecki powiat is currently the highest in Poland: 24.4 per cent in September 2023 (GUS 2023).

The Szydłowiecki powiat has been chosen as the Living Lab due to its potential in a predominantly rural environment well-connected by transportation to urban and urbanised areas. The area faces development challenges related to the functional transition of the economic base, structural unemployment, and deficiencies in technical infrastructure. The local authorities and other stakeholders believe that using natural resources, especially minerals like sandstone, iron ore, or chocolate flint extracted from Orońsko municipality, can be an opportunity for the region's economic and social upgrade. The work within RUSTIK Cycle 1 confirmed this opinion.

Pilot Region Partner

The Foundation for the Development of Polish Agriculture has been active since 1988 and focuses on two areas of activity: lending and educational campaigns and publications. The mission of the Foundation is to support sustainable rural development, in particular, entrepreneurship and creating non-agricultural jobs, and to ensure equal opportunities for women, the unemployed, and young people. The mission of the FDPA is realised through a micro-loan program and investment grants for the creation and development of small businesses, local development programs, publications, studies, and specialised socio-economic reports presenting the condition of Polish rural areas. Educational activities include environmental protection, sustainable agricultural production, promoting renewable energy sources, and adaptation to climate change.

The work in Mazowieckie LL is mainly carried out by two staff members: Karolina Witeska-Chmielewska from the FDPA headquarters in Warsaw and Witold Makulski from the Radom section. Karolina Witeska-Chmielewska, the Head of the Rural Development and Promotion Department, has been preparing and implementing projects to adapt rural areas to climate change for over 14 years. She conducts training for agricultural advisors and farmers and creates publications, websites, online training courses, and conferences as part of her information and promotion activities. She also collaborates with scientists, experts, institutions, entrepreneurs, and the media. Witold Makulski, the FDPA Field Office Manager/Loan Officer, actively promotes the offer to the SME sector, prepares loan documentation, represents the Foundation in contact with SME entrepreneurs, participates in projects implemented by the Foundation, and manages the field office. He is a specialist with 27 years of experience in building the microfinance market in Poland.

Living Lab Coordinator

The research partner is the Institute of Geography and Spatial Organization of the Polish Academy of Sciences. IGSO PAS is an important research centre that specialises in two disciplines: physical geography (geomorphology, climatology, and environmental protection) and socio-economic geography and spatial economy (urban geography, rural studies, regional and local development). The Institute has participated in numerous national and international research projects on fundamental and applied research, focusing on rural areas.

The LL Mazowieckie research team is led by Assoc. Prof. Dr Ewa Korcelli-Olejniczak and Dr Marcin Mazur assisting. Ewa Korcelli-Olejniczak has a wide range of skills, including proficiency in English, communication, managerial competencies, and experience in qualitative research and field studies on urban and urban-rural development processes. Dr. Mazur's scientific interests include

cartography methodology, map perception, the concept of the urban-rural continuum, and suburban zone transformations. He is experienced in cartography, GIS, and quantitative data analysis.

Functions and transitions

Functions

The Szydłowiecki powiat is part of the external zone of the urban-rural region of Warsaw, with the regional centre, Radom, and small towns performing essential central-place functions for the surrounding rural areas. The last decade has accelerated the transformation from an agriculture-based economy and employment structure to a production and service-oriented one, focusing on using land-based products and the region's cultural heritage. The market for local produce is expanding, and the economy is increasingly focused on non-local recipients. Since 2013, employment in the Pilot Region's agricultural sector (including forestry and fishery) has decreased from 45 to 19.2 per cent, indicating a significant shift in the area's economic and social development. However, the number of people employed in the manufacturing sector (26.1 per cent) has risen, including the processing of agricultural products, and using natural resources. Additionally, some branches of the services sector are related to this potential. Therefore, it can be assumed that the area's rural character is not disappearing. Instead, it is transformed by a trend towards land-based production (such as agriculture, forestry, mineral resource extraction, orchards, and vineyards) and consumption, including leisure, culture, and tourism.

The land use structure of the area diverges from the macro-region's average, with only 36.3 per cent covered by agricultural land and as much as 36.6 per cent by forests. The share of areas used for fruit production and livestock is also significantly smaller than in the macro-region. At the same time, regarding its touristic attractiveness, the Pilot Region ranks high as it's placed in the 2nd out of four categories for the voivodeship (SRPS 2015). The map below (Figure 14 Distribution of land use in the Szydłowiecki powiat. Elaborated by M. Mazur according to the National Base of Topographic Objects (GUGIK – Head Office of Geodesy and Cartography)) illustrates the land use of the Szydłowiecki powiat.

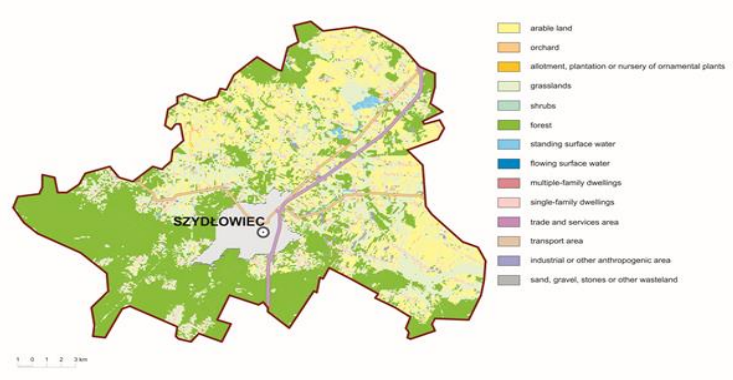

Figure 14 Distribution of land use in the Szydłowiecki powiat. Elaborated by M. Mazur according to the National Base of Topographic Objects (GUGIK – Head Office of Geodesy and Cartography)

Table 12 Leading sectors/branches (according to the number of employed) in the Szydłowiecki powiat.

Production	Consumption	Ecosystem services
construction	tourism	ecological agriculture
extraction of minerals/stone-cutting trade	culture, recreation, entertainment	agrotourism
other land-based production	education	leisure, provision of green areas

Production functions

The share of employment in the production sector in the Pilot Region is considerably high (38.3 per cent for men; 15.4 per cent for women). One of the area's specificities is the stone-cutting trade based on locally extracted minerals. Some resources, especially limestone, have been mined and processed since the Stone Age and have contributed to the economic potential of the Old Polish Industrial Region. Moreover, the region, particularly the Orońsko municipality, is known for exploiting a rare mineral, chocolate flint. According to the National Base of Topographic Objects, the Szydłowiecki powiat takes second place in the macro-region in terms of the total surface of mining areas (i.e. 7,67 per cent). All mineral resources in Poland are property of the State Treasury, and both their extraction and management are controlled by the state and supervised by the Ministry of Climate and Environment, which has competence for resources policy, granting licenses for exploration and evaluation of assets, as well as control over their exploitation. In the case of the minerals mined in the Szydłowiecki powiat, the process requires obtaining a license from the Marshal of the Voivodship.

Another leading production function is construction, with the sector steadily growing since 2012 (Poland in Figures 2023) and currently being the most represented among micro-firms.

Consumption functions

With their unique morphological features, the sandstone quarrying sites serve as an educational tool to exhibit both natural phenomena and human activity. The area's cultural heritage, geographical location, and availability of varied accommodations and dining options make it an attractive tourist destination. One such attraction is the Archaeological Park, set to open in the municipality of Orońsko, which will showcase the palaeolithic mining culture.

Besides public institutions and NGOs, 74 firms are operating in the tourism sector, and 72 organisations are in the cultural sector, which includes recreation and entertainment (RSPS 2021). Due to the proximity of urban centres, there is growing connectivity for commuting and service provision. Rural areas also perform residential functions for returning residents or incomers' first or second homes.

As for the provision of services of general interest, in 2022, 27.3 per cent of the powiat's budget was allocated to education (the largest share of all budgetary expenses), 9.6 per cent to social support, and 5.7 per cent to healthcare. There are ten pre-schools, 24 elementary schools, three high schools, and two trade schools in the district, attended by 762 students (2022/2023). 118 out of 3,172 registered firms operate in healthcare and social support (Poland in Figures 2023).

Ecosystem services

The Pilot Region's land use and functional structure provide opportunities for developing and providing ecosystem services. The district and municipalities have implemented environmental protection programs that support this goal. For instance, no industrial plants pose a risk to the region, groundwater resources are monitored, flood risks are managed, and the protected soils in the area allow for the growth of ecological agriculture and agrotourism. The latter are replacing traditional farming and diversifying the rural landscape. The area offers attractive green spaces to the local population and residents of adjacent towns and the city of Radom.

Transitions

Table 13 Main transition challenges of the macro-region and Pilot Region

Socio-economic & demographic	Climate & environmental	Digital
unemployment	water deficiency	digital exclusion
low economic dynamics	droughts	smart education
outmigration of educated population groups	reduction of biologically active spaces	

Socio-economic and demographic transition

According to the main strategic policy document of the Mazowieckie voivodship, the Radom region is considered one of the most challenging areas in the voivodeship (SRWM 2022). The average annual population growth rate of all subregions of regional Mazowieckie voivodeship is negative, with Żyrardowski (-0.1%), Siedlecki (-0.2%), Ostrołęcki (-0.3%), and Ciechanowski (-0.3%) subregions presenting low values. However, the Radomski (and Płocki subregions) have the lowest values at -0.4% in 2020. The Szydłowiecki powiat experiences a younger, well-educated population outflow, high population ageing dynamics, and technical infrastructure deficiencies.

Economic dynamics in the region, measured by the increase in the number of one-person firms per 100 working-age individuals, has been very low between 2002 and 2024. The rate has been between 74 and 95 per cent, one of the lowest among all powiats. Although this trend has slightly changed over the last decade, the unemployment rate remains the highest in the country. The rate has been stable since 2017 and is currently at 25.1 per cent. The area lacks job opportunities for graduates with tertiary education, which is why only a few of them decide to return to the region.

While transitioning from agriculture to a production and consumption-based economy, the region faces the challenge of identifying its development direction and specificity. The figure below (Figure 15 Number of firms registered in the macro-region per 1000 working-age persons. Elaborated by Marcin Mazur) shows firms registered in the rural areas of the macro-region, excluding whole municipalities with towns with a population of more than 10 thousand, which gives a comparative overview of entrepreneurial development in rural areas of the Mazowieckie voivodeship.

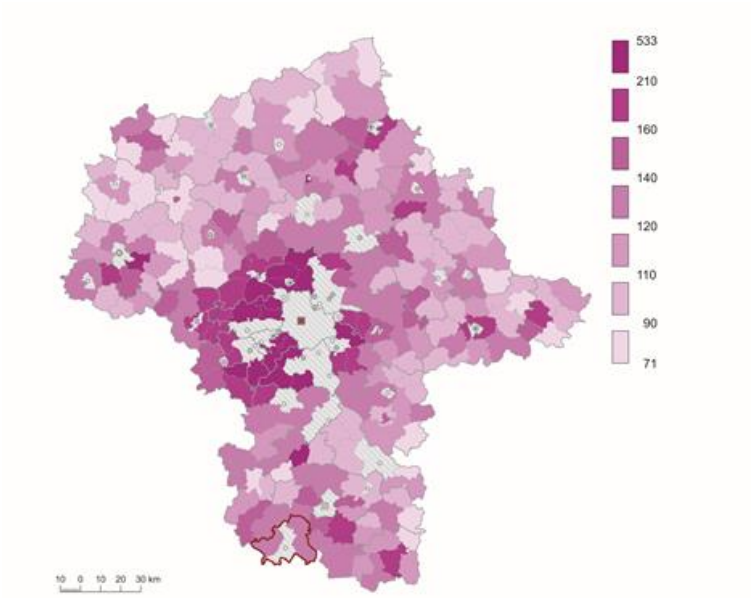

Figure 15 Number of firms registered in the macro-region per 1000 working-age persons. Elaborated by Marcin Mazur

Climate and environmental transition

Mazowieckie voivodeship is characterised by moderate environmental resources. The region is endangered by water deficiency and droughts, which strongly impact the economy and agriculture. The natural environment is subject to change and transition due to anthropogenic pressure. Ongoing urbanisation and the development of technical infrastructure result in a reduction of biologically active surfaces. Climate change and global warming contribute to a periodic drought phenomenon in the region. Municipal and industrial sewage discharges endanger the quality of water. The sustainability of high-quality water resource provision is especially challenged in the Warsaw region and Radom subregion, within which the Pilot Region is located.

Digital transition

Investing in digitally driven growth is one of the key development prerequisites in the macro-region. Access to broadband internet is growing systematically. There is no large disproportion between the capital city area and the rest of the region, with 89.5 per cent and 80.1 per cent of households, respectively, equipped with fixed-line internet (2019). The biggest transition challenges are combating digital exclusion, providing Wi-Fi and infrastructure in public places, and popularising electronic tools, information, and education.

The use of digital technologies in entrepreneurial activity is steadily growing. In 2019, 75.8 per cent of firms in the macro-region had a website, whereas the national average was 70.2 per cent. Nonetheless, considerable regional disparities remain between the capital region and regional Mazowieckie (Strategia Województwa Mazowieckiego, 2022). The Szydłowiecki powiat, as one of its 'smart' initiatives, has introduced e-services with a whole set of functions centred around information and communication, such as an electronic mailbox, registration for clients, and a geoportal website with information about locations, OpenStreetMap, land survey data, etc.

Living Lab Cycle 1: Planning Possibilities

Setting up the Living Lab

The preparation work for the Living Lab Mazowieckie started with a bilateral meeting between the LL Coordinator and the Pilot Region Partner. The issues discussed at the meeting concerned formal matters of collaboration and the choice of the Pilot Region. The decision was made to narrow the focus of the research and action to the Szydłowiecki powiat since Mazowieckie voivodeship, as a large and functionally polarised region, was considered challenging for the Living Lab's objectives.

The first meeting with representatives of the powiat and the municipality of Orońsko was held on November 22, 2022. The partners agreed to collaborate on the RUSTIK project according to the Living Lab methodology. The local government is very receptive to all activities proposed, and its representatives assist and support organisers in reaching out to other stakeholders interested in promoting the region and open to entrepreneurial ideas for its development. The involvement of authorities and other local leaders, such as school principals, in the work of the LL is expected to directly impact policy activities, including developing a local strategy.

Three workshops have since been organised, each with a different form and a mixed group of participants. The first was held in the Centre of Polish Sculpture in Orońsko, the second in the seat of the Szydłowiecki powiat, and the third was a field trip to the adjacent Świętokrzyskie voivodeship, including flint mines and a museum. The trip was organised on World Tourism Day to promote good practices and ideas for the Pilot Region's stakeholders and support the implementation of the Living Lab's goals. All the meetings were interactive, especially the second workshop, which resulted in elaborating a local entrepreneurship development potential index.

The LL Mazowieckie team conducted three surveys to evaluate the local strengths, weaknesses, opportunities, and challenges. They also analysed best practices from the neighbouring region and provided relevant data, including data gaps related to the potential of the Pilot Region.

Participants and stakeholders

The first meeting involved over twenty participants representing the administration of the powiat and municipalities, the Marshal office (regional level administration), and local NGOs, including the Local Action Group "Together on the Sandstone" (LGD), Ecological Association "Eko-Orońsko", The Association for Renewal and Development of Orońsko, the Henryk Sienkiewicz Highschool in Szydłowiec, the Psychological and Pedagogical Clinic in Szydłowiec, the Józef Brandt Elementary School in Orońsko.

Besides local authorities, the second focus group meeting involved approximately 15 participants from the Szydłowiec Labour Office, local entrepreneurs and the Chamber of Small Business and Crafts in Radom. In the field trip activity, the LL team engaged NGO representatives, the Head of the Orońsko Elementary School, municipality, and district level authorities, including the Mayor of Szydłowiec, and two local entrepreneurs (20 participants).

The third workshop additionally involved an archaeologist from the Museum and Reserve of Archaeology and Natural History 'Krzemionki', and Master goldsmith Cezary Łutowicz, who was the first artist to introduce striped flint in his jewellery to create a local brand, which promoted the Świętokrzyskie region. Both experts introduced their working sites and provided examples of how

natural minerals can be used for place branding. The LL Coordinator and PR partner institutions aim to involve more entrepreneurs in future to receive their feedback and support the LL's actions.

Data collection methods

Besides the methods described above, data to analyse the region's functions and transitions have been collected from existing local and European databases and extracted from strategic documents, reports, and scientific publications.

Living Lab activities in 2023

The survey on best practices (Table 14 Mazowieckie LL activities by type) has provided information on potential solutions to stimulate entrepreneurship in the area. This was done by taking inspiration from the success of the adjacent Świętokrzyskie region's promotion of striped flint. The survey suggests ideas such as creating an ethnographic park and a museum, showcasing jewellery products, and developing cooperation between the local government and cultural institutions to promote local heritage.

According to the survey results, most respondents cited the absence of adequate regional promotion activities as a major obstacle to the growth of entrepreneurship in regional products. They also identified some areas that require improvement to ease the activities related to regional development and entrepreneurship. The latter primarily includes cooperation between local government entrepreneurs and NGOs. The importance of well-chosen promotional activities, which determined the success of Pasista Flint, was indicated as extremely important in subsequent questions but proved to be underutilised in the municipality. Respondents also pointed to a variety of potential promotional activities in the region, such as Chocolate flint jewellery; pralines and other food products; and local events, festivals, and field lessons, which could stimulate regional development, as well as people and places that could be ambassadors for the Szydłowiec area. According to the respondents, the Orońsko Sculpture Centre, as a leading cultural institution in the area, should be a place to present artefacts related to chocolate flint.

Table 14 Mazowieckie LL activities by type

Workshops	Data collection	Other
'kick-off' stakeholder workshop in Orońsko	SWOT analysis survey	individual meeting with Cezary Łutowicz on place branding
entrepreneurship workshop in Szydłowiec	elaboration of the local entrepreneurship development potential indicator	meetings of LL Coordinator and PR partner to complete the Policy Panorama task
field trip workshop activity - Sudoł and Sandomierz	data availability survey/Best practices survey	individual collection and analysis of data (list of local firms, land use, employment, demographic structure etc.,

Reflections from Cycle 1

Cycle 1 was challenging as it required much organisational effort, but most planned activities were accomplished. The focus group meetings and other encounters with the local stakeholders revealed a high level of interest in the practical effects of the RUSTIK project. Despite some incompatibilities between representatives from individual municipalities or interest groups and an uneven level of engagement, there is a willingness to include ideas that emerge during the Living Lab work in policy development and local actions.

Collaboration between the LL partners and engagement with the Pilot Region's local authorities brought much satisfaction. It was very rewarding to discover a lot of interest in the project and that local stakeholders anticipate both support in strategic planning and practical effects for the district's development. However, since the challenge identified relates to economic performance, greater engagement had been expected from local entrepreneurs. So far, the LL team has succeeded in engaging those representatives of local businesses who participate in various community development activities, simultaneously co-create NGOs, or are directly interested in exploiting chocolate flint.

Cycle 1 results

The work within Cycle 1 aimed to identify the main transitions, challenges, and opportunities of the Pilot Region, as well as the provision of local data and data gaps. It also allowed for the development of a collaboration platform bringing together local actors. The focus group meetings facilitated have provided the LL team with an extended knowledge of local social networks and relations between individual actors and groups of actors.

The picture that emerges from the Cycle shows the region's endogenous assets, including resources, social and technical infrastructure and amenities, plus the weaknesses and challenges that the local community faces. As the district transitions from an agriculture-based economy to a production and consumption-oriented one, it faces challenges such as a lack of technical infrastructure and profitable job opportunities for educated residents. In response to the transition challenge, the work within the LL seeks solutions based on the region's natural and cultural resources and human and social capital.

The approaches referred to by the focus groups reflect some ideas highlighted in EU, national, regional, and local level policies. However, discussions focused less on environmental or climate change issues. Participants related several good practices and examples of governance arrangements. They included joint initiatives of local authorities and entrepreneurs; concrete business initiatives or organisations and their activity; NGO collaborations; the creation of new products that deploy both local natural resources and the historical and cultural heritage, such as chocolate flint products and Orońsko chocolate coffee, named after the colour of the stone.

The last field trip workshop organised by the LL team inspired the participants to reflect further on how their institution or organisation can contribute to promoting the local natural resources and cultural heritage and to place branding. Among the proposed ideas were storytelling, local symbols, creation of legends, 'playing with the notion - chocolate flint', enhancing communication, networking between entrepreneurs, and promotional activities, which could include such actors as tourist and advertising agencies, hotels and catering services, jewellers and other artisans, entrepreneurs working with types of natural produce. These ideas will be used to elaborate a local business plan for developing nature and culture-based entrepreneurship.

Part 2: Challenge and next steps

Living Lab challenge

The main challenge identified in the Pilot Region is related to the socio-economic transition: the functional transformation of the rural area from a farming-based to a production and consumption-oriented economy and the increase of spatial mobility. The area's development is affected and hampered by unemployment, specifically, a lack of job positions for the well-educated population and deficiencies in technical infrastructure. Specific challenges related to economic development are demographic transition, professional skills and education, financial resources, poor interconnectedness, and communication between actors (entrepreneurs, municipalities, etc.)

To reverse these challenging trends, the Living Lab will seek opportunities to develop entrepreneurship, specifically through using the area's natural resources, supported by awareness of and knowledge about the local cultural heritage and traditions, and strengthening local ties and networks between and within rural areas. Natural resources, such as sandstone, iron ore, and chocolate flint mined in Orońsko municipality, are believed to offer economic and social development opportunities in the region, both directly and as a means of place branding.

Rationale

The selected Living Lab challenge connects the area's deficiencies with its development potential. It reflects the needs expressed by local stakeholders and builds on earlier actions undertaken by the FDPA in the Radomski subregion. The local natural assets can be leveraged to create a place branding campaign and a development strategy aimed at boosting economic growth. Experience from other regions that have used natural assets to successfully develop various consumption functions and the activities conducted by local authorities and NGOs offer good practices. The actions taken by the Living Lab can contribute to local networking between entrepreneurs and other population groups and raise local interest in the region's development opportunities.

Knowledge to date

Living Lab Cycle 1 built on knowledge of the region's economic base and economic performance derived from secondary data sources such as official databases, strategic documents, reports, and scientific publications. The cycle extended this knowledge via individual and focus group meetings and surveys. The work exposed a lack of detailed, current data on the functional structure of the Pilot Region, especially in public statistics collection. Whereas macro-region level data is usually accessible, LAU 1 and LAU 2 level data is rarely shared.

The following information and data needs on the production, consumption, and ecosystem functions have been identified in the following table.

Table 15 Mazowieckie LL type of data needed, and collection methods planned.

Type of data	Collection methods
Number and type of firm in the voivodship and powiat (five municipalities)	quantitative analysis and structural characteristics of firms operating in a specified area of the macro-region (potentially Pilot Region)
Agrotourism Base (Radom subregion, Pilot Region - five municipalities)	a compilation of accommodation facilities, hotels, and gastronomic services in the agrotourism region
Monuments (historic and cultural sights) in the Pilot Region	inventory of material and non-material cultural monuments, including their condition and tourism potential
Places visited by families with children in the Pilot Region	Identification of places popular among families with children, considering both recreational and educational attractions
Prominent Places for Promotion in the Pilot Region	selection of locations deserving increased promotion due to their tourism, cultural, or natural potential
Data on sources and types of funding for entrepreneurial projects	analysis of available funding sources and types of financial support for planned projects in the field of entrepreneurship
Media, local portal bases, and other forms of promotion to be used to promote the region - derived from FB, Instagram, and YouTube	the engagement of local influencers and bloggers

The information above will serve as a foundation for further work within the Living Lab, enabling precise determination of priority areas and the development of strategies supporting entrepreneurial development in the district.

Research question/s

- What are the components of local development potential? What are the essential factors to consider when developing a local business strategy that impacts economic performance?
- Which good and best practices from other regions can be used to face the challenges and opportunities in the Pilot Region?
- Which new data sources and data collection methods can be used to develop knowledge about the local challenge? How?
- Which data is relevant/available/needed to further develop a local index of entrepreneurship development potential?

Policy relevance

Szydlowiecki powiat is part of the Radom subregion, which is one of the problematic areas characterised by a concentration of socio-economic problems and is endangered by long-term exclusion, according to the Development Strategy of the Mazowieckie Voivodeship. Policy intervention aims to boost the local economy and increase social activation, including social mobility, combating long-term unemployment, restructuring the production sector, and improving living conditions for the local population. Strengthening entrepreneurial competitiveness is a strategic development opportunity, which has also been selected as the focus for Mazowieckie LL.

Focus groups raised various strategies for facing the transition challenge. These included direct and indirect approaches. Direct approaches include organisational, financial, or educational support, such as policies regulating the tax burden and financing entrepreneurship (EU to local level funds and loans), providing education and skills, and assistance to create business activity. Indirect approaches involve promoting the region's assets through projects to develop local products, networking activities to bring entrepreneurs together entrepreneurs, and improving access to any data and information required. These approaches reflect some of the ideas highlighted in EU, national, regional, and local policies. However, focus group discussions emphasised environmental issues and climate change less.

Through the Living Lab, Szydłowiecki powiat aims to become a case study on how entrepreneurship can support rural areas to achieve their potential. Input from diverse stakeholders, strengthened entrepreneurial networks, common goals and complementarity effects, and knowledge and awareness of local assets are necessary for achieving this objective. The local business plan is part of a business development strategy and incorporates other sectors and actors.

Stakeholders perceive that the data to be obtained, captured, and experimented with in Living Lab Cycle 2 will be extremely valuable, especially since local authority budgets do not otherwise allow for this. From 2026 onwards, every municipality in Poland will be required to produce a development strategy, including local spatial policy directions. A General Plan – a new planning tool for the entire municipality – will also be introduced. As part of these changes, spatial planning procedures at the municipality level will be simplified and standardised. RUSTIK data will provide a valuable contribution to these measures.

Emerging data needs

As described above, data needs have been examined and identified. They pertain first and foremost to a more detailed analysis of the transition challenge (functional structure, employment structure, and dynamics) and the region's development potential: natural resources; information about the entrepreneurial sector, its connectivity and range of impact; and data on the actual and potential demand for local products and services, such as the origin of tourists visiting the region.

In Cycle 1, Mazowieckie LL introduced activities to collect data and information that diagnose the factors responsible for the existing challenges and future trends. The surveys and data exercise on the potential for entrepreneurship development identified a list of components for local economic development. Calculating the development index requires further information on the profitability of selected business activities, the quality of professional skills (especially in the craft

sector), school graduates' professional activity, unemployment according to the Polish Classification of Activities (PKD), numbers affiliated with NGOs and other organisations, information on cooperation between entrepreneurs and other industries and the share of firms deploying mineral resources, as well as outlays on the unemployed against the number of unemployed in the region.

The theme of promotion and channels to reach residents and those outside the area recurred several times in the survey. Therefore, providing Living Lab participants with information on ways to promote the region and use the resources available to stimulate local business is crucial. According to survey respondents, how participants can finance professional activities also requires in-depth investigation.

The surveys have identified the data that need to be collected and shared among LL participants. This data will be used to present information during the upcoming LL focus group meetings within cycle 2. The focus will be on utilising this data in specific regional promotional activities.

Data availability

Mazowieckie LL is working with four types of data: secondary data from official databases (European to local level); existing spatial data and information from geoportals and webpages; primary data obtained from surveys and interviews specifically designed for the Living Lab; and data obtained through additional tools such as Maptionnaire.

Table 16 Data sources at the Pilot Region level: availability and needs

Available	Needed secondary	Needed primary
selected data on entrepreneurship from the Local Data Bank (Central Statistical Office)	more specific data on functional structure at the LAU 1 and LAU 2 level	qualitative data on the assessment of local challenges, potential, solutions
EU databases, e.g... distribution of land use data - municipality level https://observatory.rural-vision.europa.eu/	inventory databases (agrotourism, sights, locations, types of funding sources etc., share of firms deploying mineral resources)	information and data on ways of promoting the region
data from geoportals, webpages, publications	selected LAU 1 and LAU 2 demographic data	information on the profitability of selected business activities, the quality of professional skills, professional activity of school graduates
	information on the profitability of selected business activities, the quality of professional skills, professional activity of school graduates	

Limitations

Limitations pertain to the lack or gaps in the availability of data at LAU 1 and LAU 2 levels and the availability of vulnerable data. Some of the gaps can be filled via survey research. In Cycle 2, further surveys are planned to complement the qualitative surveying carried out so far.

Capacities

The ability to build partnerships with different stakeholders, such as local communities, businesses, research institutions, or public administrations, is a key competence for the Mazowieckie LL. Collaborating with users in data collection and interpretation allows for a better understanding of real needs and expectations. Today, with the vast amount of data available on the internet, it is crucial to have the skills to filter, interpret, and effectively utilise this data.

Digital competencies and openness to modern marketing trends, as well as designing creative solutions (for example, in financial resources) and creating partnerships, will be extremely important for the Living Lab - both team and stakeholders. The latter constitutes an opportunity but, at the same time, a challenge to be faced in the next cycle.

Next steps

The work done in Cycle 1 has brought to light limitations and gaps in knowledge regarding the Pilot Region's main transition challenge. This challenge involves transitioning from a farming-oriented economy to one focused on production and consumption. Typical components of this transition include structural unemployment and increased spatial and social mobility. However, available databases only provide partial data and information on these processes, making conducting quantitative and qualitative survey research necessary. Other data and information sources will also be utilised, and tools such as Maptionnaire will be employed.

Other limitations identified are organisational but also result in knowledge or data gaps. To date, actions have revealed some local deficiencies and conflicts of interest between stakeholders (such as competition between authorities or disinterest in promoting entrepreneurship). There has also been a lower-than-expected engagement from local entrepreneurs. As Cycle 2 is centred around economic performance, other methods are sought, especially snowballing or using diversified entry points to establish contacts with a wider group of entrepreneurs.

Cycle 1 evidence suggests that promoting the region is a way to improve economic performance and branding. This can be achieved by creating new businesses that use natural resources directly or indirectly, reducing unemployment and making the area more appealing to residents and tourists. LL Mazowieckie will investigate holding an educational workshop on promoting regional products to continue this work. The goal is to encourage local schools to take action by organising competitions, educational activities and other events centred around promotion. Another idea is to focus on a local business plan, which can serve as a macro-scale policy and a practical micro-scale arrangement for individual firms.

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Poland: Woj. Świętokrzyskie

Jerzy Bański and Wioletta Kamińska

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Summary and Overview

The Świętokrzyski region has an industrial and rural character, with a notable division into an industrial north and a rural south. Two of the region's most serious problems are out-migration and the ageing of rural areas. This can be improved by developing tourism services. Attractive environmental conditions, as well as a significant and unique cultural value, constitute important factors leading to the social and economic development of rural areas (Figure 16 The landscape of the Świętokrzyskie Region). In current strategic documents, tourist function is perceived as one of the key functions of the Świętokrzyskie region's development (*Strategia ...* 2021).

Figure 16 The landscape of the Świętokrzyskie Region

Living Lab Achievements

Świętokrzyskie Voivodeship's first living lab (LL) conference was organised and took place (Figure 17 Participants of the first LL meeting). Stakeholders were selected to participate in the future research process. A design for further research was developed, including social survey data acquisition. A preliminary diagnosis of the state of rural tourism in the Świętokrzyskie region was also developed.

Figure 17 Participants of the first LL meeting

Key Learning to Date

Tourism (including agri-tourism) is an important but underexploited area of development potential for rural areas in the Świętokrzyskie region. This has been pointed out by researchers,

representatives of regional and local authorities, social organisations, and entrepreneurs. Several problems surround the activation of tourism potential, including a lack of recognition of the expectations of tourists visiting the region and the needs of entrepreneurs and organisations working to develop tourism. The issue must be diagnosed and planned for in the region's strategic documents.

Living Lab Challenges

One of the leading challenges for the Świętokrzyskie region is to stop and reverse unfavourable demographic processes, especially in rural areas. There is a need to increase the region's attractiveness, especially for young people, by stimulating processes to improve the overall quality of life, employment opportunities, and accessibility to public services, facilities, and culture. It is imperative to create conditions that will attract new residents. Tourism is perceived as a key function of rural area development and can help to prevent negative demographic processes. The LL aims to develop a state diagnosis and assumptions for a planned document: a tourism development strategy for the Świętokrzyskie region.

Emerging Data Needs

The data and information collected in the LL will be used to develop a strategy. The data compiled from interviews with entrepreneurs and a survey of tourists visiting rural areas in the Świętokrzyskie region will be particularly important for this process.

Next Steps

A four-stage research process is envisaged:
1) Identifying and distributing tourism service entities in rural areas in the Świętokrzyskie region
2) Selecting tourist entities for diagnostic research
3) Conducting social research with tourist entities and service users
4) Interpreting the results to develop a future strategy, including the reduction of unfavourable demographic processes in rural Świętokrzyskie

The surveyed tourist entities will include agritourism farms (50), hotels and other accommodation entities (20), and other tourist entities, such as rental companies and museums. (10). The basic research methods will be:

- In-depth interviews with owners and managers of tourist entities.
- Survey of all surveyed tourist entities.
- Survey of tourists.

The team involved in LL's work has already developed survey and interview templates. It is expected that social studies will be carried out in Spring 2024.

Part 1: Progress Review

Pilot Region Introduction

Świętokrzyskie Voivodeship covers 3.7% of Poland, and 3.2% of the country lives in the region. The northern and central parts of the region are upland areas. The oldest mountains in Poland, the Świętokrzyskie Mountains, are located in these upland regions. The south-eastern part of the region is lowland.

The region's settlement network consisted of 2,516 localities, including 45 cities. The cities of Świętokrzyskie Voivodeship are predominantly small centres, and only five towns have more than 20 thousand residents. 54.5% of the Świętokrzyskie region's population lives in rural areas (in Poland, on average, 41% of the population lives in the countryside). The settlement network comprises 45 cities and rural localities (Figure 18 Location of the Świętokrzyskie region in Poland and its administrative division (coloured units are counties divided into municipalities)).

Świętokrzyskie is characterised by a large area and many protected areas. These occupy 65% of its total area (in Poland, the average is 33%) and have significant potential to contribute to tourism development. The region has one national park, 72 nature reserves, and nine landscape parks.

Identifying a single dominant function in the rural areas of Świętokrzyskie is difficult. Individual municipalities tend to develop according to a multifunctional model. The spatial layout of the region shows a clear division into a northern part, with non-agricultural functions, and a southern and eastern part, with a dominant agricultural function. The region faces challenges resulting from both natural and migratory population movement processes. Świętokrzyskie is characterised by both an unfavourable migration balance and negative natural growth.

Figure 18 Location of the Świętokrzyskie region in Poland and its administrative division (coloured units are counties divided into municipalities)

Pilot Region Partner

The partners in the project are the Jan Kochanowski University in Kielce (UJK) and the Regional Tourism Organization of the Świętokrzyskie Voivodeship (RTO).

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UJK is the flagship institution of higher education in the Świętokrzyskie Region. It consists of six faculties. About 12,000 students are currently studying at UJK. The institution offers various fields of study to applicants, including pedagogical sciences, arts, natural sciences, humanities, economic sciences, medical and health sciences, law, and physical sciences.

The RTO is a non-governmental organisation that supports the development and promotion of tourism. The institution brings together tourism companies, local governments, associations, and foundations working to develop tourism. The RTO's main goal is to promote tourism in the Świętokrzyskie region, and the tourism opportunities created by the organisation's members.

Living Lab Coordinator

The research coordinator for the LL in Świętokrzyskie is Professor Jerzy Bański. Jerzy Bański is a full professor of human geography at the Institute of Geography and Spatial Organization, Polish Academy of Sciences (IGSO PAS). His main research interests include rural and agricultural geography, land use, regional policy, spatial organisation, and local development.

The research coordination is carried out in cooperation with Professor Wioletta Kaminska, who represents Jan Kochanowski University in Kielce, the main regional partner. Wioletta Kamińska is a full professor of social sciences at the Institute of Geography and Environmental Sciences at the Jan Kochanowski University in Kielce. She is a director of this Institute. Her scientific interests include social and economic geography, rural areas, local development, and tourism.

Functions and Transitions

Functions

The region has an industrial and rural character, with a visible division into an industrial north and a rural south. Identifying a single dominant function in the rural areas of Świętokrzyskie Voivodeship is difficult. Individual municipalities tend to develop according to a multifunctional model. The spatial layout of the region shows a clear division into a northern part, with non-agricultural functions, and a southern and eastern part, with a dominant agricultural function (Figure 19 Functional typology of municipalities (Bański, Mazur 2016)).

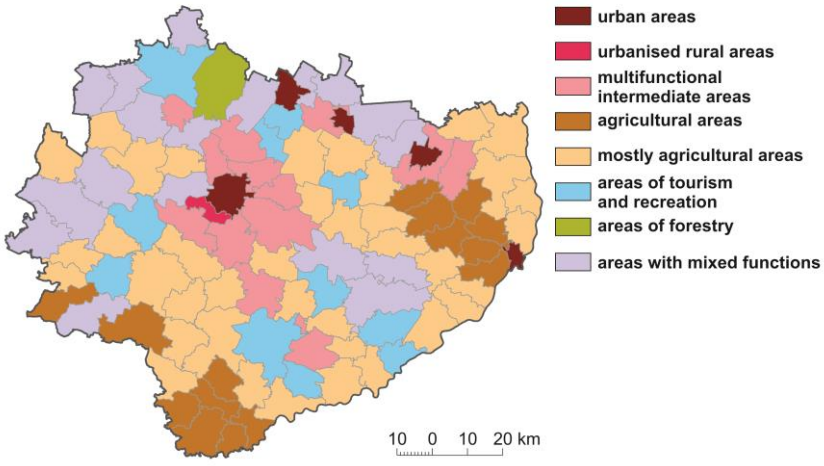

Figure 19 Functional typology of municipalities (Bański, Mazur 2016)

Production Functions

Industrial activities are based on mineral resources (concrete plants, aggregate mines). They are connected to machine and mechanical device production, concentrated in several urban centres (Kielce, Starachowice, Ostrowiec Świętokrzyski, Skarżysko Kamienna, Suchedniów, and Końskie). Small-area holdings focused on plant production (crops, sugar beets, vegetables, fruits) dominate agricultural production. A low yield of marketable agricultural output characterises Świętokrzyskie's agriculture. Many small holdings produce primarily for their own needs.

Consumption Functions

Most business entities operate in the service sector (73%) and industry and construction (25%). Świętokrzyskie Voivodeship is characterised by a large acreage and many protected areas. They occupy 65% of its total area and have excellent potential in the development of tourism. Attractive environmental conditions and unique cultural value constitute an important factor in rural areas' social and economic development. In current strategic documents, tourism is perceived as a key function of the Świętokrzyskie region's rural area development. This is accompanied by tourist and tourism-related infrastructure development, increased service providers, creation of thematic villages, and many other goals.

Tourism has developed well in the central and southern parts of the region. Tourist traffic is concentrated in these areas thanks to their beautiful landscapes (mountains or highlands) and cultural attractiveness. Tourists from all over Poland frequently visit these areas and have a well-developed accommodation base and tourist infrastructure. In the southern part of the region, therapeutic tourism plays an important role due to the presence of medicinal waters.

Residential function has developed significantly in municipalities located in the vicinity of the region's largest city, Kielce. Such municipalities have increased their population by more than 20% in the last two decades.

Ecosystem Services

Świętokrzyskie Voivodeship is characterised by a poor quality of surface water, which poses a significant threat to the environment and the socio-economic development of the region. Groundwater quality is better than surface water quality. Renewable energy sources have a relatively high potential in the Świętokrzyskie region. The share of renewable energy in total electric energy production in 2020 amounted to 20.4% (16.3% on average in Poland). Świętokrzyskie Voivodeship has a large acreage and several protected areas. The region has one national park, 72 nature reserves, and nine landscape parks. The Voivodeship is characterised by a very low percentage of people using sewage treatment plants. This problem is particularly prevalent in rural areas. In 2020, just over 95% of the population in cities used sewage treatment plants; in rural areas, this was only 41.6%. This is mainly due to the very low level of sewerage in rural areas in Świętokrzyskie.

Transitions

Socio-economic and Demographic Transition

The socio-economic transition is the biggest challenge facing the region's rural areas. One of the leading challenges identified in the current strategy for the region's development is to stop and reverse unfavourable demographic processes. Migration outflow, ageing of society, and natural population decrease are important problems for Świętokrzyskie Voivodeship's development, especially for rural areas. Between 2000 and 2022, the Świętokrzyskie region's population decreased by 9% due to migrant outflow, mainly of young inhabitants, as well as lower levels of natural population increase. These trends are accompanied by population ageing; the percentage of people post-working age increased from 17% to 25% between 2002 and 2021 (in Poland, this was from 15% to 22.5%). Social policy supporting families and the development of infrastructure

to improve the quality of living conditions has so far created unsatisfactory results. Therefore, the project identified this transformation as the most relevant and requires specific action. It can be hypothesised that rural tourism has the potential to shape positive directions of change. The region has significant untapped resources in this area.

Climate and Environmental Transition

The region is vulnerable to the results of climate change. Floods and droughts are important threats related to climate change in the Świętokrzyskie region. Vast areas are in danger of small-scale flooding and inundation. These are mainly located in the valleys of Vistula and its tributaries. Świętokrzyskie has minor surface and underground water resources. The region's inhabitants and economy are increasingly influenced by water shortages resulting from prolonged droughts.

Digital Transition

Świętokrzyskie's telecommunication infrastructure is unsatisfactory. The percentage of households with a device that has internet access has doubled within the last few years; however, the region is still in the last place in Poland in this category (in 2018, 32.5% of households were equipped with a device with internet access; on average in Poland, this figure was 45.7%).

Living Lab Cycle 1: Planning Possibilities

Setting up the Living Lab

The main objective of LL is to develop a state diagnosis and prepare strategic assumptions in the field of rural tourism to establish a tourism development strategy for the Świętokrzyskie region. It is assumed that the primary objectives will be achieved: the full use of the projects implemented to date and the creation of new products to promote optimal socio-economic effects in rural tourism development in the Świętokrzyskie region.

To realise these objectives, cooperation was undertaken with the RTO, which has long been involved in shaping rural tourism development and working with local action groups, entrepreneurs, local authorities, and regional administration. The RTO provides a specific platform for cooperation and contact with stakeholders working to develop rural tourism in the Świętokrzyskie region. A concept for the LL's activities was developed during meetings between the LL coordinator and representatives of Jan Kochanowski University and the RTO. This concept is expected to result in a basis for a future tourism development strategy for the Świętokrzyskie region. It was assumed that the results of the work would include the development of solutions aimed at the commercialisation of rural tourism, the development of tourism infrastructure, the improvement of the image of rural tourism, and the creation of cooperation networks.

Collaborative Methods

Three meetings between the LL coordinator, representatives of the pilot regional partner, and the head of the RTO have taken place so far, during which a detailed outline of the LL objectives and activities and a programme of meetings were developed. A group of stakeholders who will be regular participants in the LL meetings was identified, and a questionnaire about their expectations for the first LL meeting was developed. UJK students have been involved in the project activities and have collaborated in collecting statistical material and preliminary diagnostic work.

A survey plan and an in-depth interview plan have also been prepared. These will be conducted with owners of agritourism farms and tourists visiting these farms. The research aims to collect qualitative data on tourists' expectations and the needs of tourism entities.

Participants and Stakeholders

The stakeholders involved in the permanent activities of LL (meetings, surveys, interviews) include representatives of local government authorities, local and regional tourist organisations, entrepreneurs related to the tourism industry, and people representing the world of science.

Table 17 Permanent participants of the LL in the Świętokrzyskie region

Type of institution	Name of institution	Number of participants
Local government	Marshal's Office of Świętokrzyskie Voivodeship	1
Tourism institutions	RTO, local tourist organizations, local action groups, Polish Chamber of Regional and Local Products	6
Agricultural institutions	Świętokrzyskie Agricultural Advisory Centre	1
Owners of tourism companies	Agritourism farms, educational homestead, agropark, automotive museum	5
Scientific institutions	UJK	2

A group of students from UJK are actively participating in the work for the LL; some are preparing master's theses on rural tourism in the Świętokrzyskie region.

Data Collection Methods

Official statistical databases have very limited data on rural tourism in the Świętokrzyskie region. The literature on rural tourism in the Świętokrzyskie region was searched to obtain data. Furthermore, a survey was conducted among stakeholders, and internet sources were used. Students played a major role in collecting information materials; for example, they identified and initially assessed (using the opinions of service users) over 200 tourist entities in rural areas using Google Maps.

Living Lab Activities in 2023

The LL coordinator held three meetings with representatives of the regional partner (UJK) and the RTO to develop an outline of activities, set dates for meetings with stakeholder groups, and prepare RUSTIK documents. Cooperation with the second national LL (Mazovia) was also carried out, primarily involving the exchange of experience and information.

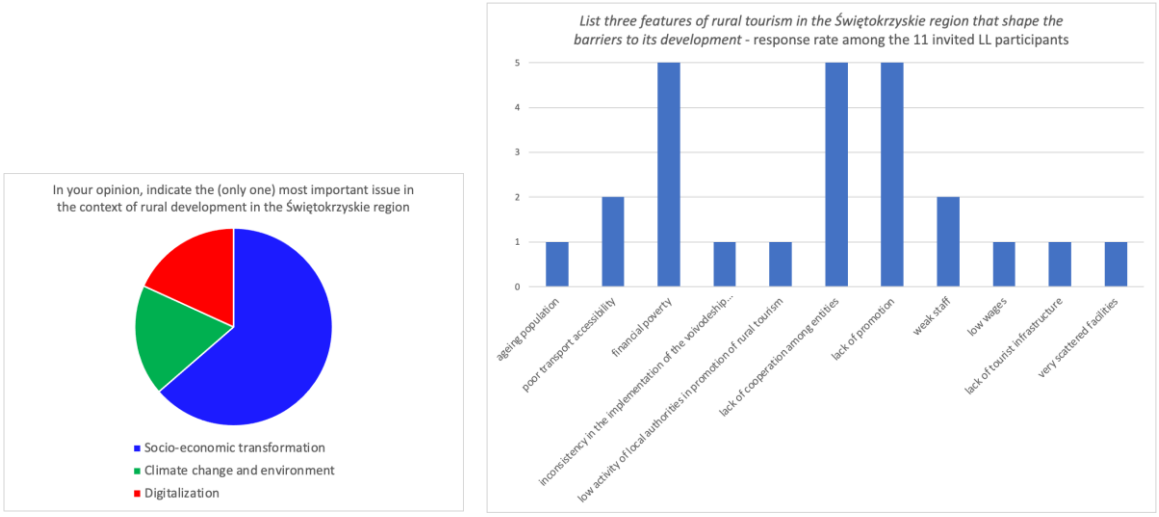

Figure 20 Examples of the results of a survey carried out during an LL meeting.

The first meeting of the stakeholder group LL Swietokrzyskie was held in May 2023. It was attended by more than 20 people and a group of students (Figure 21 LL meeting and a table showing the stakeholder preference). The meeting agenda included an introduction to LL, an introduction of participants, and an outline of the RUSTIK concept and the tasks of the LL. Attendees also discussed the demographic situation in rural areas of Świętokrzyskie and the tourism-related challenges in the region. They also highlighted the place of rural tourism in the future tourism development strategy for the region. Among other things, a survey was conducted. This asked stakeholders about the most important category of transformation in the Świętokrzyskie region (socio-economic, climatic, digital), the relevance of transformation to rural tourism development, the characteristics of rural tourism, and the role of tourism in shaping positive demographic trends.

The LL's work also involves students collecting statistical materials related to their master's theses on tourism and identifying the distribution of rural tourism-related entities in the Świętokrzyskie region.

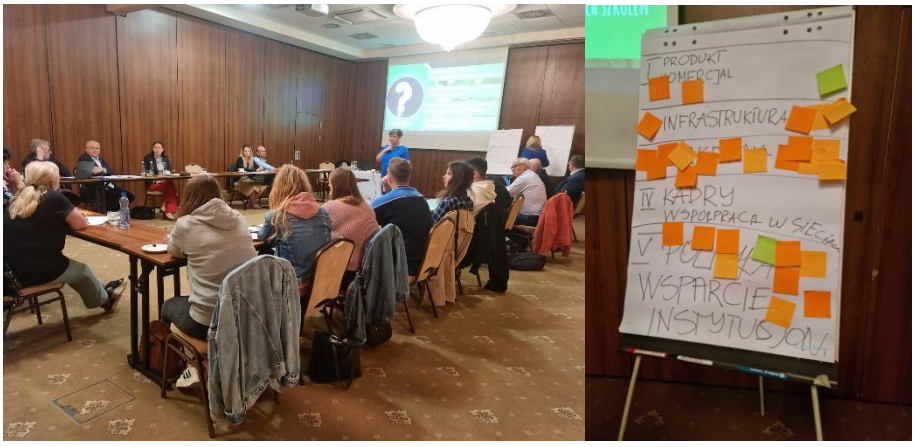

Figure 21 LL meeting and a table showing the stakeholder preference survey.

Reflections from Cycle 1

The biggest problem encountered in the LL implementation process was the availability of information (especially statistical data) on rural tourism in the region. These deficiencies concern not only qualitative data but also quantitative data. Such materials are the basis of the work of the LL. This is because the LL aims to provide stakeholders with up-to-date data to aid the development of their businesses and to outline the state of rural tourism for a future tourism development strategy.

Cycle 1 results

Meetings between the LL coordinator and representatives of regional partners enabled the identification of four challenges on which the attention and activities of LL should focus:

1. Commercialisation of rural tourism, consisting of support for the development of existing rural tourism products in the region and the creation of new, necessary products.
2. Development of tourism infrastructure in rural areas.
3. Improvement of the image of rural tourism and the effectiveness of its marketing communications.
4. Creation of cooperation networks.

Meanwhile, the teams working at the first LL stakeholder meeting highlighted the need for 1) local governments and public administration institutions to support rural tourism and 2) data and tools to support the activities of local authorities in developing rural tourism.

Item 1 constituted the need for:

- Surveys among representatives of local governments on the awareness of the importance of tourism for the social and economic development of regions.
- Training for local government employees on the importance and functioning of tourism (study visits, good practices).
- Financial support for tourist organisations and associations.
- An audit of tourist attractions in rural areas of the Świętokrzyskie region.
- The creation of tourism departments in the Marshal's offices with competent staff.

Item 2 constituted the need for:

- Surveys on tourism in rural areas of the Świętokrzyskie region.
- A data bank focused on accommodation, locally available food products, and tourist value (attractions).
- Development of a list and organisation of regional and local events.
- Research on the unique attractions of the region (list, description, method of promotion).

The survey identified topics that will be addressed at future LL meetings.

Indicate the topics/issues that would be particularly important for you to discuss during the meetings of the LL team in Świętokrzyskie.

Opportunities for the development of ecotourism	Comparison of Polish rural tourism with other countries
Promotion of thematic routes	Networking of tourist products
The role of rural tourism in creating the region's strategy	Financing and promotion of tourist base

How to activate rural communities	Tourism customer analysis
Examples of good practices	Promotion and marketing of products
How to skilfully sell the heritage of rural tourism	Possibility to obtain financial support

Part 2: Challenges and Next Steps

Living Lab Challenges

Disadvantageous demographic changes are among the most important problems for developing rural areas. One of the leading challenges identified in the current strategy for developing the Świętokrzyskie region is to stop and reverse unfavourable demographic processes, especially in rural areas. This highlights the need to increase the region's attractiveness, especially for young people, by stimulating processes to improve the overall quality of life, employment opportunities, and accessibility to public services, facilities, and culture. It is vital to create conditions that will attract new residents. Tourism is perceived as a key function of rural area development and can help to reverse negative demographic trends. The development of tourism promotes the development of other higher-level services and social and technical infrastructure. This can help residents' quality of life increase and labour market conditions improve. Tourism also requires higher professional qualifications from employees, which will improve the overall educational structure of residents in rural areas. These are only some of the elements that can contribute to improving the demographic structure in the Świętokrzyskie countryside.

Rationale

It is assumed that rural tourism development can diversify economic functions in rural areas and create new jobs. In current strategic documents, tourism is perceived as a key function of rural area development and can help suppress negative demographic processes. Świętokrzyskie Voivodeship is characterised by a large acreage and many protected areas. Attractive environmental conditions and unique cultural and health values are important factors leading to the development of various forms of recreation and tourism (agritourism, silver economy, SPA, and wellness, etc.). This project aims to develop a state diagnosis and prepare strategic assumptions in the field of rural tourism for the planned tourism development strategy for the Świętokrzyskie region. Work on the strategy has already been initiated (first technical and organisational activities), and its development is planned for 2025. The main coordinator of work on the document will be the RTO of the Świętokrzyskie Voivodeship. It is assumed that the primary objectives will be achieved: the full use of the projects implemented to date and the creation of new products to promote optimal socio-economic effects in rural tourism development in the Świętokrzyskie region.

Knowledge to Date

The available knowledge about rural tourism in the Świętokrzyskie region is very general and scattered throughout the literature. The lack of statistical material makes it impossible to conduct a detailed analysis of the current state of rural tourism; there is limited data on the tourist

equipment and facilities, the number of visiting tourists, and many other factors. Particular needs concern data on the preferences of potential tourists, the valorisation of tourist attractions, and the directions from which tourist traffic is concentrated. Such knowledge is the basis for developing new forms of tourism in rural areas using currently underutilised internal resources.

Research Question/s

The research questions arose from the discussion with stakeholders during the first LL meeting:

- *To what extent can rural tourism development stimulate positive demographic processes in the region?*
- *What types of rural tourism activities can limit processes of unfavourable demographic changes?*
- *What are the needs of rural tourism stakeholders for tourism data and derived elements?*
- *What are the expectations of tourists visiting the Świętokrzyskie region?*

Social research will be the primary source of answers to the above questions.

Policy Relevance

The main result of LL Świętokrzyskie activity will be a state diagnosis and the preparation of strategic assumptions in the field of rural tourism for the planned tourism development strategy for the Świętokrzyskie Region.

It is assumed that the primary objective will be achieved: the full use of the projects implemented to date and the creation of new products to promote optimal socio-economic effects in the development of rural tourism in the Świętokrzyskie region.

Specific Results

- Commercialisation of rural tourism consisting of support for the development of existing rural tourism products in the region and the creation of new, necessary products.
- Development of tourist infrastructure and information for tourist attractions in rural areas.
- Improving the image of rural tourism and increasing the effectiveness of its marketing communications (building the region's rural tourism brand, promotional support for rural tourism products).
- Building cooperation networks, increasing the professionalism of tourism personnel and management methods.

The above-mentioned results and the later developed tourism development strategy will be used to implement the region's development policy and develop regional planning documents.

Emerging Data Needs

As previously mentioned, the annual data on rural tourism in the region is very general, making a detailed diagnosis of the region’s condition impossible. In spatial terms, they generally concern the entire region or occasionally large territorial units (counties). Data on demographic processes are of an equally general nature. Therefore, it is necessary to collect additional data and information that will allow the research questions to be answered. This will be achieved primarily through social research (surveys and interviews) and an inventory of agritourism farms using Google Maps. Various stakeholders can use this material for important analyses (scientific research, regional diagnoses, planning, etc.).

It is assumed that the collected data will be used to diagnose the state of tourism development in rural areas in the Świętokrzyskie region, including sample issues:

- The spatial distribution of natural and cultural resources in rural areas.
- The location of tourist facilities, with particular emphasis on agritourism farms.
- Equipment for tourist facilities in the countryside.
- The condition of rural areas with tourist and tourism-related infrastructure.
- Number of overnight stays and dynamics of changes.

Data Availability

The study will use three categories of data.

The first category is statistical data for general analyses at the scale of basic administrative units (municipalities). The data will primarily concern socio-economic issues, including demographics (Figure 22 Example of spatial analysis of statistical data. Share of population in post-working age A - 2002, B - 2021).

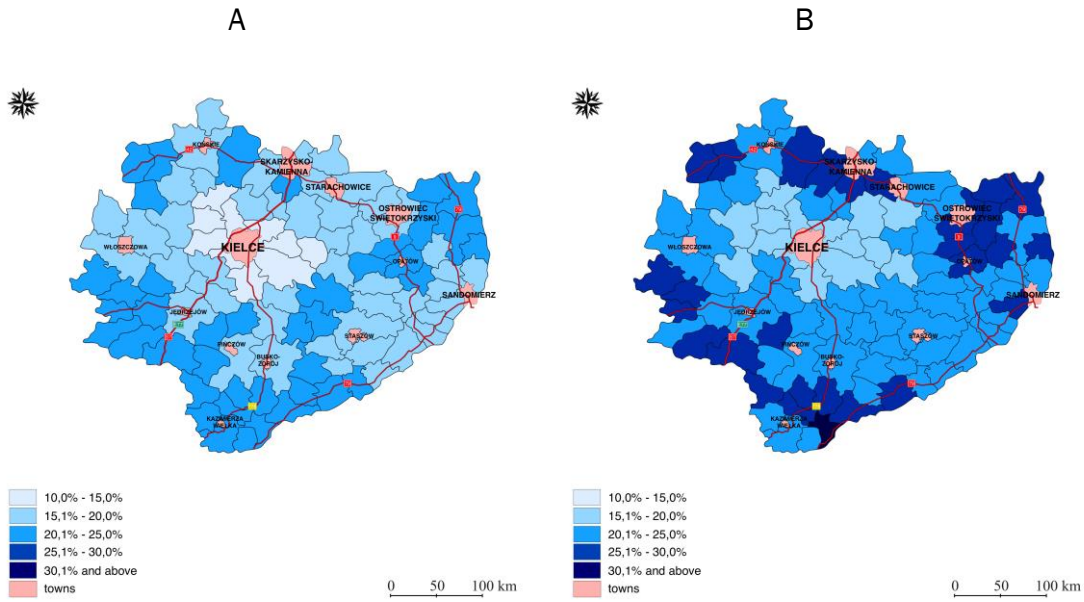

Figure 22 Example of spatial analysis of statistical data. Share of population in post-working age A - 2002, B - 2021

The second data category will be used by stakeholders to better recognise tourists' needs and take appropriate actions. Surveys will be conducted with tourists visiting the Świętokrzyskie region, who will answer the following questions (examples):

- How often do you come to rural Świętokrzyskie?
- How long are your tourist visits to rural Świętokrzyskie?
- Name at least one feature/reason that prompted you to visit Świętokrzyskie as a tourist.
- On a scale of 1 to 5, rate your level of overall satisfaction with your visit to rural Świętokrzyskie.
- On a scale from 1 to 5, rate the level of tourist development in rural Świętokrzyskie.
- List a maximum of three positive features/opinions/impressions resulting from your tourist visit to rural Świętokrzyskie.

- If you have used tourist facilities in rural Świętokrzyskie, please state what was missing in the services provided.

The third data category will be sourced from the owners of tourist facilities in the countryside, with whom in-depth interviews are planned. The questions will include:

- What types of data and information materials are used in your tourism activities?
- What data and information materials are particularly important in your tourism activities and why?
- Are the data and information materials you indicated widely and easily available, or do you encounter difficulties obtaining them?
- What data and information materials would be useful for you in running your business but are unavailable?
- What would you like to learn to develop your business?
- What questions should we ask tourists that will be useful for your business?

Limitations

The necessary data will be obtained through social research (surveys and in-depth interviews).

Capacities

The issue was commented on in Data Availability.

Next Steps

A working version of the concept for research to identify missing and key data on the potential of rural tourism in the Świętokrzyskie region has been acquired.
The experiment will consist of the implementation of the following activities:
1) Identification and distribution of rural tourism service entities in the Świętokrzyskie region
2) Selection of tourism entities for diagnostic research
3) Conduction of social research with tourist entities and service users
4) Interpretation of the obtained results to develop a future strategy, including the reduction of unfavourable demographic processes in rural Świętokrzyskie.

Methodological assumptions
Identification of tourist entities through contact with municipalities and determination of the location of tourist entities by town and internet addresses. Analysis of the location of tourist entities.
2. Selection of entities according to the following assumptions:
- agrotourism farms.
- hotels and other accommodation entities.
- other tourism entities (rentals, museums, etc.).
3. Research with entities (interviews and questionnaires)
- In-depth interviews with owners and managers of tourist entities selected under pt. 2.
- Survey with tourists; survey carried out with the selected entities from pt. 2; survey carried out after the interviews

Conclusions of the research
Preliminary assumptions for the in-depth interviews with owners or representatives of tourist facilities in rural areas

1. *Our research focuses on data and various information materials that can be used to support the development of tourism ventures in rural areas. These include statistical*

data, information on tourist facilities, maps, guidebooks, and internet sources. Please describe what data and information materials are used in your tourism activities.

2. *Please identify and characterise which data and information material types are particularly important (and why) in your tourism business.*
3. *Are the data and information materials you indicated widely and easily accessible, or do you encounter difficulties obtaining them?*
4. *What data and information material would be useful for your business but are unavailable? What would you like to know to develop your business? Please indicate the specific information relevant to you.*
5. *In our research, we plan to survey tourists visiting the Świętokrzyskie region. What questions should we ask tourists to be useful to your business? What questions would you like to ask to obtain information important for developing your business?*

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Serbia: Zaječar District

Natalija Bogdanov and Saša Todorović

Funded by the European Union
UK Research and Innovation

Summary and overview

The Zaječar district is characterized by substantial geographical and economic diversity. It encompasses four municipalities with some 97,000 inhabitants. Each municipality has distinct economic structures and dynamics, yet when compared to the national average they share commonalities such as lower wages, a lower number of employees per 1,000 inhabitants, and higher rates of population aging. In terms of employment, the economy of Zaječar district is dominated by agriculture, the processing industry, and services. The Zaječar district boasts a wealth of natural resources and cultural sites, providing a robust foundation for the development of diverse forms of tourism, including spa tourism, rural tourism, and ski tourism.

Living Lab achievements

The first Living Lab (LL) workshop was successfully conducted. During this, LL members were chosen to take a part in the LL activities which followed. Through focus groups and a survey among LL participants, a transition challenge was identified. This process also involved defining research questions and indicative data requirements.

Key learning to date

Population decline has resulted in a number of negative social, economic, and environmental consequences in the pilot region (PR). The PR lacks investments, innovators, and modern technologies; social capital, networks, and collective action institutions; and a common regional strategy/programme. The PR has a long tradition of spa tourism, and some new investments in mountain and rural tourism were made in recent years. However, the tourism sector lacks support services, adequate infrastructure and more diverse tourism offers to remain competitive. This also includes the need for better integration of local actors in food supply chains so that the benefits of tourism development can spill over to other sectors and benefit local people and the local economy.

Living Lab challenge

The key challenge faced by Zaječar district is the need for economic restructuring towards higher value-added activities and labour-intensive services. The LL focuses on developing tourism and enhancing economic benefits through the establishment of short food supply chains (SFSC). By creating an inclusive supply chain that caters to the demands of the tourism sector, the LL aims to integrate the agricultural sector into tourism, thereby benefiting local communities and small businesses. The challenge in the food supply chain arises from the low representation of local producers in meeting market demands at tourist centres, leading to the sourcing of products from other regions. The LL will seek to address these challenges by collecting data and insights from the field, enabling evidence-based decision-making, policy development, and improved coordination within the supply chain.

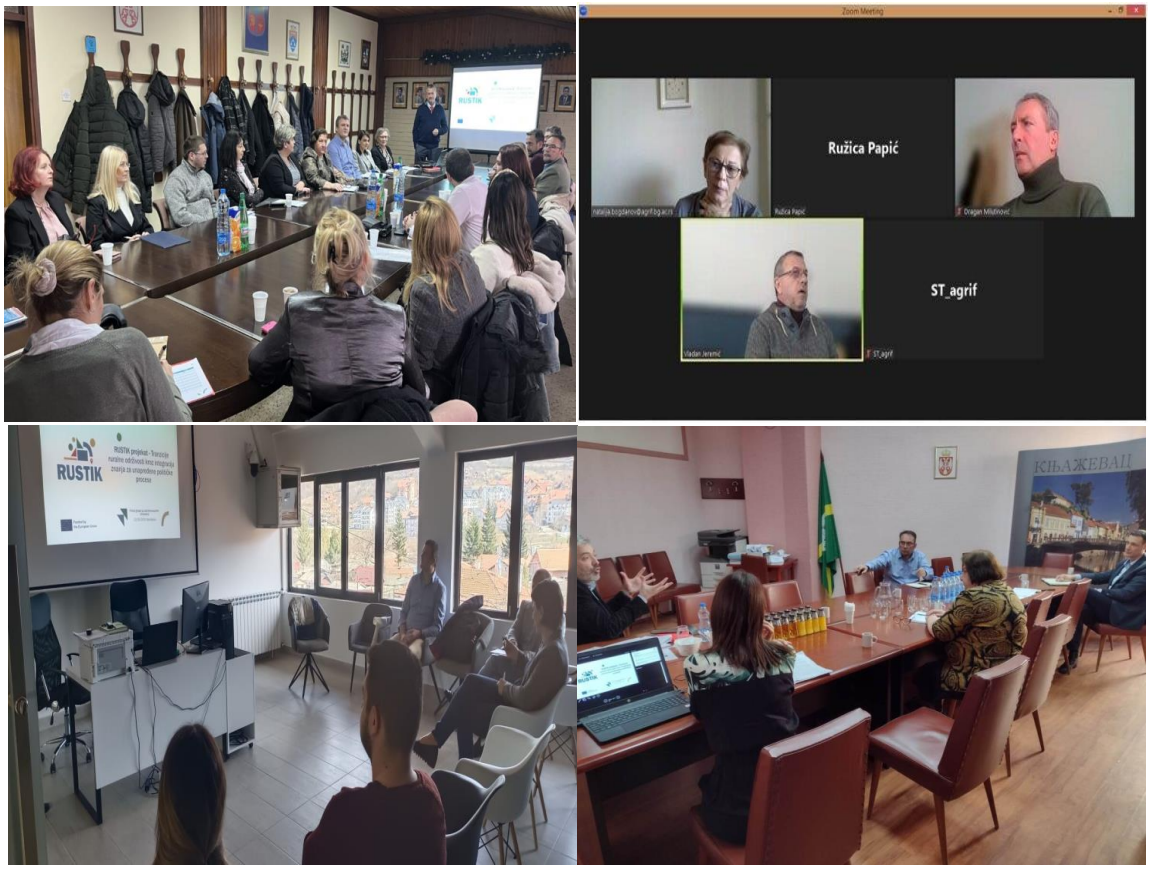
Emerging data needs

There is a scarcity of data on food supply chain participants (capacities, turnover, demand of tourists for local food, etc.). Available data include only basic indicators provided by the national Statistical Office, which are not comprehensive enough to conduct valid analyses that could facilitate decision-making. In order to gain in-depth insights into the topic, a detailed review of available internal databases of municipal services, as well as those of relevant ministries and other government agencies, will be conducted in parallel with interviews or surveys with farmers and tourism entrepreneurs. To visualize and analyse map-based information, the project will utilize geo-spatial data collected and provided by the project partners MCRIT and Mapita. MCRIT's

data will provide valuable insights into tourism capacity utilization and the most attractive destinations. Additionally, the plan includes creating map-based surveys using Mapita's public participation geographic information system (PPGIS) tool, Maptionnaire, for collecting qualitative spatial data on various topics where needed.

Next steps

In the upcoming phase, the following activities are planned to facilitate the preparation and implementation of a data experiment: a literature review, collecting geo-spatial data, a field survey, and conducting social network analysis. The involvement of LL partners and the utilisation of diverse data sources and methodologies will enrich the experiment's outcomes, fostering informed decision-making on issues related to SFSC and sustainable community development.



Part 1: Progress Review

Pilot Region introduction

Zaječar district (NUTS 3) is located in the eastern part of the Republic of Serbia, along the border with the Republic of Bulgaria. Most of Zaječar district territory is relatively remote from the major cities in the region and the main transportation corridors (map 1a). Of the four municipalities in the territory of the district, two belong to the category of town and suburban areas, while Sokobanja and Boljevac are rural municipalities (map 1b) accounting for 24.2% of the total population and 37.3% of the territory.

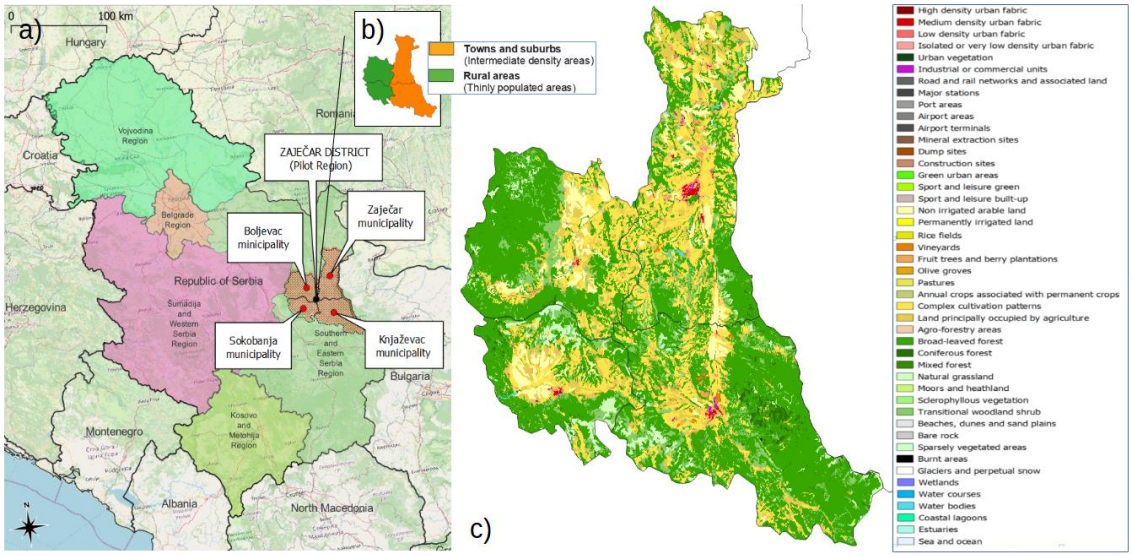


Figure 23 Map of the Zaječar district (Pilot Region) and (a) its position in the broader regional/national context, (b) degree of urbanisation for local administrative units (LAU) and (c) land use classes.

Source: (a) author's illustration, (b) author's illustration based on Eurostat, JRC and European Commission Directorate-General for Regional Policy data and (c) author's illustration based on LUISA Base Map 2018

The Zaječar district is abundant in natural resources, including thermal springs, mines, mineral deposits, and forests. The areas designated as nature parks, nature reserves and outstanding natural landscape total more than 54,000 hectares. Additionally, Zaječar boasts significant cultural heritage resources, including the UNESCO-protected site Felix Romuliana, a Roman imperial palace. The forests (49.5%) and agriculture areas (36.0%) account for the largest part of the territory (map 23c).

The region is experiencing a long-term population decline, while the share of aging population is increasing. In the period 2002-2022, the number of inhabitants decreased by 1.7% annually, which is a faster decline than in any other region in Serbia.

The local economy relies on several economic sectors (the processing industry, agriculture, mining, forestry, and metalworking industry), with the exception of Sokobanja, which is a nationally important tourist destination. The majority of companies operate in lower value-added sectors, indicating the prevalence of low-quality, often unstable jobs.

Services of general interest (SGIs) (health, education, preschool education, childcare, and elder care) are available in all municipalities, but the delivery of a number of them is declining due to insufficient funding and staff capacity. In three municipalities of Zaječar district (Knjaževac, Boljevac and Zaječar), there are inner peripheries. These areas have poor access to five or more SGIs and also poor access to hospitals, elementary schools or train stations.

The district lacks well-structured bilateral or multilateral cooperation between local self-governments, hindering their integration into a more cohesive territory. Cooperation between municipalities usually takes place through *ad hoc* activities or joint projects, often driven by donor programs (and donor agendas). Stakeholders describe the cooperation between municipalities within the district as limited because the local authorities are narrowly focused on their development challenges, and sometimes "municipalities perceive each other as competitors".

Pilot Region Partner

The Regional Development Agency Eastern Serbia (RARIS) was established in 2007, as a bottom-up initiative by the Eastern Serbia stakeholders. Its activities include leading cross-border and transnational cooperation, facilitating a regional tourism cooperation, facilitating regional investment promotion, assistance to municipalities in the preparation and implementation of priority local projects, support to elaboration of local development and sectoral strategies, and strengthening the capacities of the public and civil sector for local and regional socioeconomic development.

Living Lab Coordinator

The Living Lab Coordinator (LLC) is the Department for Agricultural Economics, Faculty of Agriculture (FOA) – University of Belgrade, which is a leading scientific research unit dealing with the economic, societal, community and policy context of the agriculture and food sciences. The focus areas of the research team include agriculture and food systems, environment, climate change and natural resources, and rural community development and engagement.

Functions and transitions

Functions

The Zaječar district is highly diverse both geographically and economically. The district consists of four municipalities characterized by different economic structures and dynamics. However, common characteristics of all municipalities compared to the national average and the region of South and East Serbia include lower wages, a lower number of employees per 1,000 inhabitants, and a lower share of young people in total employment, indicating that the district lags behind the leading regions.

Production functions

The economy of the Zaječar district is primarily driven by the primary sector and related industries, albeit there are differences between the municipalities. The main sectors include agriculture, food processing, forestry, wood products, mining, machinery, metals, footwear, and tourism. The region is characterized by small family farms, with mixed farming practices, livestock breeding, and fruit and wine cultivation being crucial. The main food processing companies are in the fruit sector (for example, wine, brandy, juices, and frozen fruit), honey and bee products, and medicinal herbs.

However, former traditional sectors and high-quality products for which the district was famous and competitive on domestic and regional markets (meat and dairy production) are in decline. There are some positive developments in wine and brandy production.

Consumption functions

In the Zaječar district, SGI are available across all municipalities, but their accessibility and quality vary based on proximity to the municipal centre. In the Zaječar district, there are a total of 37 kindergartens and pre-primary schools, 82 elementary schools, and 8 secondary schools. These educational institutions serve 173 settlements across an area of 3,624 km^2. Notably, 82% of the total schools in the district (64 schools) are village schools or local classes, catering to students from first to fourth grade of elementary school. Students continue education from 5th to 8th grade in their home schools, with municipality-organized transportation. Municipalities offer free transportation and/or accommodation in student dormitories for secondary school students. The region faces a teacher shortage, especially in secondary schools, where over half work part-time. Health care is organized with health centres in each municipality and two general hospitals (in Zaječar and Knjaževac), two specialized lung disease hospitals in Sokobanja, and a rehabilitation centre in Zaječar. Health posts in villages provide basic health care services with weekly doctor availability. Over the past decade, the number of health care facilities has declined by 30%, and employee numbers (including medical staff) have decreased by about 15%.

Public bus transportation to rural areas is free, provided by private companies with costs covered by the municipality. The quality of service varies by municipality and distance from the municipal centre, as rated by users.

In addition to natural resources, the region hosts numerous important cultural, historical, and archaeological monuments and sites that form the basis for tourism development. The number of overnight stays per 1,000 inhabitants in the Zaječar district (8,931) is higher than the average for the South and East Serbia region (1,232), as is the percentage of employment in the hotel and restaurant sector (5.7% vs. 3.5%). Sokobanja is the primary contributor to the district's tourism industry, heavily relying on this sector. Additionally, the presence of ski resorts in Stara Planina Nature Park and Rtanj Mountain has attracted a considerable number of tourists in recent years. Regarding residential function (second homes), Sokobanja and Boljevac municipalities are particularly attractive, experiencing a rising demand for real estate, especially around Rtanj Mountain, leading to increasing property prices[1].

Ecosystem services

Climate change projections highlight significant risks for the Zaječar district, including increased water use and potential decreases in precipitation and streamflow[2]. Small water bodies, which may dry up in summer or flow underground, face the most severe pressure. Forestry poses another major risk, particularly in terms of wildfires.

[1] On the territory of the Municipality of Sokobanja there is the village of Vrmdža, which despite its relative remoteness from the main roads (13 km from the centre of the municipality) has experienced an upswing in recent years, attracting a large number of newly arrived families who have established their businesses here in tourism and related service sectors, in the information technology sector, etc.

[2] Data on greenhouse gas emissions from agriculture, soil organic carbon stocks, and other agro-ecological indicators at the district level are unavailable.

The district has the potential to enhance its use of renewable energy sources, with initial investments in biomass and solar power plants made in the municipality of Boljevac. However, challenges persist in wastewater management, as the region lacks treatment facilities. Consequently, wastewater from various sources, including industry (such as the copper mine in Majdanpek), households, and unregulated landfills, is discharged directly into rivers, contributing to groundwater pollution.

Zaječar district is endowed with natural resources, such as agricultural land, extensive forests, water resources and mineral deposits. The Stara planina (Nature Park) and Rtanj (Special nature reserve) mountains boast diverse flora, including endemic plant species, protected and strictly protected species and species included in the list of endangered European flora. The Rtanj Mountain, in particular, hosts exceptional medicinal and aromatic plants with a long tradition of medicinal plant collection. The local economy benefits from these resources through sectors like forestry, honey production, medicinal herbs, and livestock grazing. Additionally, there are initial efforts in the municipality of Boljevac towards utilizing renewable energy sources.

Transitions

Socio-economic and demographic transition

The PR faces significant challenges related to depopulation, leading to multiple consequences for rural communities, the economy, and natural resources, resulting in adverse impacts on social structures. Shortages of funding and qualified professionals impact the availability, access, and quality of SGIs. The stagnant (or even declining) industries in the region lack the capacity to create more knowledge-based jobs and contribute to the local economy's growth. Furthermore, the region lacks investments, innovators, and modern technologies and services.

The region is experiencing growth in tourist numbers, mainly due to few new private investments in hotels and accommodation facilities, national and municipality investments in infrastructure, and exogenous factors ("Vouchers for holidays in Serbia" provided by Government). However, the sector lacks support services and better integration of tourism value chain stakeholders.

Climate and environmental transition

The main challenge faced by the region is the inadequate use and management of natural resources, including excessive exploitation, poor waste management, overgrazing, and abandonment of high mountain grasslands. Climate change projections indicate a high risk of increased water use and a potential decrease in precipitation, along with an elevated risk of forest fires. In the Timočka Krajina area, which includes the Zaječar district, most surface water bodies do not meet proposed quality standards due to a lack of wastewater treatment.

Digital transition

Municipalities in the Zaječar District are transitioning toward digital services. According to the National Alliance for Local Economic Development (NALED), so far local governments have managed to digitise 20% of procedures that come under their jurisdiction. The percentage of households having a computer, internet, and broadband internet connection in the region of South and Eastern Serbia (69.9%, 76.6% and 76.6% respectively) is increasing, yet remain lower than in any other NUTS II region in Serbia. According to the Statistical Office of the Republic of Serbia in 2022 in Zaječar district 61% of women and 67% of men older than 15 were computer literate. All enterprises in the PR use computers and internet, and 80.2% of them use a website for the purpose of their business.

Living Lab Cycle 1: Planning Possibilities

Setting up the Living Lab

The establishment of the LL started with a meeting of the LLC and Pilot Region Partner (PRP), initiated and hosted by the LLC. The project objectives and mid-term activities were clarified, as well as the roles and responsibilities of the LLC and the PRP by work package. The PRP created an initial list of stakeholders, which was later revised to ensure equal representation of stakeholders from public, private, and civil sectors. Invitations for the first pilot region meeting, containing project details, were distributed by PRP to all stakeholders via email. The PRP was responsible for managing participant registrations, directly contacting them, and encouraging their attendance at the meetings.

Collaborative methods

The first stakeholder meeting in the region took the form of a workshop. The key challenges for the region and resource persons for each of them were identified.

Two focus groups with selected stakeholders in the PR gathered information for the report (T1.2). Missing information and data were gathered later, by conducting interviews with key stakeholders in each municipality. The results and recommendations for further work were shared at an online meeting with LL members. Owing to the limited number of participants, the conclusions and recommendations were validated through a survey involving stakeholders from the public sector, including municipal services overseeing local economic development, tourism, and agriculture, as well as representatives from civil society organisations and the business sector. The PRP distributed the questionnaire to 22 addresses, with 17 respondents providing feedback. The survey encompassed inquiries about attitudes towards critical development challenges, priorities, evaluations of proposed development solutions, assessments of potential risks, and related aspects.

Participants and stakeholders

With the exception of the first workshop, stakeholder participation in subsequent meetings was low. The structure and number of participants in the focus groups were insufficient to achieve the objectives set (Table 18 Living Lab activities in).

Data collection methods

Data about the PR profile was gathered through desk research, interviews, and an online survey. Sources included databases from the Statistical Office of the Republic of Serbia[3], Analytical Service of Local Self-government Units[4], and different datasets and maps originating from Eurostat, the JRC and European Commission Directorate-General for Regional Policy. Information on public service quality and challenges faced by rural residents in accessing them was obtained through semi-structured interviews and maps originating from ESPON projects (PROFECY)[5]. Desk research provided insights into social capital, the environment, and the policy landscape. Stakeholders' opinions, preferences, and attitudes were explored through focus groups and surveys.

[3] https://www.stat.gov.rs/
[4] https://rsjp.gov.rs/sr/analiticki-servis/
[5] https://www.espon.eu/

Living Lab activities in 2023

Table 18 Living Lab activities in 2023.

Activities	Date	Comment
I LLC and PRP meeting	1 December 2022, FOA, Belgrade	Two topics discussed: the project objectives, role allocation and medium-term activities; LLC and PRP tasks by work packages (WPs).
A series of activities related to understanding the PR challenges: data and information gathering and processing;		
Workshop with all stakeholders	12 January 2023, Zaječar 23 participants + FOA team (3)	The project was introduced to stakeholders; moderated discussion according to the instructions of the WP1 leader.
II LLC and PRP meeting	3 February 2023, ZOOM meeting	Summarizing the workshop conclusions and follow-up activity consultations.
I focus group with LL actors	24 March 2023, Sokobanja 6 participants + FOA team (2)	Presentation of preliminary results, followed by a facilitated discussion about transition pathways.
II focus group with LL actors	24 March 2023, Knjaževac 3 participants + FOA team (2)	
III and IV LLC and PRP meetings	6 April 2023, ZOOM meeting. 30 May 2023, ZOOM meeting	Presentation of the final report (T1.2) and follow-up activity consultations.
III focus group with LL actors	1 June 2023, ZOOM meeting	The meeting was cancelled because the invited stakeholders, despite prior agreement and individual invitations, did not respond.
V LLC and PRP meeting	28 June 2023, ZOOM meeting	Discussing the results of survey on Living Labs' Resources & Capacities for data collection.
III focus group with LL actors	7 July 2023, ZOOM meeting. 8 participants + FOA team (2)	Presentation of the final report (T1.2), followed by a facilitated discussion.
September–October 2023: In light of a lack of definitive feedback from stakeholders, a survey involving key stakeholders (17) has been undertaken to affirm the research team's findings and opinions regarding priority issues, the approach to addressing socio-economic transition challenges, and associated risks. It was found that there is a need for better integration of tourism with other sectors, especially in untapped opportunities within SFSC.		

Reflections from Cycle 1

The efforts to establish the LL did not progress as intended and fell short of expectations. This was because there was a limited understanding of the LL concept among stakeholders, which resulted in stagnation, delays, low participation, and limited interaction. The information and attitudes often differed and changed from meeting to meeting, adding to the confusion.

To overcome these problems, the plan is to limit the activities and communication next year to the closest circle of interested stakeholders and the PRP will be responsible for their animation (organisation of meetings, preparation of the agenda, updating, moderation, etc.) so that the final result will be the product of joint work.

Another problem is the lack of data and information to document the chosen challenge. For instance, there is a dearth of data concerning the primary participants in the food system, their capacities, and their significance in the local market. Additionally, there is an absence of official data and research on the preferences of local consumers and tourists regarding local food. Efforts to address these challenges will be actively pursued in the upcoming months through the establishment of experimental data sets.

Cycle 1 results

Key findings after the first year of work of the LL relate to the availability and quality of data on the PR and how it is used to design and evaluate local policies, socioeconomic characteristics of the region, social capital, stakeholder engagement, collaboration, and the local policy arena.

Publicly available data on municipalities in the PR are primarily published by the Statistical Office of the Republic of Serbia. No institution in the region engages in data production, and the data collected by various municipal departments for their needs are not publicly available. Instead, they are mostly part of each department's internal documentation, often not in electronic form. Furthermore, these data are not organized uniformly on common platforms, making it challenging to track and compare long-term series of different data sets. The same applies for business sector and civil society organisations. Most stakeholders do not recognize the need for new types of data, and they lack understanding regarding their potential applications and how they could enhance their work.

The results of the desk research, focus groups, survey research, and analysis of selected socio-economic indicators have shown that the main challenge for the region is demographic decline and its consequences for the local economy. Infrastructure problems and environmental concerns also rank high on the list of issues, although they lack substantial support from data and information. The economic structure is dominated by traditional, stagnant industries (including extractive industries). Available business services aimed at supporting local businesses are weak, reflecting an unsophisticated local demand. Some investments have been made in tourism, infrastructure, and renewable energy sources over the past decade. Stakeholders anticipate that investments and the number of tourists will continue to rise in rural and mountain tourism areas. To maintain competitiveness, the tourism sector requires enhanced support services, improved infrastructure, and a more diverse range of tourist offerings.

The existing legal framework for inter-municipal cooperation in the Republic of Serbia creates conditions for voluntary cooperation among local self-governments but does not provide a reliable basis for building high-quality, durable, and effective partnerships. Therefore, the intensity of functional linkages between municipalities, including in the Zaječar district and the interactions resulting from spatial flows of people, goods, and resources remains low. Cooperation between municipalities is sporadic, primarily occurring in national-level projects related to the environment, such as regional landfills and water supply. The Local Action Group (LAG) 'Rtanj' was established in 2019. However, due to a lack of interest in mutual cooperation the LAG covers only part of the region's territory, including settlements in two of the four municipalities.

Municipalities in the district have their own development strategies covering different time periods (until 2026-2029), which are aligned with national strategic priorities and share similar objectives. Each municipality has developed its own system of support measures for entrepreneurs and agricultural producers within its competencies and priorities. Currently, the municipalities of Zaječar district are working on the development of the "Strategy for the Development of the Urban Area of the City of Zaječar and the Municipalities of Knjaževac, Boljevac, and Sokobanja". This initiative is funded by the European Union (EU) (Program EU PRO Plus) in partnership with the Government of the Republic of Serbia. The objective of this strategy is to contribute to the sustainable development of the district by promoting socio-economic inclusion and integration, fostering rural development, sustainable tourism, and strengthening urban-rural relations.

Part 2: Challenge and next steps

Living Lab challenge

The fundamental challenge for Zaječar district is related to the socioeconomic function and the need for restructuring the economic structure towards higher value-added activities based on competitive advantages and labour-intensive services. The LL decided to focus on the challenges associated with the development of tourism in order to increase economic benefits for all through the development of SFSC. By building an inclusive short food supply chain that can meet the market demand of the growing tourism sector, local communities can integrate the agriculture sector into the tourism agenda and generate social and economic benefits that improve the livelihoods of small businesses prevalent in the region.

Rationale

In addition to the perspectives of LL stakeholders, this challenge aligns with the objectives outlined in the draft of the "Strategy for the Development of the Urban Area of the City of Zaječar and the Municipalities of Knjaževac, Boljevac, and Sokobanja", and the corresponding measure aimed to enhance business infrastructure, promote innovation, stimulate business associations, and establish value chains. Understanding the food supply chain, the strength of linkages between participants, and the identification of critical points will help policy makers to deliver a more sustainable local food system while meeting tourists demand for local products. RARIS, as a leading actor and partner to the municipalities in the district in tourism development, will benefit from access to a wide range of different data and information not currently available, which will be collected for the purposes of this analysis. In this way, key actors will have the opportunity to improve the decision-making process by data driven insights and develop policy monitoring and evaluation systems that currently lack a quantitative basis. In addition, the findings are expected to benefit stakeholders and practitioners by shedding light on opportunities and constraints from their positions in the local supply networks.

Knowledge to date

Small family farms with mixed farming systems and fragmented land parcels prevail in the region, with cattle breeding, fruit and grape production being the most important. The main food processing companies are in the fruit sector (wine, brandy, juices, frozen fruit, etc.), in the processing and packaging of honey and bee products, and in medicinal herbs. However, former traditional sectors and products for which the district was famous and competitive, with high quality products (meat and dairy production), are in decline. In recent years, with the support of local governments, there were significant investments in new orchards and vineyards. However, these efforts to restore the glory of the once prosperous sector have not been accompanied by investments in the value chain and modernization of processing facilities. Some positive developments have occurred in wine and brandy production, with the opening of new wineries that produce top quality wines.

In the focus groups, the supply chain problem, and the inadequate representation of local/regional producers in meeting market needs in tourist centres was identified. Because of this, large quantities of fruits, vegetables, and other products are purchased from other regions, and the production of dairy products and meat is declining due to the unorganized purchasing

market. These problems are attributed to insufficient trust among supply chain partners, lack of stable business relationships, inadequate capacity of local cooperatives to facilitate matching local supply with demand, etc. However, knowledge gaps exist regarding local tourism demand, how food is supplied to restaurants and tourism service providers, what factors guide them, and what portion of demand is met by the local market, as well as consumer (tourist) preferences and needs concerning local products.

Research questions

Based on the described focal points of interest, the following research questions were formulated by LL work in Cycle 1.

- What is the market potential for local sourcing in the Zaječar district tourism food supply chain?
- Which products could be prioritized for local sourcing and production according to comparative and competitive advantages?
- How can networking and collaboration within short food supply chains enhance the integration of local agriculture and tourism?
- What changes are needed to make short food supply chains more sustainable and competitive?

Policy relevance

The proposed topic, addressing SFSC in the context of agricultural policy and tourism development, has significant policy relevance due to its multidimensional impact on various sectors.

As a candidate for EU accession, Serbia aligns its agricultural policy with the Common Agricultural Policy (CAP), but short supply chains and the creation of a regulatory and policy framework for their implementation have remained outside the focus of policy makers. The same is true for the policies of local self-government units, most of which lack the capacity to create more innovative support measures and encourage local actors' collaboration. Integrating SFSC into agricultural policy framework not only ensures compliance with EU standards but also addresses social, economic, and environmental challenges at the local level.

Simultaneously, from a tourism perspective, the promotion of a local gastronomic identity through SFSC offers diverse opportunities for economic growth and enhances the overall tourism experience, making it a topic of significant policy relevance for both agricultural and tourism development sectors.

It is expected that the knowledge and experience of LL will be of great importance to many local communities and could serve as an example of good practice in the creation and promotion of SFSC.

Emerging data needs

To better understand local food supply chains and their capacity to meet tourism demand in the PR, while identifying gaps, risks, and opportunities for collaboration with small businesses, various datasets on the local food system and its actors are needed. This data is essential for policy decision makers and will also inform local food producers about existing market gaps and

opportunities. According to local stakeholders, the region's opportunities to meet tourism demand with local products are untapped, and opportunities to market agricultural products are underutilised due to a lack of trust and business networks.

Data availability

The selected challenge lacks adequate documentation, particularly concerning the profiles of food system participants, their capacities and needs, as well as consumer preferences. There is a scarcity of data on food supply chain participants, including their capacities, turnover, and the demand of tourists for local food. Additionally, publicly available data on the relevance of tourism for the local economy and the development trends in tourism in the PR are limited. Available data include basic statistical indicators monitored by the national Statistical Office and the database of local self-government units. Unfortunately, these datasets are not comprehensive enough to conduct valid analyses that could facilitate decision-making for both policymakers and businesses (Table 19 Available data sources).

Table 19 Available data sources

Indicator	Source
Accommodation capacities by types of facilities	Statistical Office of the Republic of Serbia https://www.stat.gov.rs/publikacije/publication/?p=14944 Ministry of Tourism and Youth https://eturista.gov.rs/
Arrivals and overnight stays of tourists	
Number of tourists by country of origin	
% of employees in the catering and food services sector (as a % of the total number of employees)	Analytical Service of Local Self-government Units https://rsjp.gov.rs/sr/analiticki-servis/
Number of food processing companies	Serbian Business Registers Agency – data available upon payment https://www.apr.gov.rs/
Number of shops selling food (markets, supermarkets, etc.)	Serbian Business Registers Agency – data available upon payment https://www.apr.gov.rs/
Number of green markets (open markets)	Local authorities
Farm structure	Census of agriculture Statistical Office of the Republic of Serbia https://www.stat.gov.rs/

Limitations

In order to gain a more detailed insight into the functioning of local food supply chains, particularly those oriented towards the tourism sector, it is first necessary to map the key participants in the sector. This process will require a detailed review of available internal databases of municipal

services, as well as those of relevant ministries and other government agencies. Much of this data will likely require additional efforts to create standardized forms and databases.

Part of the data on tourist facilities and landmarks on the territory of the pilot region will be provided by MCRIT. However, since Serbia is not a member of the EU, some data series are expected to be unavailable, which may complicate the selection of a sample for research and/or reduce its representativeness.

Capacities

To gain access to data that is not publicly available, the LL will use its social network and the internal resources at its disposal. Since the relevant bodies of the local self-government units are an integral part of LL, it is expected that the data available to them will be made available to the research team.

For the purposes of primary research on a sample of supply chain actors, the LL research team, in consultation with other partners, will define the sample, then prepare the questionnaire, test it, train the interviewers, and supervise the fieldwork. The research team is competent in research design and performing Social Network Analysis (SNA) but is hampered by an insufficient expertise in SFSC. This deficiency will be addressed by involving researchers who have expertise in the field, whether within the FOA or external to the department.

Additional resources will be needed to conduct the field research. The number of interviewers and costs of field research will be estimated depending on the selected research area and sample size. The survey will be conducted by professional surveyors who have proven experience with similar types of research.

Next steps

In the upcoming period, a series of intensive activities have been planned within the LL framework to prepare and execute a data experiment in Cycle 2. The planned activities include a thorough and collaborative approach within the LL, and integrating literature insights, geo-spatial data, and SNA techniques to address challenges related to SFSC and tourism development. The involvement of LL partners and the utilization of diverse data sources and methodologies will enrich the experiment's outcomes, fostering informed decision-making on issues related to sustainable community development.

Literature review and thematic development: The LL research team will conduct a comprehensive review of existing literature, policy documents, and legal frameworks pertaining to food supply chains. An outline of potential thematic and methodological approaches for the data experiment will be developed during this phase. A list of possible topics for the data experiment will be compiled and presented to LL partners for their consideration.

Engagement meeting with LL partners: An interactive session will be organized with LL partners to update them on the progress made during the first cycle. The results of LL activities and the conclusions supporting the chosen challenge will be shared with the participants. Challenges related to data availability will be discussed, and LL members will be encouraged to contribute their databases and resources. LL partners will be presented with a set of potential topics related to SFSC and will be invited to select the topic that aligns best with their needs.

Geo-spatial data integration: To visualize and analyse map-based information, the project will utilize geo-spatial data collected and provided by the project partners MCRIT and Mapita. MCRIT's

data will provide valuable insights into tourism capacity utilization and the most attractive destinations, aiding in precisely defining the sample and study area for the experiment. Additionally, the plan includes creating map-based surveys using Mapita's PPGIS tool, Maptionnaire, for collecting qualitative spatial data on various topics where needed.

Refinement of research questions and methodology: Following consultations with LL partners and analysis of collected data, research questions will be more specifically formulated. Methodologies for the experiment will be proposed, ensuring alignment with the research objectives and data availability.

Coordination and supervision: The LLC will play a central role in the process of data experiment. Terms of reference for interviewers will be prepared, and the selection process will be organized. The LLC will supervise and monitor the fieldwork activities, ensuring data collection adheres to the defined protocols. Data collected will be thoroughly reviewed, processed, and prepared for further analysis.

Utilization of SNA: SNA, a methodology well-supported by literature, will be employed in the data experimentation process. Previous studies have demonstrated the successful use of SNA in understanding the impact of tourism on service sector development, economic growth, and social benefits for local communities.

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Slovenia: Osrednjeslovenska regija

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Summary and overview

The Pilot Region (PR) is a highly diverse central region of Slovenia with 25 municipalities and nine urban settlements. Despite being the most densely populated and urbanized region, over half of the area is covered by agricultural or forest areas, and the majority of municipalities are considered rural. While some settlements have strongly developed central functions, others are insufficiently equipped with them, resulting in lower quality of living and additional traffic burden in the larger urban centres.

Living Lab achievements

Much of cycle 1 was devoted to narrowing down the Living Lab's (LL) topical focus, contacting potential LL members (mainly representatives of research and policy organisations, but also businesses with whom the LLC and/or PRP had fruitfully collaborated during previous work) and discussing the specific research question / topic(s) of experimentation in subsequent cycles. Most discussions were semi-structured brainstorming sessions that make use of the LLC and PRP's skills and tried to match challenges with opportunities for win-win solutions.

Key learning to date

Finding a common language between research and practice partners and linking top-down theory with bottom-up action continues to be a challenge. Narrowing down numerous interlinked issues on the ground to tangible research questions risks being seen as overly theoretical and sterile but some stakeholders. The PR lacks a unified regional administration and is affected by decisions at the national and municipal level. Although it has its own development programme, its implementation comes with relatively little autonomy and funding in practice. Its constituent municipalities face a diversity of socio-economic and environmental challenges, but the twin challenges described below may provide a useful bridge between them, especially across the urban-rural divide.

Living Lab challenge

The LL's challenge tries to link the partners' knowledge and expertise in two fields: food loss and waste (FLW), and social inclusion. The specific challenge will be to see whether it is possible to acquire real-time data of excess food, provide these data to underprivileged segments of rural society (directly or through intermediaries). This could help assess how/whether social innovation in this field can improve subjective wellbeing through the redistribution of surplus food to individuals experiencing constrained food access/food poverty.

Emerging data needs

The main data gaps relate to real-time information about availability of excess food and need for it (number and location of people). Another data-related need is the complexity (and availability) of data required to assess subjective wellbeing and potential changes in it.

Next steps

Contacting stakeholders relevant to the 'social' side of the experiment; conduct a literature review on socio-cultural aspects of access to good food.

Figure 24 Meeting with broader LL members on Food Loss & Waste

Part 1: Progress Review

Pilot Region introduction

The central Slovenian statistical (NUTS3) region is the most densely populated and urbanized Slovenian region, especially in the central part, along the edge of the Ljubljana Marshes and on the south-eastern edge of the region. There are six local administrative units (LAU 1) (Domžale, Grosuplje, Kamnik, Ljubljana, Logatec and Vrhnika) (Statistični urad Republike Slovenije [Statistical office of the Republic of Slovenia] - SURS, n.d.) and 25 municipalities (LAU 2) in the region (Figure 25 Municipalities in the Osrednjeslovenska region (Regionalna razvojna agencija Ljubljanske urbane regije [Regional Development Agency of the Ljubljana Urban Region] - RRA LUR, 2022), below). Nine urban settlements have city status, but most municipalities are considered rural (Nared et al., 2019).

Figure 25 Municipalities in the Osrednjeslovenska region (Regionalna razvojna agencija Ljubljanske urbane regije [Regional Development Agency of the Ljubljana Urban Region] - RRA LUR, 2022)

Ljubljana, the national capital, has a branched system of local and state social infrastructure, providing social infrastructure for all central national institutions. Social infrastructure for the performance of higher-level functions is also being strengthened in some other settlements (Ministrstvo za okolje in proctor [Ministry of spatial planning and environment] – MOP, 2019). While some settlements have well developed central functions (administrative, services,

maintenance etc.), others are insufficiently equipped with such functions. The situation is worsened by the loss of local care functions (medical centres, post offices, banks, etc.) through centralization. This reduced access in rural areas generates additional traffic burden in larger urban centres (RRA LUR, 2022).

Overall, the region is developed above the national average, characterized by demographic development, growing urbanization and intensive daily labour migration. The economic orientation of the municipalities is diverse and moderately concentrated on the service sector. Population density ranges between 37.4 and 1065.4 inhabitants/km² (RRA LUR, 2022). The average population is about 22,200 inhabitants, ranging from about 3,000 (Horjul) to 293,000 (Ljubljana) (SURS, 2022). The municipalities, whether urban or rural, generally have positive population growth, with significant differences in terms of the extent and cause of population change; all are also characterised by population aging. Figure 26 Classification of Slovenian municipalities in terms of rurality and population trends; Source: Nared et al., 2019., below, shows the classification of Slovenian municipalities by rurality and population increase/decrease.

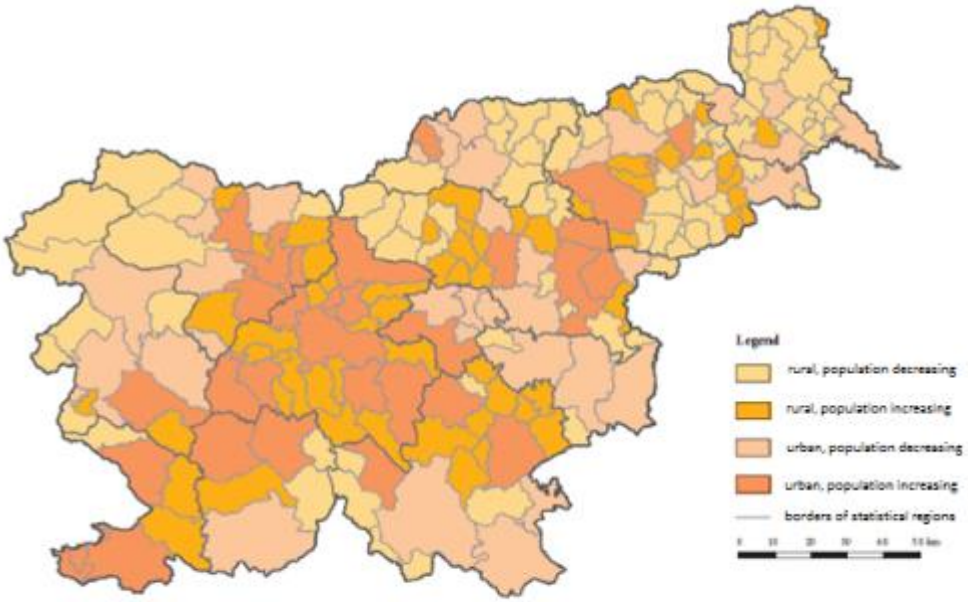

Figure 26 Classification of Slovenian municipalities in terms of rurality and population trends; Source: Nared et al., 2019.

The region has a large proportion of preserved natural areas and extensive forest cover; agricultural and forest areas cover over 50% of the area. There are 67 ecologically important areas, and the Natura 2000 (N2K) network covers 26,7% of the region (RRA LUR, 2022). Agriculture is a prominent land use, even in urbanised, wealthier municipalities.

All parts of the PR are reasonably well connected to highways and/or expressways and the PR is relatively well covered by public transport.

Pilot Region Partner

Allium is a farm, social cooperative, and employment centre. It enables work and career development by employing individuals from vulnerable groups. It is a member of the Etri group,

committed to raising awareness and creating a healthy and inclusive society while acting in a socially responsible way. The group is guided by principles of care for the environment (ecology), well-being at work (ergonomics) and responsible consumption (ethical economy).

Living Lab Coordinator

The University of Ljubljana Biotechnical Faculty's scientific and research work combines basic, applied, and developmental research in life sciences and related fields. One of its goals is to help understand the relationship between the environment and society, and this is among the main tasks of the researchers included in RUSTIK, members of the chair of Agricultural economics, policy, and law. They focus on the societal aspects of natural resource management and issues related to rural areas generally. With a variety of backgrounds in animal science, agronomy, biology, and related fields, they are engaged in research, teaching and consulting on agricultural and environmental policy, economics, and law, as well as the bioeconomy. They employ a variety of methods, ranging from economic modelling through economic experiments to qualitative methods such as interviews and focus groups.

Functions and transitions

Functions

The PR is highly diverse: there are large disparities both between and within municipalities; these could be roughly divided into three areas: (i) the central urban area, (ii) intermediate (peri-urban) areas with a lower population density and strong presence of agriculture and forestry, and (iii) relatively remote and agricultural rural areas with somewhat lower incomes. Thus, it can be said that production, consumption, and ecosystem functions are intertwined and dispersed across the region.

Figure 27 A view of the northern part of the region, demonstrating its diversity.

Consumption functions

The region has a polycentric system of settlement with a high concentration and development of central and service activities. Geomorphological characteristics and traffic corridors have the greatest influence on settlement patterns: from the dense urban core inside Ljubljana's motorway ring, settlements spread in a star pattern in 5 development directions (NW, N, E, SE, and SW). These are the areas of employment centres and their hinterlands, which stretch along the highway system, and the areas between them are dominated by scattered settlement and intensive construction. The RRA LUR Development Strategy identifies urban centres as areas where conditions for the development of larger production plants and service activities should be located, and they are also seen as the main places of housing supply. Development of previously undeveloped greenspace is precluded.

Opportunities for tourism and leisure can be found in strengthening the tourist offer (sustainably) in the urban centres, especially Ljubljana, promoting them as cultural hubs that can serve as starting points for recreationally interesting, less urbanised nearby areas. The region also offers ample recreational opportunities for local inhabitants, with several rivers and easily accessible forest and mountain areas.

Production functions

The regional strategy outlines that agricultural land with the greatest production potential (in the wider urban area of Ljubljana and in the vicinity of urban settlements) should be preferentially used for agriculture; these areas are seen as supplying cities via short local supply chains, with the support of the green public procurement system. The economic and social role of agriculture in ensuring the vitality and population of the region's rural areas is also acknowledged and is to be promoted. Similarly, agriculture is seen as performing an important environmental and territorial function.

The region has considerable forest cover. With the aim of fostering sustainable development, reducing greenhouse gas emissions, and building a circular economy, forestry offers renewed and intensive development opportunities for the wood processing industry, and greater use of wood in the construction of buildings while using forestry and processing residues for energy generation. Solar energy and hydropower, wood biomass and geothermal energy for heat production are seen as having the greatest potential for electricity production.

Ecosystem services

The framework of the green system in the region is formed by a connected system of N2K sites, which are seen as central in ensuring a favourable state of habitats. Landscape areas also represent a potential for tourist or leisure activities. As stated, agriculture and forestry are seen as having a high potential for fostering the sustainable management of natural resources and raw materials, contributing to the mitigation of climate change, and conserving cultural (agricultural) landscapes as a public good.

Transitions

The two transitions addressed in the PR by RUSTIK partners are not the same as those highlighted by the official regional development strategy (RRA LUR, 2022) as key challenges. This seven-year regional strategy (2021-2027), which outlines the substantive, developmental and financial needs for a period that matches the EU's Multiannual financial framework, is broadly based on the Slovenian development strategy 2030 (Strategija razvoja Slovenije – SRS 2030) and the Slovenian Spatial development Strategy 2050 (Strategija prostorskega razvoja Slovenije 2050 –

SPRS 2050). It provides a prioritization of needs and an estimate of the funds required to address them, currently clustered in three so-called developmental priorities: (i) a creative region of opportunities, (ii) a smart region tailored to people, and (iii) a green region of sustainable solutions. More specifically, the strategy highlights and attempts to tackle the challenges resulting from centralized services and the associated daily migration mobility, traffic-related congestion, and skills loss ('brain-drain') from peripheral regions. Furthermore, it focuses strongly on infrastructural issues.

Since the LL's inception, the Slovenian RUSTIK LL partners have agreed to focus on the issue of food loss and waste (FLW) and its relation to aspects of social inclusion and social entrepreneurship. Though perhaps not considered central, these issues do have a place in the regional strategy and some lower-level (municipal) strategies, especially when related to stimulating a circular bioeconomy, the 'silver' economy of older citizens, and quality of life. These topics were selected due to their increasing societal relevance, but also to build on the partners' strengths.

Socio-economic and demographic transition

While aging populations and the associated financial issues are relatively well researched, there is a notable lack of information about issues surrounding rural poverty, access to food and subjective quality of life. Part of the LL's experiment will be to address this data gap.

Climate and environmental transition

FLW are increasingly recognised as major sources of GHG emissions (and as economically and resource inefficient and detrimental to social justice). However, while certain data do exist on quantities of food produced by organisations along the food supply chain, they are not provided in real time. Furthermore, data on household production of food waste could be extended and improved.

Living Lab Cycle 1: Planning Possibilities

Setting up the Living Lab

Work in the LL so far has mainly revolved around narrowing the focus of specific issues to be addressed within RUSTIK, as well as reaching out to potential broader LL members; so far, mainly members of the partners' networks working on issues of FLW have been contacted, as originally agreed between the LLC and PRP. In the next steps, stakeholders working in the social sphere will be invited to participate.

The majority of work consisted of brainstorming meetings between the LLC and PRP, including telephone calls and e-mail communication. An initial focus group with potential core LL members was also held, followed up by another, broader meeting with stakeholders working on FLW. The latter had been associated with a FLW-related event marking the first official national day without food waste (April 24th, 2023).

Collaborative methods

Among these, the following may be highlighted (see also Table 20 2 LL activities to date):

- The initial focus group with potential core LL members – this was mostly an unstructured discussion, held online and attended by the LLC, PRP, another researcher and officials from the agricultural and environmental ministries.

- The broader meeting on April 24th, where mainly data-related issues were discussed with ministry officials, researchers, PRP and LLC representatives and a small number of representatives from selected businesses.
- Several smaller PRP-LLC meetings to discuss ways forward.

Participants and stakeholders

Currently, participants from the PRP and LLC form the core of the LL, although they are both connected to a number of related activities and networks will help inform the LL. The work has thus involved between 2 and 12 people. Most of the other LL members are currently researchers and officials working on the issue of FLW, but this is expected to expand as the social sphere is explored more systematically. While other members have been consulted, the main discussions about research questions have been between the LLC and PRP.

Data collection methods

Mainly desk research of data bases, strategies and other policy documents have been used to feed formally into the work conducted under WPs 1, 2 and 4.

Living Lab activities in 2023

The table below lists activities that were strictly related to the work under RUSTIK. It is emphasised that both the PRP and LLC engage in relevant and related activities that inform their work under RUSTIK. This includes project work, consultancy and other activities linked to food waste and food systems, agriculture, and agricultural policy, as well as rural issues, social inclusion, and social entrepreneurship.

Table 20 2 LL activities to date

Date	Event
22.11.2022	Brainstorming LLC-PRP on the LL's topical focus. FLW proposed and broadly agreed upon.
3.2.2023	Phone call LLC-PRP to discuss potential LL members
15.2.2023	Introductory online meeting with potential LL members
19.-22.2.2023	Participation in LL kick-off event (LLC & PRP)
4.4.2023	LLC-PRP meeting on participation in national FLW event
24.4.2023	National FLW event, introductory meeting with broader group of LL members
3.7.2023	Brainstorming LLC-PRP on research questions and addressing data gaps
16.-19.10.2023	Consortium meeting, Parma
By end 2023	Planned: further discussions of specific activities in cycle 2

Reflections from Cycle 1

As Slovenia is not administratively regionalized, Osrednjeslovenska remains a statistical rather than an administrative region. There is no level of government between the municipal and national state levels and, consequently discussions across these levels in the LL will need careful facilitation. Although no difficulties in this respect have been experienced so far, the PRP holds no formal power to ensure engagement with policy and other decision-makers specifically related to RUSTIK's activities.

Discussions between the PRP and LLC have been notable due to their respective practice-oriented and research-oriented foci. This is a complementary strength and both teams have worked well together in the past year. This includes communicating in a fruitful manner, aiming to use the project to provide outputs that are both practically relevant and scientifically sound, and providing replicable results with a high level of policy relevance.

Cycle 1 results

Some quantitative data are available related to the two issues addressed, including e.g. annual data on food waste per segment of the food supply chain, or aggregated information such as risk of material deprivation or social exclusion at the level of statistical regions (NUTS3) and per year. In other contexts, data are lacking especially in areas that can be assessed using qualitative data and indicators, such as subjective quality of life, dignity, and similar intangible concepts. While some existing data may prove useful, new and/or composite indicators may have to be devised to accommodate the needs of the experiment.

In the emerging field of FLW in Slovenia, the policy environment is developing without some of the contested discourse associated with food production. However, due to its novelty, experience and information is lacking, including in relation to financing.

Rural social statistics are available, but these do not reveal details of hidden poverty and social exclusion. Such details are currently known and knowable through interviews with practitioners in the field.

While functions and transitions may be useful for framing concepts for policy and research, they have limited utility for specific situations on the ground, where all these concepts occur at the same time (and sometimes in the same space).

Cycle 1 culminated in the selection of the topic for experimentation in the next cycle.

Part 2: Challenge and next steps

Living Lab challenge

Indeterminate quantities of excess food could be redistributed to marginalized citizens, the number of which is poorly understood. Food poverty is closely related to other forms of material and social deprivation. The current idea behind the 'experiment' is two-fold: firstly, assess the possibilities for gathering current data on excess food and mobilising this food towards those who need it (using novel sources of information or ways of acquiring it); and secondly, to assess how this redistribution of food may improve quality of life and subjective wellbeing among vulnerable groups in rural areas. The next step in the LL will involve identifying how such redistribution practices could be made more systematic.

Rationale

The challenge was chosen due to its increasing societal importance and as a reflection of partners' expertise. The PRP's activities revolve around dignity and social inclusion, framing food as a tool for social cohesion. Circumstantial evidence shows that poverty, social exclusion, and poor access to quality food are worse in rural areas; conversely, more urbanised areas and their associated institutions such as schools, supermarkets, restaurants, and long-term care facilities, may be a significant source of FLW. The Osrednjeslovenska region, where rural and urban areas are interspersed over relatively short distances, may provide a good arena for testing how/whether these characteristics may be turned into a mutually beneficial relationship, and reveal opportunities for disseminating and replicating good practice.

Knowledge to date

Data on FLW are generally out of date by the time they are published, and real-time data would be helpful. Additionally, information on social exclusion (especially in rural areas) is circumstantial and not well reflected by statistics, as these mainly focus on different aspects of material deprivation and access to services, and less on complex and intangible issues such as disempowerment and dignity. Examining such perceptions is also sensitive, making it difficult to formulate supportive courses of action; new approaches and social innovation are needed. Around 10 % of people were estimated to be a risk of poverty in the region in 2022 (SURS, 2023).

Research question/s

Emerging specific research questions include:

- How can current data on excess food be provided (directly or indirectly) to those who need it in a way that preserves dignity and promotes empowerment and social inclusion in deprived segments of rural society? How much FLW can be prevented in this way?
- How does food, access to food and the related cultural aspects relate to subjective wellbeing? How can these aspects be measured?

Policy relevance

Some policy measures are in place attempting to mitigate both poverty and FLW (and their adverse climate implications). More concrete data on FLW prevented and subjective wellbeing improved can be used to monitor progress towards existing policy goals. Indirectly, improved

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subjective wellbeing would also affect other policy issues, such as out-migration from rural areas and limited access to general services. Ideally, the experiment would result in replicable and transferable good practices that could be stimulated through policy measures, such as under the Common Agricultural Policy's second pillar. However, a prerequisite for this would also be the formulation of appropriate indicators to monitor such complex measures in a cost-effective way. Furthermore, up-scalable good practices might also find a place in the future Regional Development Programme, which draws from the Cohesion Fund, the Just Transition Fund and the EAFRD. Even in its current version, the Regional Development Programme mentions food self-sufficiency, rural quality of life and efficient waste management among its goals, although indicators for monitoring are limited in their scope (e.g. utilised agricultural area for rural quality of life and kg of municipal waste per person generated for efficient waste management).

The PRP and LLC are already well connected to institutional networks but will continue to strive to improve these connections and exchange knowledge on good (and bad) practices.

Emerging data needs

While the data needs are outlined above, challenges remain in acquiring real time information, as well as with the sensitivity that surrounds information on poverty and social exclusion. Institutions that hold sensitive data of this kind cannot share them. Therefore, it will be an important ethical challenge to consider confidentiality, and great care will have to be taken not to jeopardize the dignity of those supplying personal data.

Data availability

There are certain emerging software solutions that help mobilise excess food, the examination of which may offer useful insights, for example by providing information on amounts of food waste mitigated, money saved and numbers of users/beneficiaries. Institutions working with marginal groups will be consulted to explore ways of reaching individuals in need without breaching confidentiality and jeopardizing dignity. It may be possible, following upgrades of existing digital solutions, that members of target groups may be approached by such institutions and included in such systems while remaining anonymous, circumventing the need to contact them directly. This would be preferable to approaching them via the RUSTIK team, to ensure policy relevance and scalability beyond the duration of the project.

Limitations

Data are either not current (on FLW) or do not exist (on social exclusion in rural areas). There is a lack of indicators for some forms of information, such as dignity.

Capacities

The data needs are not clearly formulated yet. For the moment, the LL seems to be able to satisfy its data-related needs.

Next steps

In the near future, the experiment will have to be made even more concrete in terms of timeline, goals and division of labour. Some literature review is also needed on socio-cultural and psychological aspects related to food access. It is likely that the experiment will begin with a scoping phase, during which past local activities in the specific fields selected will be explored

through desk research and interviews. A meeting between the LLC and PRP to define further activities, different parts of the experiment and respective duties is scheduled.

The appropriate stakeholder organisations will be contacted and included in the work, especially those working in the social field, as well as officials from municipal governments, and others such as LAGs and representatives from the hospitality sector.

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Spain: Galicia

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Summary and overview

The Galician Pilot Region includes 20 municipalities spread along the southern half of the region (NUTS2) of Galicia. They have been selected because they have submitted proposals for participation in the regional administration's "model settlement" initiative. They represent 2,653 square kilometres and around one million different plots of land (an average of 0.26 ha/plot). The total population was 40,652 inhabitants in 2021, but there are more than 110,000 registered landowners and only about 5,700 farms.

Living Lab achievements

During 2023, the Living Lab assessed the basic socioeconomic and biophysical characteristics of the Pilot Region and identified a list of potential stakeholders and stakeholder categories, including Local Action Groups, common land communities, local and provincial authorities and relevant private firms related to the agriculture and food sector. A first focus group involving local and regional authorities was conducted to provide feedback on the initial assessment of transitions and challenges in the Pilot Region.

Key learning to date

Overall, Cycle 1 of the Living Lab allowed us to identify the socio-economic transition as the most relevant for our Pilot Region. In particular, the gap between fragmented land ownership and the declining farming and forest sectors was identified as one of the main reasons for the relative stagnation of forest and agricultural production. Participants in the focus group allowed us to identify the lack of match between housing ownership and housing demand as another key issue related to population decline and economic activities in the area. The analysis of existing policies related to the relationship between land ownership and land use revealed that the regional administration has put in place several policy instruments (a land bank, model settlements, agroforestry polygons, and a catalogue of forest and agricultural soils) intended to promote the use of abandoned land in recent years. There is a similar set of measures concerning housing (census of vacant dwellings, register of housing demand) implemented by a different department of the regional administration. Somehow, nevertheless, these do not seem to have worked so well in the period that they have been active, reasons for which, we hypothesise, include that either these policies struggle to generate and use relevant information about owners and prospective tenants/buyers of land and housing, or they are applied on a scale that is too limited for the challenge at hand.

Living Lab challenge

The analysis carried out so far allowed us to identify high levels of land fragmentation (twice as many landowners as inhabitants, nine different plots per owner) and a substantial reduction in economic reliance on agriculture (only one farm for as many as eight inhabitants) as the main underlying causes of a less than satisfactory socio-economic transition in the Pilot Region. Difficult access to information regarding land ownership and high transaction costs (related to the need to negotiate with multiple actors, often in distant locations) are among the most important problems experienced by farmers and new entrants to agriculture when trying to get access to land, and this, in turn, is reflected in the share of different land uses in the Pilot Region and the levels of economic activity associated to the primary sector. Therefore, we define the main challenge for Cycle 2 of the Living Lab as "How to reconcile land use and land ownership?"

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Emerging data needs

We lack a more precise understanding of the problem's scale and the leverage factors that could be used to motivate owners to make their property available for agricultural or forest production (either by sale or rental). More specifically, we lack detailed knowledge about the location, area, and characteristics (biophysical, structural) of the land owned by absentee owners, non-farmers, or groups of heirs of the same deceased person. The same could be said for houses that are currently not on the sale or rental market. From a qualitative perspective, we also lack specific knowledge about optimal conditions to enable owners to agree to reach agreements to make their land or houses commercially available for local farmers or inhabitants.

Next steps

During Cycle 2, the Living Lab will initiate an information-gathering experiment applying quantitative and qualitative approaches, using existing reports for the model settlements' projects and interviews with local stakeholders, respectively.

Figure 28 One of the model settlements proposed by local inhabitants to the regional administration, with the parcel structure superimposed. For spatial reference, note the scale bar at the bottom left corner.

Part 1: Progress Review

Pilot Region introduction

Galicia is a region (NUTS2) located in a peripheral position in the northwest of Spain. With a total area of 29,574 km² and a population of 2.69 million, Galicia's average population density is similar to the rest of Spain (91 inhabitants/km² vs 94 inhabitants/km²). Nevertheless, about three-quarters of that population is concentrated in one-fifth of the territory, meaning that average density, when only rural municipalities are considered, is around 30 inhabitants/km². Perhaps one of the most remarkable differences from the rest of Spain is the high fragmentation of land ownership: an estimated 1.7 million people are landowners (about two-thirds of the total population), and the total number of land plots is close to 12 million. As a result, each landowner's property amounts to an average of 1.5 ha, often distributed among several plots. A second local characteristic to highlight is the extreme distribution pattern of Galician rural settlements. While occupying 6% of the territory, Galicia has half of Spain's population settlements (more than 30,000 in absolute terms), 90% with less than 100 inhabitants.

Since the mid-twentieth century, the primary production sector's intensive specialisation has led to a significant expansion and continuity of biomass, aided by the growth of forests and other naturally colonising vegetation. Dense and continuous patches of biomass, combined with short but intense periods of drought during the summer, result in a substantial wildfire risk. In the context of rising average temperatures and the increasing frequency of short but intense droughts, published records reveal a fire-damaged area approaching 50,000 hectares/year every five or six years. The last serious event took place in 2017, when 393 fire incidents occurred in less than a week, at least 51 inhabited settlements found themselves located inside the fire perimeter, and 873 communities (more than 87,000 people in total) were located less than one kilometre away from the fires' advance (Chas-Amil et al., 2020).

As a response to the wildfire events of 2017, the regional parliament of Galicia passed a law in 2021 (Law 11/2021, May 14th, for farmland recovery) with a toolbox of legal instruments for the reorganisation of land use and land ownership. One such instrument is the "Model Settlements" initiative, aimed at promoting the active management of land in the proximity of inhabited settlements and encouraging innovative approaches to local participation, agricultural production, and improving living standards. By law, local authorities (municipalities, LAU2) may submit proposals to initiate this process in a given settlement, but only after landowners (more specifically, landowners that jointly account for 70% of the proposed area) have formally agreed to be involved.

The Galician Pilot Region comprises 20 municipalities spread along the southern half of the region (NUTS2) of Galicia that have submitted proposals for participation in the model settlement initiative. The population in these 20 municipalities in 2021 was 40,652, within a total area of 2,653 square kilometres (15.3 inhabitants/km²). All the municipalities are classified as "rural" according to the degree of urbanisation classification.

Pilot Region Partner

The Pilot Region partner for this living lab is the Galician Agency for Rural Development (*Axencia Galega de Desenvolvemento Rural, Agader*). Agader is a public agency tasked with coordinating

public initiatives for rural development in the region, including managing the LEADER programme and monitoring and controlling Local Action Groups. The promotion of employment, the provision of basic services and the improvement of local infrastructure in rural areas are also included in the Agency's duties.

The most relevant aspect of Agader's activity for this project is its role as the responsible agency for the instruments included in the Law for farmland recovery and other (pre-existing) legal instruments dealing with the relationship between land ownership and land use (particularly, a regional land bank in operation since 2007). Agader is a central actor in this regard and centralises information, resources, expertise, and legal responsibility related to these kinds of instruments in the region.

Living Lab Coordinator

The University of Santiago de Compostela (USC) is a public institution for higher education and research endowed with autonomy, full legal status, and its own heritage. It comprises two campuses in the cities of Santiago de Compostela and Lugo. The USC assumes and performs its functions as an essential public service to the community through study, teaching, research, and knowledge transfer.

The living lab coordination is carried out by a team of 6 professors and researchers from the Department of Applied Economics and the Department of Agricultural and Forest Engineering of the University of Santiago de Compostela (Table 21 Composition of the living lab coordination team (by family name, in alphabetical order).). Their areas of expertise include evaluating rural development policy, environmental policy in agriculture, agricultural economics, regional economics, land use/cover change and evaluation of land markets. They have participated in several EU-funded projects on rural development, digitalisation, and agricultural knowledge and innovation systems (most recently, SHERPA, DESIRA, and AgriDemo-F2F). Prof. Edelmiro López was appointed Regional Director-General of Rural Development from 2005 to 2009. Prof. Eduardo Corbelle is part of the USC team involved in the consortium providing the Support Facility for the EU CAP Network (former EIP-AGRI Network).

Both teams (USC and Agader) have a long-standing history of cooperation. Some of the recent projects in which they have collaborated include the preparation of the Galician Common Agricultural Policy Strategic Plan or maintaining a Regional Observatory of Land Markets (*Observatorio Galego de Mobilidade de Terras*).

Table 21 Composition of the living lab coordination team (by family name, in alphabetical order).

Name	ORCID	Area of expertise
Dr. Eduardo Corbelle Rico	0000-0002-2382-6767	Land use/cover change, evaluation of land markets, biodiversity
Dr. Ana Isabel García Arias	0000-0002-7440-0715	Processes of agricultural change, evaluation of environmental policy in agriculture

Name	ORCID	Area of expertise
Eng. Beatriz Guimarey Fernández	0000-0001-9763-9369	Organization and facilitation of workshops, Communication and interaction with Research institutions and platforms
Dr. Edelmiro López Iglesias	0000-0002-1563-9371	Agricultural economics, agricultural policy, rural development, and regional economics
Dr. María do Mar Pérez Fra	0000-0002-5202-1706	Processes of agricultural change, evaluation and design of rural development policy
Dr. Raúl Ríos Rodríguez	0000-0003-2614-1875	Economic journalism and media economics

Functions and transitions

Functions

The productive structure of the Pilot Region is associated with a diversified economy with a strong presence of the tertiary sector and a lesser presence of the primary sector compared to other rural municipalities in the region. The agricultural sector of the Pilot Region municipalities is not specialised in any particular production, and it is formed, for the most part, by non-specialized, small, family farms. The Pilot Region holds many of the Natura 2000 sites in the NUTS2 region. The higher proportion of native hardwood forests and low-intensity farming systems in the Pilot Region, compared to other locations within Galicia, also contribute to the higher environmental value, as these systems are associated with high levels of species diversity and habitat richness (Lomba et al., 2022).

Production functions

Biophysical constraints largely limit the expansion of the farm and forest models that dominate the Pilot Region municipalities, particularly in dairy farming and cultivating fast-growing species for timber production (mainly *Eucalyptus spp.*). Small, non-specialised family farms form much of the farming sector in the Pilot Region, although some specialised models are emerging (vineyards, chestnut pistachio, and olive trees). Vineyard plantations are protected by three designations of origin (Monterrei, Ribeira Sacra, Ribeiro) and already have a long-standing tradition and high participation levels. In any case, the share of employment in the farming and forest sector is generally lower than the average value for the NUTS2 region (6.32% in 2020), and the structure of employment in the Pilot Region is dominated by the tertiary sector (services), which represents around half of the total number of jobs.

Consumption functions

The Pilot Region municipalities are characterised by low demographic densities, strong population ageing and a GDP and income per inhabitant lower than the Galician average. Furthermore, most of these municipalities are distant from the main urban areas. These characteristics mean the pressure of economic activities and population consumption on the territory is relatively low.

However, recent years have seen increasing pressure from external demands, such as the supply of renewable energy and other goods linked to natural resources.

Ecosystem services

The Galician Green Infrastructure Strategy (Díaz-Varela et al., 2019) classifies municipalities in the Pilot Region as "abandoned rural areas" or "abandoned urban-forest", areas where farming has been abandoned or replaced by afforestation during recent decades, sometimes with some presence of urbanisation processes. While some farming activities will remain in these municipalities in the future, it is expected that these municipalities' main function within the NUTS2 region will be related to the conservation or regulation of ecosystem services and landscape values. Incidentally, some of the economic activities related to conservation functions (e.g. tourism) may end up helping to maintain a certain level of farming activity, thus reducing farmland abandonment.

Transitions

While multiple transition challenges could be of interest, we believe the socio-economic transition occupies a central position in the Galician case. More specifically, we believe that the complex relationship between land use and land ownership lies at the heart of farmland abandonment, demographic decline, and wildfire risk (while the climate transition compounds the latter). A very high level of land fragmentation in this area is a large obstacle to developing an active farming sector, with implications for employment structure, demographic trends, and landscape changes. The latter has, in turn, implications for wildfire risk (as scarce farming activities favour biomass encroachment and spatial continuity) and biodiversity (because of the progressive loss of high nature-value farming areas).

Socio-economic and demographic transition

Municipalities in the Pilot Region show a general trend towards population loss, with an average annual rate of change in the last two decades around -1.22%, in line with most of the other rural municipalities in the NUTS2 region. Negative natural population changes result from ageing and low fertility rates. Nevertheless, the Pilot Region municipalities and the whole NUTS2 region experienced a positive net migration rate in the period 2001-2021, largely due to the return of citizens that had migrated to other regions of Spain or Europe and America once they reached retirement age. Positive net migration rates are compatible with, and often mask, the emigration of young residents in search of better job opportunities elsewhere, something common to other places in Galicia. The highest emigration rates are recorded in the 24-34 age bracket (Toxo Asorei & García Arias, 2018). The population is considerably older in the Pilot Region: the ageing index, old-age dependency ratio and global dependency ratio all show higher values in the Pilot Region municipalities than in the NUTS2 region.

The loss of demographic and economic weight of rural areas in recent decades has been accompanied by a reduction in the importance of agricultural activity in these areas. Nevertheless, the structure of land ownership has not changed accordingly. Land fragmentation can be measured in more than one way (van Dijk, 2003), and several indicators are applicable here. According to cadastral statistics, there are 1,028,803 plots of land, with an average size of 0.25 ha/plot, and 110,679 landowners in the Pilot Region (9 different plots per owner, on average), but only 40,652 inhabitants (less than half the number of landowners, as many of them live elsewhere in Spain and abroad) and only 5,776 farms, according to the 2020 agricultural census. In summary, most landowners do not farm anymore (there are 19 times as many landowners as

farmers) and, in some cases, do not live in the same area where their land is located (there are as many as 2.7 landowners as inhabitants). Difficult access to information regarding land ownership and high transaction costs (related to the need to negotiate with multiple actors, often in distant locations) are probably the most important problems experienced by farmers and new entrants to agriculture when trying to access land.

The farming sector is not the main provider of employment in the Pilot Region municipalities, as in any other rural area in Spain. However, farming can still provide a base of economic activity that justifies employment in the tertiary sector, both for the existing population and for immigrants (Palacios *et al.,* 2022). Previous studies have shown that an increase in the activity of the farming sector in these areas (usually associated with low-intensity farming systems) could represent an increase in these municipalities' gross value added of more than 2.5% and, in some cases, of more than 5% (Corbelle-Rico *et al.*, 2022). We hypothesise that the current contraction of the farming sector in these areas of the NUTS2 region is largely related to property fragmentation issues and that, therefore, tackling these issues could contribute to reducing population and economic decline.

Climate and environmental transition

Rural depopulation and farming decline have resulted in landscape changes in recent decades, particularly the abandonment of former farmlands and the expansion of tree cover. Today, farmers manage only around 15% of the territory in the Pilot Region. The remaining area is largely covered by forests (53% of the Pilot Region) or shrublands and other semi-natural areas (29%). This implies the presence of a large volume of biomass on the territory, with a large degree of spatial continuity, and thus poses a wildfire risk problem. The expected trends of climate change, which forecast higher average temperatures and an increase in the frequency and intensity of summer droughts, compound to generate an even larger problem. While earlier responses have been largely centred on fire suppression, this has been recently recognised as a planning problem (a matter of reconciling land use and land ownership), strongly tied to rural development and the preservation of agricultural activities in rural areas.

Digital transition

Digital infrastructure deployment and network coverage have developed quickly in recent years. According to the official statistics, 89% of Galician households had internet access in 2018 (91% in Spain), and most (88%) had broadband access. The percentage of rural households with broadband access was slightly lower (76%), although a strong increase has been noted in recent years. In terms of the real level of digitalisation, 70% of rural Galician households used the Internet regularly in 2018 (80% in Galicia and 87% in Spain), but this masks significant nuances based on age and educational level. For example, in rural households with people under the age of 45 and with a higher educational level (secondary education or above), internet use exceeds 90%.

It seems that the reason for lower internet usage in rural areas is not primarily due to technological barriers but rather other issues such as the suitability of available services to meet the community's needs, lack of knowledge about digitalisation possibilities, and limited ability to take advantage of these. These problems are particularly prevalent among the older and less educated population. The cost of services, which are comparatively expensive in rural areas (for the same level of performance), constitutes another limiting factor.

Living Lab Cycle 1: Planning Possibilities

Setting up the Living Lab

During 2023, the Pilot Region partner (Agader) and the Living Lab Coordinator (USC) initiated the Living Lab by reviewing the characteristics of the municipalities that had applied to be part of the regional government's model settlements initiative. This allowed us to identify one of those municipalities as an outlier with distinct demographic and socioeconomic characteristics from the rest of the group. Therefore, only 20 of the initial 21 municipalities were selected to be part of the Living Lab.

Agader established initial contact with the municipalities during March and April 2023. As a result, a focus group was formed in April 2023. The mayors of two municipalities in the Pilot Region (Boborás, A Veiga) and two representatives from the regional administration (General Director for Rural Development and General Vice-director for Land Mobility) held a meeting with researchers from USC in the premises of the Inter-University Research Centre for Atlantic Landscapes (CISPAC) in Santiago de Compostela. Participants in the meeting contributed feedback to the Task 1.2 report, which helped identify new topics (housing) that had not been considered before and, in general, to improve on the qualitative assessment provided in the report.

A list of 34 additional potential actors that can be involved in the Living Lab in future was prepared as a result of Task 4.2 (Institutional Mapping). Among them, we consider relevant that at least some of the eight Local Action Groups with activities in the Pilot Region municipalities, as well as some of the common land communities (375 in the Pilot Region) or the provincial authorities (three different in the Pilot Region, which hold subsidiary responsibilities for the municipal authorities), are involved in the next Living Lab cycles.

From the point of view of the organisation of meetings, the dispersed locations of the municipalities forming the Pilot Region make it advisable to take advantage of online meetings, which would probably greatly increase the will to contribute to most potential participants. The actual costs derived from inadequate transportation infrastructure, remoteness and dispersion were recognised when arranging meetings with potential participants.

Living Lab activities in 2023

Table 22 List of Living Lab activities in 2023

Task	Description	Dates
Task 1.2	Pilot Region Report	April-May 2023
Documentation review	Review of documents related to the "model settlements" initiative of the regional government	April 2023
Focus group 1	1st meeting of the focus group	April 2023
Task 4.1	Review of national and regional policies	May 2023
Task 2.2	Information on Living Labs' data availability and interests	June-July 2023

Task	Description	Dates
Task 4.2	Institutional mapping	July-August 2023
Task 4.2	Policy panorama	September 2023
Task 3.1	Living Lab Report	October-November 2023

Reflections from Cycle 1

Overall, we believe that Cycle 1 worked satisfactorily. Coordination between the Pilot Region partner and the Living Lab coordinator has been generally smooth, as we could build upon a previous long-term cooperation relationship in different projects. As a result, most tasks related to the project have been completed in due time and with useful results. However, small adjustments in the staff assigned to the project on both sides have prevented us from being more proactive during Cycle 1. This is reflected in the low number of focus groups organised. This was compounded by local elections in Spain in May 2023, which limited the ability of some local authorities to engage in Living Lab activities. An initial lack of understanding of which stakeholders would be most relevant for the focus groups also caused some delays. We expect the results of the institutional mapping and policy panorama carried out as part of task 4.2 will allow us to better direct our demands to the relevant actors during Cycle 2.

Cycle 1 results

Overall, Cycle 1 of the Living Lab allowed us to identify the socio-economic transition as the most relevant for our Pilot Region. The gap between fragmented land ownership and the declining farming and forest sectors can largely explain why the potential of these areas for quality forest and agricultural production has not been realised. Stakeholders consulted in the first focus group confirmed this idea and added a second concern: the lack of a match between housing ownership and demand. We believe both issues can be traced back to similar characteristics, including absenteeism, property fragmentation, multiplicity of heirs having a say on the same (usually small and low value) property and, as such, ways of determining relevant information and how to use it may be needed.

Analysing relevant information and consultation with relevant stakeholders confirmed that the digital transition is not a major concern in the Pilot Region. On the other hand, the environmental transition is very relevant because the expected increase in short, intense periods of summer drought will likely increase wildfire risk – one of the main environmental concerns in the area. Nevertheless, the analysis of published evidence indicates that wildfires are a symptom of inadequate land use management in the area rather than a problem *per se*. In this regard, we believe that tackling the issues of land ownership and land use will contribute to the improvement of the wildfire regime in the area, as it could be expected that less abandoned land would be occupied by natural revegetation.

The analysis of existing policies related to the relationship between land ownership and land use revealed that the regional administration has put in place several policy instruments (including a land bank, model settlements, agroforestry polygons, and a catalogue of forest and agricultural

soils) intended to promote the use of abandoned land in recent years. There is a similar set of measures concerning housing (census of vacant dwellings, register of housing demand) implemented by a different department of the regional administration. Nevertheless, these measures do not seem to have worked well in the period that they have been active, which we hypothesise might be attributed to either one or both of the following situations: either these policies are failing to generate and apply relevant information about owners and demandants of land and housing, or they are applied at a scale that is too limited for the challenge at hand.

Part 2: Challenge and next steps

Living Lab challenge

The analysis to date allowed us to identify the high levels of land fragmentation (twice as many landowners as inhabitants, nine different plots per owner) and the low reliance of the local economy on farming (only one farm for as many as eight inhabitants) as the main underlying causes of a less than satisfactory socio-economic transition in the Pilot Region. Limited access to information regarding land ownership and high transaction costs related to the need to negotiate with multiple actors, often in distant locations, are likely the most significant problems experienced by farmers and new entrants to agriculture when trying to access land. This, in turn, is reflected in the share of different land uses in the Pilot Region and the levels of economic activity associated with the primary sector. Therefore, we define the main challenge for Cycle 2 of the Living Lab as: "How to reconcile land use and land ownership?" In other words, which information mechanisms do we have available to promote the active use of land (and housing) even though their current owners are not farmers and probably do not live nearby?

Rationale

Agader is a regional agency with responsibilities in rural development. One of the tasks assigned is implementing policy instruments listed in the regional law for agricultural land recovery (*Ley 11/2021, de 14 de mayo, de recuperación de la tierra agraria de Galicia*). The law is part of a process recognising farmland abandonment as one of the key problems for rural areas in the region, which helps explain depopulation and ageing, loss of valuable agricultural landscapes (some associated with high-nature value farming systems) and, above all, increasing wildfire risk. A large wave of wildfires in 2017 stimulated the regional parliament to pass the abovementioned legislation. While some of the instruments foreseen in the law are generally oriented toward the promotion of agricultural use of abandoned land, others are specifically oriented towards increasing the protection of human settlements against wildfires. In particular, the "model settlements" are intended to promote agricultural land use near settlements, preventing the encroachment of vegetation and thus reducing the likelihood of fire reaching houses.

Knowledge to date

There are several sources of information about land ownership in Spain, including cadastral data and land book data. Nevertheless, there have been limitations in the scale of application of data from these sources, including confidentiality issues. Where mechanisms for updating data are inefficient, this can also affect the accuracy of information linked to land ownership and inheritance.

The question of updating public registers is out of the scope of this Living Lab. Instead, we are interested in the diverse policy instruments (including the model settlement initiative) that the regional administration has implemented to encourage owners of underused land to consider alternative land use potentials. To date, landowner participation with these instruments has been inconsistent. The set of incentives and motivations that could be used to appeal to landowners, absent or not, regardless of their age or social extraction, remains a question that limits the efficient use of those policy instruments.

Research question/s

We formulate the main research question for Cycle 2 of the Living Lab as "How to reconcile land use and land ownership?" More specifically, we are interested in:

- New ways to use existing information about land (and housing) ownership so that it can better promote access to land and housing by existing and new demandants.
- New ways to produce or improve information about land/housing ownership.
- Identifying situations where a given policy instrument (out of those contemplated by the law) can be preferable to others to promote active use of underused land/housing.
- Identifying ways to spread the implementation of instruments, such as the model settlement initiative in other locations in the Pilot Region.

Policy relevance

The challenge and research questions above are particularly relevant to the context of the Iberian northwest. The characteristics of the land property structure in that quadrant of the Iberian Peninsula, including parts of Spain and Portugal, are similar and are associated with comparable socio-economic and environmental problems. More generally, farmland abandonment associated with misalignment of land ownership and land use is commonplace in the Mediterranean basin, with large wildfire events being the main observable symptom. Because of this, although we naturally focus on the instruments included in the Galician Law for Farmland Recovery, similar policy instruments are being tried in different countries. Mechanisms for engaging landowners in these innovative schemes need to be examined.

Emerging data needs

The existing literature provides a reasonable image of the whole process of misalignment between land and housing ownership and the corresponding demand. This suggests that many landowners do not live near the land/houses they own and often share ownership with their relatives as part of an undivided inheritance. Sometimes, it is a significant challenge to even contact owners to explore opportunities for alternative land use arrangements. The mismatch between owners and people seeking land is likely to become exacerbated in the future due to depopulation and the shift away from agriculture as an economic activity in many rural communities.

In other words, although we have identified clear local challenges and opportunities, we lack a precise understanding of the problem's scale and the leverage factors that could be used to engage with and motivate owners to consider alternative land use potentials. More specifically, we lack detailed knowledge about the location, area, and characteristics (biophysical, structural) of the land owned by absentee owners, non-farmers, or groups of heirs of the same deceased person. The same could be said for houses that are currently not on the sale or rental market. We also lack a clear qualitative understanding of current owners' expectations, plans, fears, worries and concerns.

Data availability

Above, we have suggested two approaches to Living Lab Cycle 2. The first is a quantitative examination of land ownership characteristics. The second foresees the qualitative exploration of the motivations and concerns of current property owners. The first approach will be carried out systematically in the preparation phases of any project concerning one of the instruments

contemplated in Galicia's "farmland recovery law" and other legal regulations. Property investigation is, by default, a part of the administrative process for every project associated with these instruments – for example, when a land consolidation project is being prepared, or a model settlement project is initiated. The existing 20 model settlements in our Pilot Region are currently undertaking a property investigation phase, funded by the regional administration (Agader), and carried out by external contractors, typically a team of agronomists, surveyors, and legal consultants. The results will be available for review by the public, and we expect that the review of their contents will help us to understand the precise structure of land ownership in those locations.

Besides reviewing the documents from the property investigation phase, we aim to contact the external contractors currently involved in investigation tasks and collaborate with the teams involved in preparing the quantitative assessments of property structures in the Pilot Region. These contractors usually have extensive experience in property investigation, as they have worked for the public administration for years. We expect that they will provide us with a rich view of the investigation process, including their views on the reliability of the available and their knowledge from interacting with landowners during fieldwork and personal interviews. To the best of our knowledge, this kind of systematic, comprehensive, and structured analysis of the property investigation process has not been carried out before. We believe that it could be very useful for future policy guidance. Additionally, we hope to interview selected landowners and other knowledgeable informants associated with the 20 existing model settlement initiatives in the Pilot Region.

Limitations

Quantitative information derived from model settlement projects does not necessarily represent the whole Pilot Region: the Pilot Region includes 20 municipalities, while model settlements are just 20 villages, one in each municipality. Care must be taken before trying to extrapolate this information to the Pilot Region or, even more, to the whole NUTS2 region. Nevertheless, it might provide a reasonable insight into the property-related issues in the Pilot Region.

Recovery of qualitative information will also need a properly designed approach, probably including individual interviews and focus groups.

Capacities

The working team in the Living Lab has experience using quantitative and qualitative data, as it includes personnel from engineering and rural sociology, respectively. Notwithstanding, they would likely need additional practical support for the interview and focus group phases.

Next steps

During Cycle 2, the Living Lab will initiate an information-gathering experiment using quantitative and qualitative approaches. A detailed review of the projects for the 20 model settlements already in progress in the Pilot Region should provide a complete quantitative image of the structure of land ownership in those locations, which will be useful to understand to which extent model settlements or other instruments would be appropriate. We will also be interested in knowing more about the difficulties and paths used to compile this information. More specifically, we will explore the existing protocols and regulations regarding information sharing between public agencies (cadastre, principally, but also local authorities) and the private consultants that usually carry out property investigation projects. We will explore the insights of the contractor teams that

have already done property investigations during 2022 as part of the ongoing administrative process resulting from the regional administration's formal declaration of model settlements.

Besides increased knowledge about the specifics of the land and housing structure in the Pilot Region, we will also be interested in knowing more about current owners' values, concerns, and expectations. Specifically, we are interested in assessing the conditions that would increase landowners' willingness to put their properties on the market, be it directly or via any of the instruments included in the Farmland recovery law of Galicia.

Thus, alongside the detailed review of the 20 model settlement projects, the main activities of the Living Lab during Cycle 2 would include interviews with private consultants commissioned as part of the model settlement initiative, local and regional authorities, and landowners.

USC will be responsible for reviewing the model settlement projects and their main findings concerning property structure in the Pilot Region. Agader, in turn, has a central role in the model settlement projects, as it is directly in contact with local authorities, external contractors, and other relevant actors. As such, we envision Agader's main role as a facilitator for establishing contact with relevant actors. From then on, Agader and USC will coordinate to participate jointly in all meetings with stakeholders. USC will be responsible for processing all the information gathered in these meetings.

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Spain: Sant Miquel de Balenyà (Osona)

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Summary and overview

Sant Miquel de Balenyà, part of the Seva municipality in Osona County, stands as a distinct entity with a population of 1,353. Its strategic location amidst the Montseny and Plana de Vic has contributed to a strong production sector, particularly in agri-industrial activities. As a Municipal Decentralised Entity (Entitat Municipal Descentralitzada (EMD) in Catalan), the Sant Miquel de Balenyà Council actively participates in the RUSTIK project, aiming to address the RUSTIK challenge, especially within its local context.

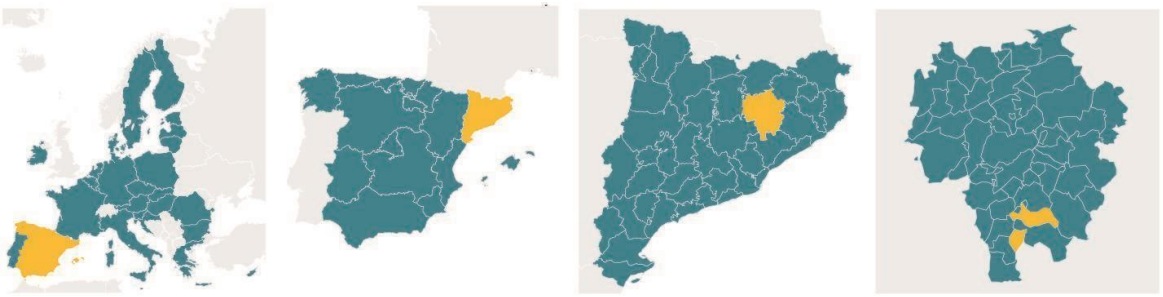

Figure 29 Location of the Seva municipality in the context of Europe, Spain, Catalunya and Osona (authors' own elaboration from Wikimedia Commons).

Figure 30 Sant Miquel de Balenyà (Andreu Blanch).

Living Lab achievements

Throughout 2023 the Living Lab made significant progress, completing comprehensive groundwork for data collection and community involvement. Activities included carrying out surveys and fieldwork to assess the industrial, commercial, and agricultural sectors, as well as mobility. Collaborative efforts involved engaging stakeholders, establishing partnerships with local associations, and implementing a local publication strategy to disseminate project updates. Additionally, planning and preparatory sessions have been fundamental in Cycle 1, paving the way for the upcoming phases.

Key learning to date

Key learnings highlighted the significance of better-planned timelines, comprehensive data gathering strategies, and challenges in our work due to data scarcity. The communication between project actors has been commendable, with weekly meetings held since May 2023. However, challenges persist in task planning and data collection activities, which have lagged. Despite these hurdles, Cycle 1 has paved the way for refining methodologies and ensuring a more holistic approach in Cycle 2.

Living Lab challenge

The Living Lab's challenge focuses on enhancing the quality of life in Sant Miquel de Balenyà, prioritising social cohesion, equity, climate resilience, and balanced socio-economic competitiveness through improved territorial and urban planning. The selection of this challenge arises from the area's complex demographic shifts, urban-industrial interface, and future infrastructural changes. It highlights the relevance of socio-economic and environmental transitions and has a special focus on involving a significant proportion of the population in decision-making.

Emerging data needs

Data serves as a fundamental tool to address the Living Lab challenge, particularly in understanding demographic distribution, socio-economic metrics, climate-related vulnerabilities, and economic competitiveness. Detailed demographic and socio-economic data will provide insights into community needs and perceptions, while environmental data can inform resilience strategies. Moreover, economic and mobility data will aid in fostering a balanced approach to economic growth and inclusivity.

Next steps

Moving forward, the Living Lab aims to bridge identified knowledge gaps by intensifying efforts in data collection through fieldwork and collaborative methods. Plans involve engaging the community in decision-making processes, refining data collection strategies, and aligning methodologies to address specific challenges. Strengthening stakeholder partnerships, continuous communication, and methodical data assessment are key priorities to enhance the Living Lab's effectiveness in Sant Miquel de Balenyà.

Part 1: Progress Review

Pilot Region introduction

Sant Miquel de Balenyà is part of the Seva municipality, which is one of the 50 municipalities that comprise Osona County. Sant Miquel de Balenyà Council is the Pilot Region Partner and, therefore, the focus is the individual town in the context of the county. The town developed after the creation of a train station in 1875 and, nowadays, Sant Miquel de Balenyà has 1,353 inhabitants. It is in the south of Osona County, between the north face of the Montseny and the Plana de Vic.

Pilot Region Partner

The Pilot Region Partner is Sant Miquel de Balenyà Council. This council is a Municipal Decentralised Entity (Entitat Municipal Descentralitzada (EMD) in Catalan): an administrative level lower than the Municipality. This status is given to towns with qualities that differentiate them from the main municipality core.

The team working on the RUSTIK project is led by Andreu Blanch. The president of the EMD is Inès Puigneró, who is really involved in the project. The entire technical team of the council is involved in the implementation and monitoring of the project, carrying out internal communication and work events.

Living Lab Coordinator

The Living Lab Coordinator is Fundació Ersília, a private non-profit foundation devoted to promoting a collaborative and active learning culture to deal with global and local urban challenges. Our team is composed of Marité Guevara, who has an MA in Communications and a long-standing relationship with Sant Miquel de Balenyà; and Guillem Ulldemolins, who has an MSc in Geospatial Technologies.

Functions and transitions

Functions

Production functions

Sant Miquel de Balenyà has a strong production function, particularly in the secondary sector. Over 30 industries are located in the area, covering a wide range of sectors. The sector that occupies many people is the agro-industrial sector, especially the pork industry, and most of them are low wage workers (Blanch and Ulldemolins, 2023).

The agro-industrial sector is also strong within the primary sector, with 7 livestock farms and 226.8 hectares of agricultural holdings, representing 53.3% of Sant Miquel de Balenyà. 14% of the area is covered by forest, but currently, no forestry development is ongoing (ICGC, 2018).

The tertiary sector is developed, with essential services common to rural areas being provided, such as schools, hairdressers, and mechanics, with restoration being particularly important due to strong economic activity and the town being a transit area at regional level.

Consumption functions

Sant Miquel de Balenyà is one of the northern gateways to the Montseny massif, a natural area designated Reserve of the Biosphere and Natural Park, which brings many people to the area, mainly for weekend holiday purposes. There are specific festivities in the area that reflect the tourism intensity, mainly the Medieval Market in Vic and the Mushroom Fair in Seva.

The residential area is centred mainly in Sant Miquel de Balenyà town. There are a few countryside houses, mainly related to agriculture and farming, and there is the Serrat de l'Aguilar neighbourhood, along the main road and more directly linked to the municipality of Tona.

Ecosystem services

The challenges facing Sant Miquel de Balenyà regarding landscape and cultural heritage conservation, biodiversity maintenance, soil protection, and water availability are intertwined with critical environmental concerns. Specifically, the county faces water scarcity due to declining rainfall, impacting various activities and ecosystems. Water quality issues linked to pork manure pollution affect the northern side of Osona, while decreasing water availability is a primary concern, amplified by diminishing rainfall. Climatic risks, notably decreased rainfall and rising temperatures, profoundly affect the northern Montseny, impacting vital leisure and economic activities like mushroom and chestnut collection, trekking, and cycling. These environmental challenges threaten both local ecosystems and the sustainability of recreational and economic practices within the region.

Transitions

The key transitions addressed by the Sant Miquel de Balenyà Living Lab are the socio-economic and the environmental. The challenge will be addressed in a holistic approach.

Socio-economic and demographic transition

The town has a growing demography, and this is driven by three factors: its location (well-connected with Barcelona and the county capitals Vic and Granollers), the presence of factories attracting more workforce than inhabitants in the village, and the number of secondary residencies, some of which have become main residences since the Covid-19 crisis. At a regional level there is a strong incoming migratory flow that leverages the low fertility rate (IDESCAT, 2023).

Climate and environmental transition

In relation to energy, there is a commitment to green energy in the area. On the public side, wood chips from the Montseny forests are being used as solid fuel powering the boilers, and the private sector is investing in solar panels, mainly on industrial roofs. Efforts need to be made regarding the water availability problem, which will become more severe in the upcoming years.

Digital transition

The digital infrastructure is appropriate for the area, with the main population centre and the industrial area covered by optical fibre and all sites being covered by 4G connection. The industrial sector is barely digitised, whereas the commercial one is progressing in this sense. However, there is no need to digitise some services as they are directly accessible to local people, who are the main users. There is currently no information on people's digital capacities.

Living Lab Cycle 1: Planning Possibilities

Setting up the Living Lab

The Living Lab was gradually established from the start of the RUSTIK project through to June 2023. Following the initial efforts by both the EMD and Ersília in defining the Living Lab for the project proposal and kick-off, Ersília embarked on a learning phase, diligently gathering all available data from the area.

In May 2023, a new RUSTIK technician, Andreu Blanch, was selected to join the EMD team, and the municipal elections were held, resulting in the election of Inès Puigneró as the president of the EMD. These developments brought stability to the ongoing research efforts and laid the foundation for the work to be carried out in the coming months.

In June 2023, both parties collaborated to develop a comprehensive plan which outlines all the activities planned for the first cycle and extends to March 2024. This program was presented to the EMD president in July and is currently being implemented.

The primary focus of this program is data collection, with the overarching objectives of gaining a deeper understanding of the area's reality and facilitating decision-making in subsequent phases. It is structured into five distinct topics:

Secondary information sources

Gathering all available data and creating a geographic database shared by the EMD and Ersília. It includes topographic data, land registry data, statistical data, and many other specific datasets.

Census

Reports based on self-collected data.

Studies

Reports based on information not gathered directly by the LL team.

RUSTIK tasks

Completing the tasks for WPs 1, 2, 3 and 4 during this period, and keeping up to date with the project, especially through Living Lab Coordinators' Meetings and attendance at project meetings.

Communication and citizen involvement

Dissemination of data collection findings and relevant RUSTIK news in the local newspaper (bimonthly).

Collaborative methods

The main collaborative methods employed so far have been the surveys made for the census. These surveys have already been completed with all enterprises located in the industrial estates and those engaged in commercial activities and are ongoing for the agricultural and farming sector. Return sessions are planned for industries in late November and for commerce by the start of 2024.

Participants and stakeholders

The participants involved so far are mainly those consulted for census purposes. Some individuals have been consulted for specific topics, such as access to certain data, including EMD staff and associated stakeholders.

Some key stakeholders have been identified. On the local scale, industrial and commercial associations have been approached. The Mancomunitat de la Plana, an Intermunicipal Consortium that provides services to 10 municipalities in the area, has also arisen as a relevant stakeholder.

Data collection methods

Until the start of the summer, the main data collection efforts involved collecting available datasets from institutions such as the Catalan Statistics Institute (IDESCAT), the Spanish Land Registry Office and some departments of the Catalan Government (for example, Industry, Education, Agriculture).

From this point on, fieldwork has been a key focus of our work for the Living Lab. We have undertaken a census, with interviews conducted with industrial, commercial, agricultural and livestock holdings. A major campaign was led by the EMD to assess all the buildings in the area: their state, use, occupation, and other metrics. Train station users were also counted and interviewed, to understand their mobility patterns and assess potential modifications to the train station area.

Living Lab activities in 2023

Table 23 Activities carried out in the Sant Miquel de Balenyà Living Lab since the start of the project.

Living Lab activities in 2023	
January	Basic mapping
February	Living Labs Kick Off meeting in Sant Miquel de Balenyà and Barcelona
May	Meeting EMD - Ersília and start of work for Andreu Blanch
June	Planning of the first cycle activities Preparation of our local RUSTIK Database Fieldwork: commercial activities Local publication RUSTIK project evolution (1)
July	Meeting with Mancomunitat de La Plana's Development Team Fieldwork: Houses and buildings
September	Fieldwork: Mobility study at the train station Local publication RUSTIK project evolution (2)
October	RUSTIK Project Meeting in Parma Population study: Study of the evolution and structure of the population
November	Internal RUSTIK session in the EMD Fieldwork: Interviews in the agricultural sector Local publication RUSTIK project evolution (3)

Reflections from Cycle 1

Our assessment of Cycle 1 is positive overall. The communication between the two actors in the Living Lab has been smooth, with weekly meetings since May 2023.

Some difficulties arose from the task planning, with a rather optimistic timeline that has been difficult to achieve. This timeline mostly included data collection activities, and the inclusion of RUSTIK deliverables and tasks was initially overlooked.

Also, the challenge definition has been difficult due to the lack of data available. The Living Lab team had a clear idea, but we faced challenges in obtaining the necessary data to solidify our vision. Despite these obstacles, we managed to lay a foundation for the Living Lab's objectives and activities.

Overall, Cycle 1 provided invaluable insights, emphasising the importance of better-planned timelines and a comprehensive approach to data gathering and task execution. We're enthusiastic about implementing these lessons learned in Cycle 2 to enhance our project's effectiveness and outcomes.

Cycle 1 results

Cycle 1 has been positive for finding the focus of our Living Lab.

The functions and transitions assessment improved our understanding of the local context, and the local administration’s strategies and priorities.

On evaluating the different challenges that the area is facing, we have decided to work on a topic where the Pilot Region Partner has influence. Some topics related to the nature of the rural area or linked to global processes were discarded. We also decided to reduce the geographical scope of the Living Lab, from the county of Osona to Sant Miquel de Balenyà, as this is the remit of the PRP, and thus where its scope and interests lie.

Positive partnerships have been established, or are in the process of being established, with local stakeholders such as the enterprises, industries, agricultural workers, and retailers. The role of the “RUSTIK Technician” is seen as a friendly face of the administration by the different stakeholders, and the administration understands its potential for improving the decision-making process.

Part 2: Challenge and next steps

Living Lab challenge

The challenge of the Living Lab is to enhance the quality of life in Sant Miquel de Balenyà, with a specific focus on social cohesion and equity, climate resilience, and balanced social and economic competitiveness. The means to achieve this goal will be through the improvement of current territorial and urban planning. This will involve understanding the territorial model and local perspectives on issues within the territory which may be addressed through planning; as such, citizen participation in the project will be required to successfully achieve our goals.

Rationale

The choice of this comprehensive challenge is based on the complex territorial pattern in Sant Miquel de Balenyà, despite its small geographic and population size. An industrial area with over 30 industries lies very close to the town, segregated only by the train line. There are also industries adjacent to the urban area and a residential building next to the industrial zone. The space between them is not well-defined, with large unpaved parking lots and some buildings in a dilapidated state. People currently move across the train tracks for various purposes, despite the lack of a level crossing.

Regarding territorial planning, the area is facing significant change due to the construction of a bypass road (see Figure 31 Sant Miquel de Balenyà territory and main future urban projects (authors' own elaboration).), which will redirect heavy vehicle traffic currently using the main street (parallel to the train tracks). This allows for calming the affected streets, although it also poses a risk of losing the vehicles that tend to stop within the area, mainly for breakfast or lunch on their way to the Montseny area.

Sant Miquel de Balenyà faces common challenges shared by many rural areas such as the closure of commercial activities or the long daily commutes of residents to urban areas for work and education purposes.

Beyond these challenges, it also exhibits significant dynamism due to its industrial activities, drawing a large number of workers to the area daily. The train station also adds to the town's vibrancy, serving as a mobility hub for people from Tona, Seva, Taradell, and El Brull for their daily commute. Promoting sustainable mobility is crucial given its rail connectivity to major regional urban centres.

Additionally, mid-term demographic projections foresee an increase in inhabitants in the area, amidst the collapse of the Metropolitan Area of Barcelona (IDESCAT, 2022). The area benefits from its dynamism, excellent connections, privileged natural environment, and improvements in road and rail infrastructure. The limited supply of vacant housing and future urban expansions will place housing policies at the forefront of debate in the coming years.

The local administration is keen on having an urban planning strategy tailored to current needs, as historically, this planning has traditionally fallen under the purview of Seva Town Hall. It is worth noting that the current planning framework dates back to 2006 and has undergone several modifications in recent years, attempting to adapt to present-day requirements (Ajuntament de Seva, 2006).

The local administration has a particular interest in territorial planning, evident in initiatives like the DIES study granted by the Barcelona Provincial Council to explore partial modifications in the Urban Master Plan (POUM) within the Monells Area (2020) and this year's grant focusing on the Balenyà-Tona-Seva railway station surroundings (more information is available at the RUSTIK repository: https://www.ersilia.org/rustik-smbalenya).

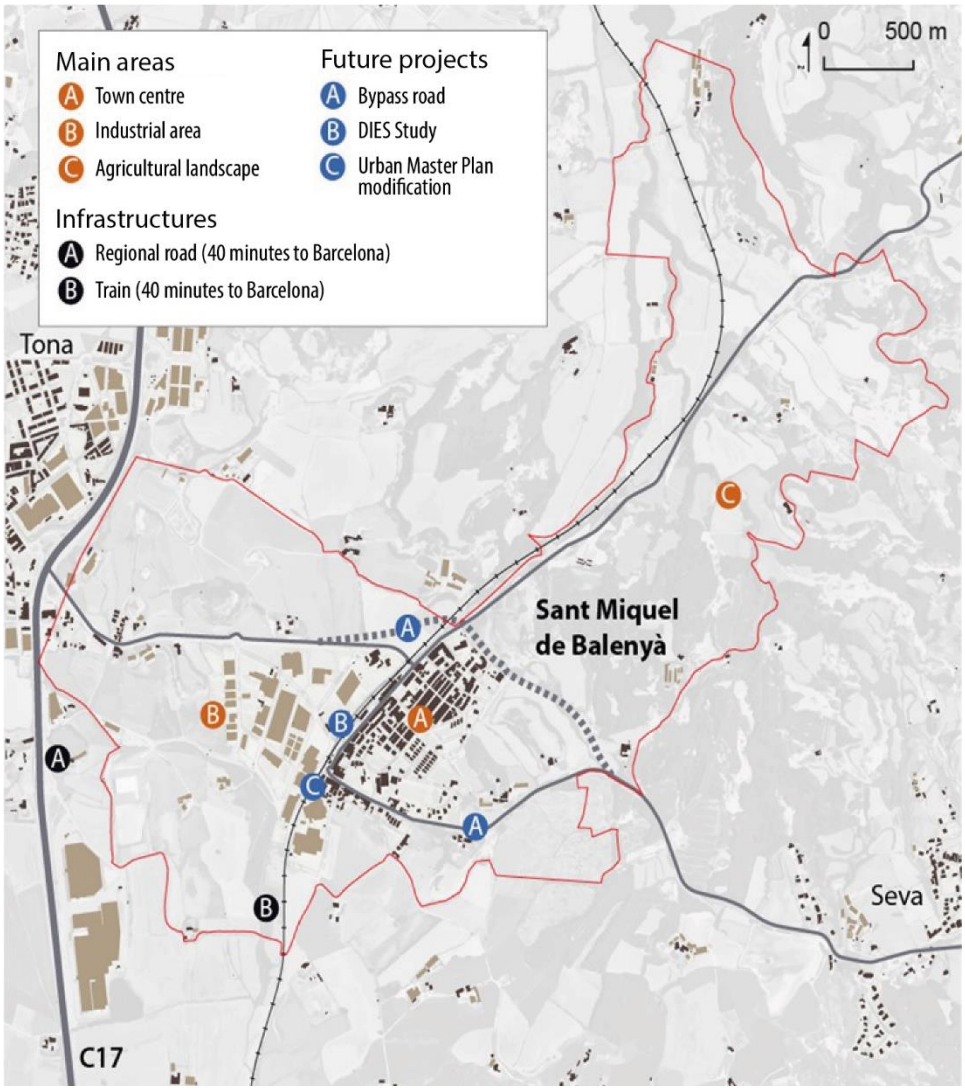

Figure 31 Sant Miquel de Balenyà territory and main future urban projects (authors' own elaboration).

There is a strong interest in involving the population in this process, given the presence of highly active and politically engaged neighbourhood groups. Empowering these voices is both feasible and essential within a local administration such as the EMD and in a Living Lab of such small dimensions.

Knowledge to date

The starting point is the current territorial and urban planning documents, both the Seva Urban Master Plan (POUM) and the Partial Territorial Plan of the Central Counties. The existing knowledge base is supplemented by subsequent studies, although it remains somewhat limited.

Since the beginning of the RUSTIK project, efforts have been made to gain a more precise understanding of the local reality through data collection on industrial and commercial activities, the state of buildings, population trends, and sustainable mobility linked to the train station and the pedestrian pathway connecting the station to the town of Tona.

On the topic of social cohesion and equity, work has been done by the County Council of Osona (CREACCIÓ, 2023) in order to identify the current situation in the area, especially around the topics of talents and vulnerable collectives. Climate resilience has been tackled in the agricultural, industrial, and commercial census, which asked about topics such as energy sources and water supply (Blanch and Ulldemolins, 2023). There is an emerging energy community in the town and also a growing energy community in the industrial estate. This is expected to start working soon owing to complementarity of their resources and needs. The county council is also leading the Nova Energia d'Osona (2023) project, with the aim of reducing GHG emissions by 40% in 7 years. Finally, social and economic competitiveness is a major issue, and we have identified the current situation of the different agricultural, industrial, and commercial sectors) through the census.

Research question/s

The research questions that we seek to answer from our Living Lab work in Cycle 2 are:

- How can improvements in territorial and urban planning positively impact social cohesion, equity, and the overall quality of life for residents in Sant Miquel de Balenyà?
- What measures can be implemented to enhance the community's resilience to climate-related challenges, ensuring sustainable development and environmental preservation?
- How can a balanced approach to social and economic competitiveness be achieved, fostering local economic growth while maintaining social equity and inclusivity?
- What strategies and methods can effectively engage and involve the community in decision-making processes and project development, ensuring their voices shape the outcomes of the Living Lab initiative?

Policy relevance

An essential implication arises from the current Urban Planning Law, which does not grant EMDs the right to approve modifications to the Urban Master Plans (POUMs), a responsibility held by the City Council. The process is particularly complex in the case of the area close to the C17 road, the Avellanet industrial estate, the Balenyà-Tona-Seva Station surroundings, the Bypass road, urban crossings, and the Monells area (see Figure 31 Sant Miquel de Balenyà territory and main future urban projects (authors' own elaboration).).

The work of the Sant Miquel de Balenyà EMD is especially relevant as efforts are being made towards a national policy modification that would allow for urban planning modifications, benefiting all EMDs in Catalonia.

At the local level, this process would serve as the starting point for a new Urban Master Plan. The current plan dates back to 2006 and, despite partial updates on several occasions, has not been completely revised since. Updates to the 2008 Partial Territorial Plan of the Central Counties (PTPCC) and the Transport Infrastructure Plan of Catalonia 2006-2026 (Departament de Territori, 2006) are also anticipated in the coming years. The knowledge provided by the RUSTIK project is crucial in achieving favourable developments in these plans.

Emerging data needs

As a grassroots Living Lab, our aim is to involve as much of the local population as possible in the data collection process. We also hope to involve a significant proportion of the local population in the decision-making process for better urban planning.

The main problem we have is that due to the scarcity of data at such a low level, all of the data has to be collected from scratch. Although this is feasible as we are working in a small area, this is a time-consuming process.

Our needs are in the domains of social cohesion and equity, climate resilience and balanced social and economic competitiveness. We require more detailed demographic data (for example, population distribution, age groups, diversity) and socioeconomic data (for example, income levels, employment rates, education levels). Additionally, we require data which may be gained from community surveys (such as attitudes, perceptions, and the needs of residents regarding social cohesion and equity) and also data on social services and community programs (such as accessibility, effectiveness, and usage).

Regarding climate resilience, there is a need for environmental data (such as weather patterns, historical climate data, and climate change projections), data on the vulnerabilities of existing infrastructure to climate-related risks, and also risk assessment of potential threats (such as flood zones and fire risks) and their impact on the community.

The last topic is competitiveness, and in this regard, we need economic data. We have started to gather data on local businesses, industries, employment sectors, and economic growth rates, but also require accessibility and mobility data (for example, transportation networks, and connectivity to employment and services).

Regarding community involvement, throughout the process we will need to gather engagement data and feedback. This will include responses to initiatives, public meetings, and forums. Policies will be assessed by their effectiveness and alignment with community needs.

Data availability

Of the data described above, there is very little currently available; however, the reduced geographical dimension of the Living Lab is beneficial, as it has allowed us to collect data on several topics. There are though, some big gaps, as even basic metrics, such as demographic data, are not available at the EMD scale.

Land registry, agricultural and livestock holdings, and public facilities and equipment are the main types of data available currently. Some other data has been retrieved such as land use, urban master plans, energy efficiency certificates of buildings, and the number of users of the train service.

Other data has been gathered through data scraping, and big data sources have also been identified but not yet evaluated. These include AirBnBs in the area, sport activities registered on Strava, and the natural and historic landmarks included on Google Maps. None of this data is now seen as crucial for our analysis.

Accordingly, the main source for data will be the data collected from fieldwork and through collaborative methods involving the local population. We would like to explore datasets which

capture mobility metrics (such as data extracted through mobile phone movements captured by mobile phone masts).

Limitations

The main limitation at this stage is data scarcity. A lack of crucial information, especially at the EMD scale, makes it challenging to gain insights into demographic, socioeconomic, and other essential metrics. The available datasets in this regard lack the granularity required for effective planning and decision-making.

We are also facing issues related to the scope and depth of data, as while certain datasets exist (land registry, agricultural holdings, public facilities), they might not cover the breadth of information needed to address the issues outlined in the Living Lab challenge.

Capacities

First of all, it must be said that despite limitations, the data collected so far, plus those retrieved (such as land registry data, urban master plans, and energy efficiency certificates) provide a foundational understanding of the area's infrastructure and land use.

Furthermore, relying on fieldwork and collaborative methods involving the population presents an opportunity to gather more comprehensive and contextually relevant data. Also, the big data sources, though not yet evaluated, could offer supplementary insights once analysed and integrated with other relevant data sets.

Finally, our approach demonstrates adaptability by considering unconventional data sources, showing a willingness to explore and utilise innovative approaches to fill data gaps.

Next steps

Knowledge gaps or limitations identified in the sections above that we would like to address.

The identified knowledge gaps encompass the whole range of essential data, particularly at the scale required for precise analysis, hindering insights into demographic, socioeconomic, and climatic factors crucial for effective planning. Moreover, the absence of critical metrics and technological data highlights the need for comprehensive information. To bridge these gaps, fieldwork and collaborative methods involving the local population stand as our primary avenue for gathering pertinent data, showcasing an intent to supplement existing knowledge. Despite these challenges, the project demonstrates adaptability and openness to innovative data sources, highlighting a commitment to leveraging community engagement and evaluating diverse datasets to mitigate these knowledge limitations.

What do we need to do before feeling ready to proceed with the data experiment in Cycle 2?

Before embarking on Cycle 2's data experiment, several critical preparatory steps must be taken to ensure readiness. The initial phase involves conducting a comprehensive assessment of available datasets and meticulously identifying gaps crucial to fulfilling the Living Lab objectives. Concurrently, a well-structured community engagement strategy must be crafted to actively involve locals in data collection, validation, and interpretation, aligning insights with community needs. A robust methodology, blending traditional fieldwork with innovative approaches, must be developed to effectively address the knowledge gaps that are identified. Additionally, the development of plans for seamless integration of diverse datasets collected through various means, including fieldwork and collaborative methods, is essential for coherent analysis and interpretation. Ethical considerations concerning data collection, privacy, and usage must be

meticulously addressed to ensure adherence to legal and ethical standards, particularly regarding community-related information. Lastly, equipping the project team with comprehensive training and resources is imperative to proficiently manage diverse data sources, methodologies, and community engagement. This holistic preparation lays a sturdy foundation, maximising the value of gathered data, its relevance, and its potential impact on the Living Lab's success.

Plans for meeting with stakeholders or using particular methods.

To ensure effective stakeholder engagement and method implementation in Cycle 2, several plans are proposed. This includes mapping key stakeholders for involvement, organising community workshops and focus groups to gather local insights, and involving stakeholders in data collection. Seeking expert advice, utilising online platforms for broader engagement, and arranging regular stakeholder meetings will ensure ongoing communication and the refinement of methodologies which are suited to citizen engagement. Additionally, partnerships with local institutions will leverage resources for efficient data collection and engagement. By combining these strategies, the project aims to foster a collaborative environment, ensuring diverse stakeholders contribute to the success of the Living Lab.

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United Kingdom: Gloucestershire

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Summary and overview

Gloucestershire (see map, left) is a mainly rural county in South West England. It has a population of almost 650,000[6], of which about a third live in the two largest urban settlements of Cheltenham and Gloucester. Gloucestershire has a 2-tier local government structure of county and district councils. The county council is responsible for highways, education, and social care, while the district councils have delegated planning functions.

The Living Lab (LL) covers Rural Gloucestershire (i.e. the four most rural districts of the county, namely Stroud, Forest of Dean, Cotswold, and Tewkesbury). The LL is principally concerned with the digital transition challenge, especially with prototyping a dataset; and securing a commitment within the county's digital strategy to include rural and community-level (LAU2) data.

Living Lab achievements

The LL activities in the first year have involved establishing good working relations between the Pilot Region Partner (PRP), Gloucestershire Rural Community Council (GRCC), and the Living Lab Coordinator (LLC), the Countryside and Community Research Institute (CCRI). We organised a focus group, workshops and conducted interviews with county stakeholders. Following this, we completed several RUSTIK tasks such as the Pilot Region report, Institutional Mapping, a Policy Panorama, and data surveys. Significant time has been spent on defining the Living Lab transition challenge (see Section 1.2.2 below).

Key learning to date

The work during RUSTIK Cycle 1 has allowed us to develop a comprehensive overview of the opportunities and challenges Rural Gloucestershire faces, and the context within which the PRP, GRCC, is operating. Following various meetings, interviews and GRCC work with the Digital Accessibility, Inclusion, Support, and Innovation network (DAISI), we were able to explain the functions of the LL to prospective stakeholders. The process also allowed for a deeper understanding of community needs in respect of all three transitions and of stakeholder dynamics, as well as the effective use of data for decision-making.

Living Lab challenge

The Gloucestershire LL focus is on the digital transition. The experiment will test the opportunity for developing a dataset of fine-grained community-level data generated and used by (mostly rural) community support organisations such as social housing providers, food banks, health and social care advocates, and local parish or town councils.

[6] https://www.gloucestershire.gov.uk/media/szofuc4l/current-population-of-gloucestershire-2021.pdf

Emerging data needs

One of the problems the LL seeks to address is that finer-grained, community-level data on digital transformations are lacking, despite national and county-level digital strategies. Before the pandemic, the initiation of a digital strategy in Gloucestershire was grounded in economic development objectives and led by Gloucester City Council. The LL will hopefully help build capacity for collecting community-level data (potentially through a dashboard system) to better inform the county strategy to the benefit of rural citizens in what has become a digital inclusion strategy, with broader objectives than economic development.

Next steps

The next step in the Gloucestershire LL is to organise meetings with the most relevant stakeholders in respect of the selected experiment. Once these are completed and an action plan for Cycle 2 is drafted, it is important to work with the respective stakeholders, such as DAISI, the county council, and the district municipalities to examine what additional value RUSTIK can offer. The LL aims to engage with the *Maptionnaire* tool to collect some of the data needed to inform our next steps.

Figure 32 Gloucestershire, view from Leckhampton Hill (A. Morse, 2020).

Part 1: Progress Review

Pilot Region introduction

Gloucestershire, population 646,627 (Office for National Statistics (ONS), 2021), is an administrative county in South West England, located on the border with Wales. It lies directly to the north-east of the largest regional city, Bristol (population 465,000), and the county town, Gloucester, is about 160km west of London. Gloucestershire covers an area of 2,653 km2 (1,024 square miles) and has a population density of 244 people per km^2 (ONS, 2021).

Gloucestershire's government structure is 'two-tier': Gloucestershire County Council has strategic responsibilities including education (schools), libraries, flood risk planning, highways, and transport planning among other public services. The county is composed of six districts, each with a District Council of elected members having authority for local responsibilities including waste/recycling and spatial planning. In turn, districts are composed of numerous smaller towns and parishes (municipalities of the smallest scale of local government), which have limited authority and service delivery functions (e.g. markets), but that provide important advice on local planning.

Gloucestershire has a polycentric urban pattern, with two adjacent urban centres – the city of Gloucester which is the county's administrative capital (population 132,416) and the former spa town of Cheltenham (118,800) – which together account for around 40% of the county's population. There is a third substantially urban district, Tewkesbury (94,900). The three remaining districts are Stroud (121,100), Cotswold (90,800) and Forest of Dean (87,000). The population in all Gloucestershire districts increased between 2011 and 2021. The ONS has classified Gloucestershire as a 'Predominantly Rural County'. This means that between 26% and 50% of the county's population lives in rural settlements and large market towns; the actual figure is 42.3%.

The LL covers Rural Gloucestershire, and more specifically four predominantly rural districts – Cotswold, Forest of Dean, Tewkesbury, and Stroud – for the purpose of data provision and analyses in respect of population, settlement, business data and employment, and excluding the urban centres of Cheltenham and Gloucester. While Tewkesbury and Stroud are predominantly rural districts, they are named after their main towns (populations 14,393 and 26,077 respectively (ONS, 2021)). For land-based data, the entire territory of the county is taken into consideration. The population in Rural Gloucestershire is 393,824. Population density averaged across the county is 244/km^2 and this is sub-divided by district in Table 24 Distribution of area and population by types of area (based on Census, ONS 2021 and Berry 2023), below.

Table 24 Distribution of area and population by types of area (based on Census, ONS 2021 and Berry 2023)

	Pilot Region (Rural Gloucestershire)		Broder region (Gloucestershire County NUTS3)	
	% of total area (ha)	% of total population (2021 Census figures)	% of total area (ha)	% of total population
Cities	0	0		251,252 (38.95%)
Town and suburban areas	41605.9 (15.90%)	215,988 (54.84%)		215,988 (33.48%)
Rural areas	220068,28 (84.1%)	177,836 (45.16%)	220082.24	177,836 (27.57%)
Total area %	100,0	100,0	100,0	100,0
Total area (ha and inhabitants)	261674.2	393,824	270454.03	645,076

Pilot Region Partner

Gloucestershire Rural Community Council (GRCC) is the PRP. GRCC is an independent charity that works within communities to inspire, enable, and deliver community action. GRCC works countywide to strengthen and develop communities to create thriving, sustainable places for local people to live and work.

GRCC is one of 38 Rural Community Councils within a national 'umbrella' network called Action for Communities in Rural England (ACRE).

The Gloucestershire PRP team comprises:

1	Barbara Pond	Head of Operations & Business Development, GRCC	GRCC governance, business planning, project management, policy, and business development.
2	Daniel Gale	Digital Inclusion Manager, GRCC	Specialist support for hard-to-reach rural communities, co-ordination of Digital Accessibility, Inclusion, Support, and Innovation network (DAISI).

Living Lab Coordinator

The Gloucestershire LL research partner is the Countryside and Community Research Institute (CCRI), which is part of the (public) University of Gloucestershire. Formed in 1986, CCRI is an applied social science institute with a broad range of interests including environmental

governance, agri-food and forestry studies, rural sociology, urban and regional development, social impact assessment and policy evaluation (in the UK, Europe and further afield).

The Gloucestershire LL research team comprises:

1	Janet Dwyer	Professor of Rural Policy	Policy analysis, rural development, institutional adaptations, and environmental sustainability.
2	Katarina Kubinakova	Research Fellow	UK and EU rural and community development, policy analysis and evaluation
3	Daniel Keech	Senior Research Fellow	Urban food studies, urban regeneration, nature-based solutions, and cultural geography.

Functions and transitions

Functions

The main RUSTIK functions in Gloucestershire are summarised in Table 25 Summary of production, consumption, and ESS functions (aggregated; variations at district levels) below.

Table 25 Summary of production, consumption, and ESS functions (aggregated; variations at district levels)

Production	Consumption	Ecosystem services
IT including cybersecurity	Tourism and leisure	High risk of flooding
Agriculture and allied land uses (e.g. forestry)		Natural capital: High level of designated landscapes/habitats
Public services (health and social care, public administration, defence).		Flood risk management via nature-based solutions.
Manufacturing		

Production functions

Although production functions vary at the district level (for example, Forest of Dean includes forestry and quarrying/mining, while Cotswold is characterised by farming), most of Gloucestershire's land (83%) is agricultural.

Important and growing non-land-based industries include IT industries, such as programming, medical technology research and cybersecurity, the latter linked to the presence of the UK Government's intelligence service headquarters in the county. The public sector is also an

important employer, either directly or through contracted health services, military administration, higher and further education, and public administration institutions in the county. Manufacturing and engineering is also an important sector.

Consumption functions

Key consumption functions are countryside recreation, linked not least to designated landscapes and habitats, urban heritage tourism, and sports.

Ecosystem services

Gloucestershire has been subject in recent years to significant pilot programmes for the introduction of nature-based solutions to environmental challenges, including rural natural flood management (for which governance innovation was supported in an earlier LL), water quality catchment management interventions and low-carbon agricultural transitions.

Transitions

Socio-economic and demographic transition

Gloucestershire has an ageing population and, concurrently, there is movement of young people under 25, who either leave or enter the county to study and/or work. Gloucestershire has a lower proportion of 0-19-year olds and 20-64-year olds when compared to the national figure, whilst the proportion of people aged 65+ exceeds the national figure. Projections suggest this trend will continue, with the number of people aged 65+ projected to increase by approximately 71,000 or 52.5% between 2018 and 2043[7].

In the four rural districts, Tewkesbury experienced an increase in all age groups apart from 15-19 and 40-49-year olds. Forest of Dean is the only district to experience a decrease in the number of young people (-1.30%) whilst Tewkesbury had the largest increase with an 18.77% increase in 0-19-year olds.

With one exception (in Tewkesbury) all four districts in the PR are experiencing a decrease in children, young people, and those of working age, and an increase in older people. This creates a higher demand on certain social and health services and the need to draw workers from outside the county.

Aside from age segmentation, the county's overall population is rising. The provision of affordable and social housing is insufficient, and private rents and house prices are generally rising. One consequence is the pricing out of younger aspirational homeowners. While district councils in the PR have devised affordable housing strategies, national affordability guidelines in new developments are pegged to market prices, which remain high in Gloucestershire.

Finally, public transport connections are limited and east-west transit between rural areas is overshadowed by strategic north-south road and rail networks.

Climate and environmental transition

Just over half (51.4%) of the County is designated as an Area of Outstanding Natural Beauty (AONB).

[7] https://www.gloucestershire.gov.uk/media/2122265/equality-profile-2023.pdf

All four district councils in the PR have committed to legally binding net zero targets.

Biodiversity net gain (BNG) is a new opportunity which compels developers to deliver 10% BNG either on- or off-site. Gloucestershire has one of the country's most advanced (but still emerging) nature and climate funds, a broker for BNG payments in the county.

Livestock farming is predominant in the county, and farming's contribution to the net zero agri-transition is being discussed and piloted.

New arrangements for guiding regional investments towards nature-based solutions in flood risk-management have emerged in the past three years through the Regional Flood and Coastal Committee.

Digital transition

In Gloucestershire, 96.49% of premises have access to Superfast (>=30 Megabits per second (Mbps)) broadband connectivity. This level of digital connectivity is consistent with the national position experienced across England (96.96%). National aspirations for digital connectivity are now linked to supporting Gigabit broadband connectivity. Ultrafast speeds of up to 100Mbps are available to nearly two-thirds of premises (59%) – in line with the rest of the South West England region, but substantially lower than across England as a whole (69%). The lower figure in Gloucestershire reflects the county's rural character.

Based on the Digital Exclusion Mapping in Gloucestershire (Citizens Online, 2022) between 30,000-40,000 (6-8%) adults in the county are effectively offline with no internet access at home, lacking internet-capable devices, or lacking the foundational skills to use a device, or all of the above.

A further 80,000-100,000 adults are online but are likely to be missing out on the full benefits of the internet. This is because they lack some or all of the essential skills for finding and using information, staying safe, and completing transactions online –and/or they may lack access to a decent device or internet connection.

The phasing out of traditional 'landline' telephone provision in favour of digital communication should be completed in the county by 2025. Meanwhile, rural digital connectivity and computer literacy among some communities, not least elders, is limited and uneven. Enhancing digital connectivity and skills for younger, older, and socially vulnerable citizens is a vital digital transition which will enhance access to jobs, training, markets, and social and health services.

Chosen transition

The digital divide is a significant concern for rural communities. Without reliable digital connectivity, some communities risk being left behind. The PRP, GRCC, is advocating for improved digital infrastructure and ensuring that local communities have the necessary skills to engage in the digital world confidently. The focus of the Gloucestershire LL is going to be the digital transition.

Table 26 RUSTIK transition challenge for Gloucestershire

Socio-economic & demographic	Climate & environmental	Digital
n/a	n/a	Local level data sets to support local social organisations to interface with larger-scale digital development policies (potentially via a dashboard).
		Inclusion of rural and community interests in county digital strategy development and implementation.

Living Lab Cycle 1: Planning Possibilities

In respect of setting up the Gloucestershire LL, the initial step involved discussions to identify the specific challenges and the transition area to be addressed in the forthcoming process.

The focus of the LL, as perceived by GRCC's DAISI project, is to cultivate a grassroots-driven model for data collection and analysis. This approach contrasts with the top-down methodologies typically seen in organizations like the ONS, focusing instead on harnessing local insights and experiences. This is an important gap in terms of equity in relation to digital inclusion and policy making. We do not believe that community-level data is being gathered elsewhere in England and one potential is that the LL could offer important and replicable (or locally adaptable) learning for other counties and become an important tool in influencing digital policy.

Regular meetings have taken place between the LLC and PRP to discuss the best approaches towards stakeholder engagement, conduct regular stock-taking on RUSTIK activities, and define the priority transition and experiment. The main steps include:

- **Communication and Outreach**: The foundational phase included extensive outreach through emails and meetings, and targeting local stakeholders and potential partners, such as community groups, local businesses, and regional councils.
- **Agreeing Responsibilities and Planning Resources**: A clear allocation of roles and balanced task distribution was established, with attention given to both human and material resources. This included collaboration with local data actors for resource sharing.
- **Membership Consideration**: Membership was designed to reflect a cross-section of the community, encompassing representatives from various sectors affected by digital inequity, including local educational and healthcare institutions.
- **Establishing Operational Protocols**: The establishment of regular meetings ensured steady progress and fostered collaborative efforts, integrating local governance structures for strategic guidance.

Collaborative methods (see also Table 27 Gloucestershire LL activities during Cycle 1, below)
These included focus groups and stakeholder surveys aimed at capturing qualitative data from local community organisations such as charities, a farmers' organisation, and housing

associations. These tools provided insights into local digital needs and barriers, leveraging local institutions for wider participation. In particular, RUSTIK helped to enrich a broader perspective and helped to align local concerns with broader data strategies and discourse.

Participants and stakeholders

The LLC and PRP have established a positive working relationship and connected with a wide variety of potential stakeholders in the county. Engaging a diverse array of participants was key, including local community level organisations, technology experts and policy makers. This included partnerships with local educational institutions and non-profit organisations to extend the reach and depth of stakeholder engagement.

Data collection methods

There is substantial level of information at the county level (NUTS3); however some information at LAU2 level has been difficult to obtain, especially information related to environment, for example, soil heath, water retention, water quality, number of farm holdings, data on forestry (employment data are collected at present for combined category Agriculture /Forestry /Fisheries), as well as data on migration and relevant data from the 2001 and 2011 censuses. Data on broadband and mobile phone coverage are available at postcode level, so it is a challenging task to aggregate these for the Pilot Region level.

Quantitative Data Collection: Surveys and analytics tools were used to quantify digital access and literacy; local data agencies collaborated to provide comprehensive analysis.

Fieldwork: Direct engagement in communities provided critical insights into practical challenges, with local volunteers and organizations playing a significant role. These activities were conducted by GRCC PRP mostly though their work in the DAISI network.

Living Lab activities in 2023

Table 27 Gloucestershire LL activities during Cycle 1 below provides a detailed overview of activities undertaken during Cycle 1 of the LL in Gloucestershire.

Table 27 Gloucestershire LL activities during Cycle 1

Date	Activity	Description
05/12/23	Meeting with GRCC Head of Operations and Business Development	To update on RUSTIK progress so far and set up a meeting with GRCC project manager (the LL PRP)
22/03/23	Meeting with GRCC team- Head of Operations and Business Development and Digital Inclusion Manager.	To gain a greater understanding of the three transitions in Gloucestershire, the current data landscape, and to plan the focus groups
29/03/2023	GRCC consideration and identification of key stakeholders, contact made.	Check of current understanding of stakeholder priorities, to help make linkages from RUSTIK to county strategic thinking and determine focus group participants

Date	Activity	Description
28/04/23	Focus group –workshop. Mix of stakeholders- NGO's, charities, network, housing association.	To identify practical gaps in the data needs and to identify and agree a set of priority topics for taking Gloucestershire PRP participation in RUSTIK forward
04/05/23	3 individual online meetings with stakeholders- discussion on transitions and challenges. County council (CC) Inclusive Employment, Environment, and Infrastructure Directorate; CC Economy and Strategic Planning team; Barnwood Trust (charity).	To complete the first WP1 report
05/05/23	Online meeting with farmers organisation (local branch of the National Farmers' Union).	To complete the first WP1 report.
09/05/23	2 online meetings – Hartpury University and The Association of Parish and Town Councils	To complete elements of the digital and socioeconomic sections of the WP1 report
07/06/23	Meeting with CCRI GIS and data specialist Meeting with Gloucestershire County Council data analyst	To complete elements of the WP2 report and discuss data gaps
28/06/23	Meeting with GRCC RUSTIK project manager	To complete elements of the digital sections of the Institutional Mapping task.
06/07/23	Meeting with GRCC RUSTIK project manager	To provide an update on progress so far, discuss challenge focus and experiment and agree next steps for work in Gloucestershire LL
19/07/23	Meeting with GRCC RUSTIK project manager (online)	Discussion on the WP4 tasks
04/08/23	Meeting with GRCC (online)	WP4 mapping task
05/10/23	Meeting with GRCC	Discussion on the tasks ahead- Parma LL presentation, WP3 report and LL experiment

Reflections from Cycle 1

Successes included effective engagement and a strong sense of community ownership of the LL to date. Challenges were noted, including managing diverse needs and limited resources, with resolutions planned for enhanced resource strategies and targeted communication in Cycle 2 Cycle 1 results.

Key learning includes a deeper understanding of community needs and stakeholder dynamics, as well as the effective use of data for decision-making.

At the start of the Cycle 1, different transitions were discussed with a wide range of local- and county-level stakeholders representing public, private and third sector organisations and charities. Gloucestershire LL stakeholders discussed all three transitions and very soon it became clear that socio-economic and digital transitions were of most interest. Several priority topics were identified under the socio-economic and digital transitions.

The dominant demographic challenge in Rural Gloucestershire is the polarised age profile. On the one hand, young people are migrating away from the county's rural settlements to find work in local and regional cities. Other barriers to securing a viable livelihood in the countryside are limited public transport connectivity and the cost of housing. The attractive countryside, an important draw for tourists, also leads to second home price inflation. There were almost 3800 properties classed as second homes in the county in 2021, with around 1800 of these in the Cotswolds – about 5% of Cotswolds homes are effectively vacant[8].

On the other hand, Gloucestershire remains an attractive place to live for affluent retired citizens. Yet constrained accessibility of public social care and health services in rural areas is challenging and could be substantially improved through better rural and institutional connectivity and IT literacy among older people to support access to on-line services.

The LLC and PRP established a close collaboration and substantial time was devoted to select the priority transition and subsequent experiment.

The digital transition theme became the focus of the Living Lab, also thanks to the work of the PRP and their involvement in the DAISI network. The digital divide has been identified as a significant problem in the county, especially among elderly citizens as well as vulnerable people. The LL experiment will test the opportunity for developing a dataset of fine-grained community-level data generated and used by (rural) community support organisations such as social housing providers, food banks, health and social care advocates, local parish and town councils, and rural communities.

All RUSTIK tasks to date (WPs 1-4) have been completed in close cooperation with the PRP and both teams established an effective working relationship, which relies on regular contact and consensus on aims, approach, stakeholder recruitment and plans for Cycle 2.

[8] https://www.gloucestershirelive.co.uk/news/gloucester-news/clamp-down-gloucestershire-second-home-8775471 accessed 17th November 2023.

Part 2: Challenge and next steps

Living Lab challenge

The Gloucestershire LL focuses on the digital transition theme. The experiment will test the opportunity for developing a dataset of fine-grained community level data generated and used by (rural) community support organisations such as social housing providers, food banks, health and social care advocates, local parish and town councils, and rural communities.

Our planned experiment is directed towards the prototyping of two outcomes. Firstly, a prototype dataset could become a tool for holding fine-grained community-level data which does not currently exist. Local inflections of national datasets are available but under-utilised due to stakeholder perceptions of inadequate local applicability. The development of a dataset could enhance a sense of stakeholder 'ownership', as well as enhancing the interface with/compatibility of local and national datasets with local needs. This objective will be trialled in the town of Cirencester and surrounding parishes (in Cotswold District).

The second prototyping will involve working with Gloucestershire County Council in the development of the county's digital strategy. This currently lacks many aspects of digital inclusion (including rural and community-level), due to its primary consideration of the needs of industrial and public service clusters of urban areas. The LL would test a methodology/process for devising a strategy commitment to embracing cross-sectoral community-level data that could be replicated in other districts of the county (and potentially other rural districts in the UK). The initial prototyping of the dataset in Cirencester could potentially be replicated for adaptation in Gloucestershire's other three rural districts via the county digital inclusion strategy.

In summary, the LL experiment will work towards:

- the development of a dataset resource for enhanced digital inclusion.
- a specific strategy commitment in favour of community data inclusion

Rationale

Gloucestershire is a relatively affluent and growing county (economically and demographically) which offers a highly attractive lifestyle option for its citizens. Yet employment growth, start-up, trading, and training opportunities remain linked to urban industrial clusters and housing costs are high in rural areas. The Centre for Economics and Business Research indicate enhanced job prospects, higher income levels, higher savings in shopping costs, and more frequent contact with family and friends among internet users[9]. Rural residents may feel the need to leave the county for work and training, while retirees may experience sub-optimal access to the services they need and have spent their lives investing in – this is especially the case for poorer retirees with limited

[9] https://cebr.com/reports/the-economic-benefits-of-digital-skills-and-inclusion-in-the-uk-cebr-gives-evidence-to-the-lords-digital-committee/ Accessed 17th November 2023. Also see Gloucester City Council Digital Inclusion Strategy 2020-2025, Appendix 1, p.5.

public transport options. Understanding the precise nature of the problem through the provision of fine-grained rural data will help to inform strategies for digital inclusion.

The digital divide is a significant concern for rural communities. Without reliable digital connectivity, communities risk being left behind in an increasingly digital world. The PRP is advocating for improved digital infrastructure and ensuring Gloucestershire communities have the necessary skills to engage in the digital world confidently. GRCC intends to run digital literacy programs, support businesses in their digital transitions, and lobby for better broadband access. They also work more strategically to bring digital equity to Gloucestershire, working with the diverse communities of the county to bring this forward in a manner that best suits them, linking into the socio-economic transitions. A number of challenges linked to the digital transition were identified during the Gloucestershire LL focus group meetings as well as through GRCC's work with the DAISI network. These include:

- Limited Access to Digital Services: The digital divide is exacerbated by limited access to crucial digital services like telehealth, online education, and e-commerce.
- Low(er) Digital Literacy: Individuals across the region often lack the required skills to navigate the digital world effectively.
- Technology Affordability: Many residents find digital devices and services unaffordable, further widening the digital divide.
- Ageing Population: Many rural communities are characterised by an ageing population, which results in increased difficulties in accessing and navigating digital technologies.

The focus of the LL experiment is initially in Cirencester, a market town in Cotswold District, where the PRP has excellent links with local, grassroots organisations.

Knowledge to date

Digital Equity in Gloucestershire: Current State of Knowledge and Gaps

In rural areas there is a notable digital divide. This encompasses disparities in access to high-speed internet, digital literacy levels, and availability of digital services. Rural areas often lag behind urban counterparts due to geographical challenges, lower population density, and sometimes, limited economic incentives for private sector investments in digital infrastructure.

The resulting impacts on local communities and the local economy are substantial. For businesses, it can mean reduced competitiveness and market access/reach. For residents, especially the elderly, young people, and those who are economically disadvantaged, it limits access to vital services, education, and social inclusion.

Efforts towards bridging the gap have been attempted by a range of organisations. There have been initiatives by local authorities, community groups, and partnerships including GRCC, for example through the Digital Accessibility, Inclusion Support & Innovation (DAISI) project, aiming to improve digital access and literacy. These efforts include setting up Wi-Fi hotspots, providing digital literacy training, and lobbying for better social tariff knowledge around broadband.

Existing data sources provide information, such as the Digital Exclusion Risk Map executed by the Good Things Foundation and the ONS, which illuminate broadband and internet usage.

While efforts are underway to improve digital equity, there is limited comprehensive data on the long-term effectiveness of these initiatives. How they translate into improved economic opportunities or quality of life in the long run is not fully understood.

There is a need for more detailed, granular data on specific digital skills gaps among different demographic groups within rural areas. This can help tailor digital literacy programs more effectively.

More comparative research between rural areas and urban areas could provide deeper insights into the specific challenges and successful strategies for rural digital inclusion.

There is currently a lack of detailed studies on how the digital divide in rural areas directly impacts local economies, which could be critical in advocating for more resources and policy attention. In Gloucestershire, a nuanced impact of digital inequity on the social fabric of rural communities is under-explored. The role of digital access in fostering community resilience is still an emerging field of study. Additionally, as technology evolves, so does the nature of digital exclusion, requiring ongoing research and adaptive strategies to ensure equitable access.

The commissioning of public, social and health services across all sectors would benefit from additional examination of digital access possibilities.

The prevalence of older people with limited digital skills in some rural areas can exacerbate the digital divide, creating a psychological barrier for younger people who may be trying to find rural livelihoods and would, ideally, not have seek work elsewhere.

Research question/s

The research questions we will try and answer in cycle 2 of the Living Lab are:

- What is the nature/quality/potential of access to digital services among, for example, social housing providers and tenants in Cirencester? (The exact target group will be selected after further discussions with the PRP and the local community organisations in Cirencester).
- How typical are the experiences in Cirencester compared to other rural settlements in Gloucestershire?
- What opportunities does the data uncovered in the LL provide for enhancing the rural digital inclusion strategy (for example the development of a transferable dashboard) in a way that does not rely on the continuation of RUSTIK?

Policy relevance

The key policy arena for the LL is the Gloucestershire digital inclusion strategy and its roll-out among the 2nd tier district councils (4 of 6 are predominantly rural).

This policy will also be connected to social and health policies in the county, as outlined in the RUSTIK policy panorama.

Emerging data needs

The LL will begin by assessing the level of knowledge that exists about digital access and confidence amongst the rural community target group. Stakeholders will be invited to articulate existing data tools for assessment and their augmentation.

Data availability

Main gaps and challenges identified regarding data:

- Access to timely and relevant data - accessing up-to-date, comprehensive, and specific data regarding the social, economic, environmental, and digital dimensions of rural communities.
- Data Integration –integrating the diverse data collected or accessed is a challenge. With a broad focus on multiple aspects of rural life, a variety of data types are available and collected from different sources in different formats, with different definitions of 'rural'. This diversity makes it challenging to synthesize a coherent, holistic picture of rural communities' realities.
- Lack of data analysis expertise at local level, or organisation/institution level, for example, NGO/charities may have limited resources. It is challenging to acquire or retain the level of expertise required for sophisticated data analysis.
- Data Privacy and Ethical Considerations: navigating the complexities of data privacy can be a challenge.

Table 28 Data needs and future steps:

Data need	Source	Date
Rural connectivity plans compared to individual user capabilities.	Interviews with Digital Inclusion team, GCC Review of DI strategy documents.	January 2024
Current rate of digital connectivity and user capabilities in social housing providers in Cirencester	Interviews with Bromford Homes.	February 2024
Plans for greater digitalisation of social and health services in Cotswold District	NHS Gloucestershire and Cotswold District Council social care teams.	March 2024
Review of data and infrastructure needs with stakeholder groups	GRCC (PRP) and University of Gloucestershire Cyber/Computer Department.	March 2024

Limitations

Neither GRCC nor CCRI has the capacity to collect and hold a large pool of data in, for example, a data lake, which would require the acquisition and servicing of IT hardware, as well as careful management of data protection. These ambitions are beyond the scope of RUSTIK's resources. However, the LL will be aligned as far as possible with development of the Gloucestershire Digital Strategy and its objectives, seeking to enhance these for rural users through the development of tools (for example a dashboard) which help the county's data managers to improve their knowledge of data inclusion in rural districts.

Capacities

We expect MCRIT (Multicriteria Planning, Catalonia, Spain; RUSTIK project partner) to offer opportunities for gleaning comparative European data at the regional level. We will also make use of Maptionnaire (a citizen engagement platform) for the mapping of locally gleaned data. Existing capacity is available in the LL research team, but it will be very important to correctly understand data access opportunities/restrictions by ensuring the correct stakeholders are included in the LL activities. The LL research team has limited IT expertise (which is available via the PRP), while the University of Gloucestershire's cyber security and computing department are available for consultation, and tool development and prototyping (for example, in the case of a dashboard facility).

Next steps

Cycle 1 was an important chance to build relationships within the LL, both internally among CCRI and GRCC, but also with potential stakeholders in Gloucestershire. We have a defined and specific transition mission and an ambition to make the LL outcomes in Gloucestershire a potential learning resource for other counties interested in digital transformation, inclusion, and equity.

To enable us to achieve our goals, in Cycle 2, we will:

- Reach out, initially, through interviews, to social housing providers in Cirencester to assess their current and future data needs, and how these compare with the county's Digital Strategy (DS).
- This will require close liaison with county DS officials, starting with meetings to examine progress, priorities, rural delivery objectives and capacity gaps. Initial meetings will be followed by interviews.
- After the analysis of the results of these interviews, CCRI and GRCC will develop a more detailed programme of stakeholder engagement, leading to scoping and prototyping of a digital needs dashboard.
- We will also work closely with GCC to explore the potential for connecting with the LL to enhance the rural dimensions of the DS.

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United Kingdom: Monmouthshire

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Summary and overview

Monmouthshire (Welsh: Sir Fynwy) is a small, predominantly rural county in south-east Wales with a population of 93,000. It is a county characterised by demographic change, notably population ageing, exacerbated by a constrained, expensive housing market which is inaccessible to many younger residents. Monmouthshire County Council (MCC) is actively seeking solutions and searching for data which contribute to the development of strategic predictions and projects for the county.

Living Lab achievements

Throughout the year CCRI researchers have met with key staff at MCC to discuss RUSTIK tasks and to establish an understanding of Monmouthshire's needs in relation to the three transitions through a focus group with seven MCC colleagues. The focus of the discussion was their data needs and the priorities for the county. More latterly, our discussions with MCC have focused on agreeing the challenge which will guide the Living Lab work in Cycle 2. The Living Lab challenge was agreed through a series of emails in September and October 2023, with the Head of Enterprise and Community Animation and the Performance and Data Insight Manager. The Community and Partnership Development Manager, who will succeed the Head of Community Animation and Enterprise in March 2024 as MCC lead for RUSTIK, approved the challenge in a meeting in October 2023, with a follow up meeting taking place in November 2023 to inform research questions for the data experiment phase. In Monmouthshire we will focus on the demographic transition and the challenge of supporting demographic balance in the context of an ageing population and youth out-migration from the county. MCC has identified a data need for more detailed qualitative understanding of younger populations' perspectives on the county as an attractive and viable location in which to live and work.

Key learning to date

Cycle 1 has allowed us to develop a comprehensive overview of the opportunities and challenges faced by Monmouthshire, and the political context within which the local authority is operating. This includes an understanding that MCC is now at the stage of developing enabling strategies to deliver the high-level priorities identified in the Community and Corporate Strategy. Some of this work has been delayed by local elections which resulted in a minority administration in the county (resulting in the delayed approval of the Strategy), but with a new majority administration now in place, it is hoped by MCC officers that progress can resume.

We are conscious that MCC staff are very busy; however, there is a positive approach to making good use of collaborative opportunities and of the role this way of working can play, in ensuring sustainable transitions in the county. MCC is actively seeking solutions and searching for data which contribute to the development of strategic predictions and projects for the county.

Living Lab challenge

The Monmouthshire Living Lab experiment will focus on understanding the drivers of demographic change, and ways to achieve better demographic balance through retaining and attracting younger working-age people to live and work in the county.

While demographic change is the focus, MCC has recognised that the RUSTIK transition challenges are interlinked. Exploring reasons why younger people stay, leave, arrive, or return, therefore, also offers an opportunity to examine other areas of concern in Monmouthshire,

including transport and housing issues, income and social inequalities, and the changing skillsets needed for the environmental and digital transition.

Emerging data needs

MCC has comprehensive demographic data. However, whilst this information shows us that the county is ageing, due both to younger people leaving the area, and inward migration being skewed towards older age groups, it does not demonstrate the reasons why this is the case or the nuance within these reasons, to fully inform policy responses. This is the gap that the data experiment aims to fill.

MCC's strategic priorities around affordable housing and economic growth are positioned in its strategy statements as responses to the demographic challenge, with a view to making Monmouthshire an attractive and viable place for younger people to live and work and contributing to longer term economic growth and sustainability of communities. However, there is limited qualitative data on the reasons young people choose to leave the county (or perhaps feel they have no choice but to leave), or barriers to inward migration from younger people. It may be that this form of data could offer individual insights into a range of as yet unknown reasons for people leaving or barriers to return/arrival, some of which may be beyond MCC's control. Discussions with MCC have also identified a knowledge gap around groups who are older than the usual policy definition of a 'young person' (up to age 25), but who are still relatively young (late-20s, 30s, 40s) and have a large proportion of their working lives ahead of them. MCC is keen that the qualitative research captures the views and experiences of this group (which includes both young families and people without children) to understand what could make Monmouthshire an attractive and viable home and place of work for this population group.

Next steps

Our next step is to meet with MCC colleagues to identify the key groups that should be involved in the experiment (building on a desk-based mapping of relevant groups and organisations undertaken by the Pilot Region Partner) and begin planning interviews and workshops with individuals in these groups. This is a particularly important step as some of the key issues of relevance to the challenge may be outside MCC's direct control. Therefore, the development of cross-sectoral relationships and engagement of relevant stakeholders will be crucial in Cycle 2. We are in the process of organising a workshop with MCC colleagues in January 2024 – this will involve officers across different areas of the authority whose remits relate to the challenge in different ways and will build engagement with RUSTIK across the organisation. In addition, we will use this workshop to collectively identify key stakeholders with these officers. This will inform future stakeholder engagement events throughout February and March 2024, in which we will collectively determine the data experiment approach.

Figure 33 Raglan Castle, Monmouthshire.
(This Photo by Unknown Author is licensed under CC BY-SA)

Part 1: Progress Review

Pilot Region introduction

Monmouthshire (Welsh: Sir Fynwy) is a predominantly rural county in south-east Wales (see Figure 34: Rural-urban classification map (Berry, 2023)), covering an area of approximately 880 square kilometres, with a population of 93,000 resulting in a low population density of 1.1 persons per hectare. It is home to diverse landscapes of exceptional quality, including the Bannau Brycheiniog National Park, Wye Valley Area of Outstanding Natural Beauty, Usk Valley and Gwent Levels.

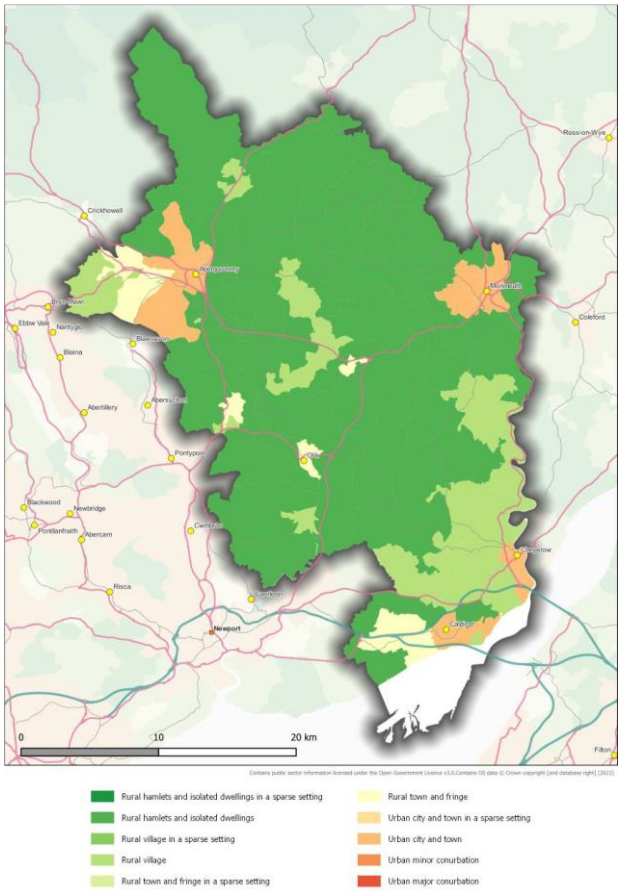

Figure 34: Rural-urban classification map (Berry, 2023)

Half of the population lives in the main towns of Abergavenny (13,689 people), Monmouth (10,675 people), Caldicot (10,339 people) and Chepstow (11,939 people) (Monmouthshire County Council, 2021a). 80% are economically active; with 30% of those who are economically inactive being people who are retired.

The county is in a strategic position with significant economic advantages, being located near growing cities such as Bristol and Cardiff. However, despite having a good road network, public transport networks within the county are weak. The bus services that link the towns and the more rural settlements have been reduced and the rail network between the county and its surrounding cities suffers from inadequate frequency and high fares (Monmouthshire County Council 2021b).

An increasing number of the population speak Welsh - although the county is well below the Welsh national average for Welsh speakers - and just over half of the county's population consider themselves to be Welsh (Monmouthshire County Council 2021b). Monmouthshire's culture is a source of great local pride and enthusiasm, with a rich social and industrial heritage which, combined with the county's attractive natural environments, supports an economically important visitor economy (Monmouthshire County Council 2021d).

Pilot Region Partner

Monmouthshire County Council (MCC) is the governing body for the Monmouthshire principal area of Wales. It is responsible for the provision of all local government services, including education, social work, and environmental protection.

The Replacement Local Development Plan (RLDP) (2022) and the Community and Corporate Strategy (CCS) (2023a) are key documents which will guide MCC's approach to the three transitions. The RLDP is currently at the Preferred Strategy stage, and this is the version of the Plan referenced in this document. The Preferred Strategy was endorsed by the Council in October 2023, and the Deposit Plan, which is the first full draft version of the emerging RLDP, will be published in Spring 2024 subject to engagement and consultation. It is important to be aware of the wider governance context, particularly regarding the influences of MCC's strategic regional partnerships. These include the Cardiff Capital Region City Deal - a group of 10 local authority areas comprising the cities of Cardiff and Newport, the South Wales valleys, rural communities, and a coastal belt. This collaborative programme will leverage investment for regional growth and sustainable success. Another emerging partnership is the Marches Forward Partnership whereby the largely rural local authorities on either side of the English-Welsh border (Monmouthshire, Powys, Herefordshire, Shropshire) will work together on areas of shared concern and to leverage funding from central government.

MCC's responses to transitions will be influenced by the seven well-being goals set out in the Wellbeing of Future Generations (Wales) Act 2015. This Act aims to improve the social, economic, environmental, and cultural well-being of Wales and gives a legally binding common purpose for national government, local government, local health boards and other specified public bodies. MCC works in partnership with other South-East Wales statutory and public bodies as part of the Gwent Public Services Board in developing strategy and policy responses to the Act.

MCC is positive about collaborations and the role they can play in ensuring sustainable transitions in the county. It is actively seeking solutions and searching for data which contribute to the development of strategic predictions and projects for the county.

Demelza Jones is the RUSTIK contact for MCC and is employed as a Research Fellow by CCRI and seconded to MCC. Demelza is a sociologist, with expertise in the study of young people, children, and families' lived experiences; migration and diversity; and social inequalities.

Living Lab Coordinator

The Countryside and Community Research Institute (CCRI) at the University of Gloucestershire is the research partner. The CCRI is one of the largest specialist rural research centres in the UK, working at the interface of agriculture, society, and the environment on issues relevant to rural and urban development, in the UK, Europe and further afield.

Aimee Morse is a rural sociologist. Her research interests include the social and environmental impacts of collaborative working in rural communities and factors which influence individuals' relationships with their local environment.

Bryonny Goodwin-Hawkins is an interdisciplinary social scientist with research interests in socio-economic development initiatives in rural areas and peripheral regions.

Together, Bryonny and Aimee act as the LL Coordinator for Monmouthshire.

Functions and transitions

Functions

The functions about which MCC is most concerned are employment, including the recruitment needs of businesses and the skills required of employees; land management and ownership; and decarbonisation.

Production functions

Employment in Monmouthshire is characterised by high levels of out-commuting to nearby cities such as Cardiff and Bristol. Of the 44,100 employed residents, 27,100 work in Monmouthshire and 17,000 commute out for work (Monmouthshire County Council 2021b)

The county has a higher share of individuals working in the tertiary sector than the Welsh average; however, employment in Monmouthshire itself is relatively less skilled. There is a disparity in income between those working in Monmouthshire and those working outside the county, which in turn affects the ability of those working in the region to live there. Additionally, professional jobs within the county attract a wider regional labour market (Monmouthshire County Council 2021b)

The largest employment sectors are human health and social care and the wholesale and retail trade. In addition, agriculture and forestry are both important parts of the landscape and economy, although they are in decline (Monmouthshire County Council 2021b)

Consumption functions

Despite its relative economic affluence, Monmouthshire has some of the most deprived areas for access to services. The Welsh Index of Multiple Deprivation (WIMD) includes 10 indicators to capture households' access to services. In this domain, high deprivation is widespread across rural Wales, and 16 of Monmouthshire's Lower Super Output Areas (LSOA) are in the 10% most deprived category (Statistics for Wales, 2019). Those LSOAs closer to the urban centres of Abergavenny, Monmouth and Chepstow are not as deprived.

The average house price in Monmouthshire was £363,949 in September 2022. This compares to the average house price across Wales of £223,798 and across the UK of £294,559 (Abergavenny Chronicle, 2022). There are several reasons for these higher prices, including strong demand for a limited housing stock, which is skewed towards detached and semi-detached dwellings, coupled with physical, policy and environmental constraints that limit the scope for further expansion of existing urban areas (Monmouthshire County Council, 2020; 2022). Prices are also high in relation to local earnings; there is a need for more affordable housing as currently people are likely to leave the area to meet their housing needs (Monmouthshire County Council, 2020).

Monmouthshire's landscapes provide significant consumption benefits, with tourist visits to natural and cultural landscapes contributing £244.99 million to the local economy in 2019 (Monmouthshire Public Service Board, 2022). In addition to its cultural and historical assets, the county is recognised as a Top Food Tourism Destination in Wales (Visit Monmouthshire, nd.), home to an increasing number of contemporary food and drink experiences.

Ecosystem services

Monmouthshire's natural environment is recognised as one of its greatest assets, with large numbers of sites with protection designations. Monmouthshire supports many important habitats and species, with 225 species listed in the Environment of Wales Act 2016 as living organisms of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales.

Monmouthshire County Council has responded in several ways to the climate crisis, most notably declaring a climate emergency in 2019. This saw the development of a Climate and Decarbonisation Strategy (Monmouthshire County Council 2021a) for the county and is reflected in the Council's purpose '*to become a zero-carbon county, supporting well-being, health and dignity for everyone at every stage of life'*.

There is very high solar resource potential in Monmouthshire, and the RLDP suggests that a more proactive approach to renewable energy schemes should be taken, to capitalise on this potential.

Transitions

It is clear that the transitions in Monmouthshire are closely interlinked. In a focus group, MCC employees identified mobility, demographic changes, and transport as the most important challenges.

Socio-economic and demographic transition

Monmouthshire has an ageing population with a mean age of 48 and predictions that by 2036, 36% of the county's population will be aged 65+ (Monmouthshire County Council 2021d); this has implications for its economic base, future economic growth prospects, the social sustainability of the region's communities, and the public health and social care offering in the region as the demand pressures of an ageing population combine with the reduced revenue resulting from a decrease in the working-age population. In an MCC workshop, a lack of higher education, employment and affordable housing opportunities were determined as factors which lead young people to leave the county, and, in the case of employment and housing, which make the county an inviable destination for many younger returnees and younger new arrivals (in-migration is skewed heavily towards older arrivals). This demographic imbalance is the challenge which will be addressed in the Living Lab experiment.

There is a pressing need for both a range of housing options, and affordable housing, to address the demographic imbalance in the county. Modelling predicts that around 7 in 10 new households will be priced out of the housing market, which is the most expensive in Wales (Monmouthshire County Council, 2020). This issue is complicated by the physical, environmental and policy constraints on further developments around existing urban areas (Monmouthshire Public Service Board, 2022).

Vibrant towns (such as Abergavenny) are recognised as key to the county's future success; however, their success is threatened by wider economic factors including rising energy costs, declining household spending power and changing patterns of retail. MCC, in collaboration with

local Town and Parish Councils, recognise that there is a need to re-imagine the county's towns to ensure they remain motors of the economy and support innovative solutions to housing need (such as repurposing some town centre spaces towards residential use to support local needs for affordable housing), particularly as expenditure increasingly leaks out of the county via out-of-town retail and internet shopping.

There is a need to create more local opportunities for young people in apprenticeships and graduate placements in the region. These opportunities may increasingly include 'green jobs' across several sectors. Local training programmes may need to be repurposed to reflect the future needs of key industries, and there is an ambition to work with local colleges to ensure related courses and content are offered (Monmouthshire County Council, 2023b).

Climate and environmental transition

Decarbonisation has been identified as both a challenge and an opportunity for Monmouthshire. MCC declared a climate emergency in 2019 and the Community and Corporate Plan sets out its aim to become a zero-carbon county.

The ongoing agricultural transition represents an opportunity for carbon capture, including through the Welsh Government's commitment to 10% tree cover on farms. MCC's Climate Change and Environment workshop identified an ambition to support the farming sector to adopt sustainable practices which improve carbon sequestration and natural flood alleviation.

MCC are keen to ensure the County's natural capital is managed appropriately. There is a strong emphasis on nature recovery in the Climate Emergency Action Plan. Additionally, the Motion for Rivers and Ocean Action Plan represents a commitment to ensuring the two main rivers, the Usk and Wye, are clean, healthy, and productive.

Digital transition

There are two key challenges in the digital transition: access to broadband and digital skills. Work has been carried out across Wales to install better fibre broadband; however, MCC recognises that further work is required to address inequalities across constituencies, ensure home workers can access broadband of suitable speeds, and allow businesses to compete with those in the economic powerhouses of South West England, such as Bristol (Monmouthshire Public Services Board, 2022).

The Welsh Government's Digital Communities Wales Initiative aims to create a more digitally inclusive Wales. MCC's Community Hubs offer computer skills courses to residents through this initiative.

Living Lab Cycle 1: Planning Possibilities

Setting up the Living Lab

Demelza joined MCC as the PRP representative in September 2023. Prior to Demelza's appointment, Aimee maintained regular email contact with the lead contact at MCC (Head of Enterprise and Community Animation), often arranging meetings to discuss specific RUSTIK tasks and seeking introductions to other MCC colleagues whom the lead contact felt would be best placed to support the tasks' requirements.

The challenge was agreed through a series of emails in September and October 2023, with the Head of Enterprise and Community Animation and the Performance and Data Insight Manager. The Community and Partnership Development Manager, who will succeed the Head of Community Animation and Enterprise in March 2024 as lead contact, approved the challenge in a meeting in October 2023. Demelza has arranged to meet regularly with the Community and Partnership Development Manager throughout the data experiment.

Collaborative methods

A focus group on data needs was organised with MCC colleagues. This focus group explored the key challenges and opportunities in Monmouthshire, and how these related to data, with seven members of MCC. The findings contributed to the 1.2. report.

The presentation of the Monmouthshire Pilot Region for the RUSTIK consortium meeting in Parma (October 2023) was presented to the Head of Enterprise and Community Animation, the Community and Partnership Development Manager and the Community and Partnership Development Lead, and their feedback was incorporated into the finalised presentation.

The Task 4.2 Policy Panorama was shared with colleagues at MCC for their input, prior to submission.

We are currently in the process of working with MCC to identify appropriate stakeholders across Monmouthshire's public, private and third sectors. Engagement with these stakeholders will form the initial part of Cycle 2

Participants and stakeholders

The Head of Enterprise and Community Animation was our main contact at MCC from RUSTIK's inception to September 2023, when Demelza began her role in MCC. They were involved in several meetings to discuss tasks 1.2, 2.2, 3.1 and 4.2.

Seven MCC colleagues were involved in the WP 1, Task 1.2 focus group:

- Head of Policy, Performance and Scrutiny
- Head of Enterprise and Community Animation
- Head of Economy, Employment and Skills
- Planning Policy Manager
- Data Analyst
- Sustainable Food Projects Manager
- Business Insights Manager

Three of these colleagues have also provided further support in meetings for specific tasks: the Head of Policy, Performance and Scrutiny (task 1.2), the Data Analyst (task 2.2.1 and 2.2.2), and the Sustainable Food Projects Manager (task 4.2).

An additional colleague provided the required GIS files for Task 2.2.2. The institutional mapping exercise (task 4.2) involved speaking to two colleagues involved in the focus group, and one further colleague who is responsible for environmental partnerships.

Living Lab activities in 2023

Table 29 A list of activities completed in Monmouthshire in Cycle 1.

Date	Activity	Description
14/03/23	Meeting with Head of Enterprise and Community Animation	To update on progress so far and set up a meeting with the Policy and Performance team and begin planning the focus group.
27/03/23	Meeting with Head of Enterprise and Community Animation and Head of Policy, Performance and Scrutiny	To gain a greater understanding of the three transitions in Monmouthshire, the current data landscape, and to plan the focus group, including determining who should attend the focus group.
04/05/23	Focus group – data workshop	To identify practical gaps in the authority's data needs and to identify and agree a set of priority topics for taking Monmouthshire's participation in RUSTIK forward.
08/06/23	Meeting with data analyst	To complete the first WP2 data survey on data availability.
28/06/23	Meeting with data analyst	To complete the second WP2 data survey on LL resources and capacities.
13/07/23	Meeting with Head of Enterprise and Community Animation	To complete elements of the digital and socioeconomic sections of the Institutional Mapping task.
08/08/23	Meeting with Sustainability Policy Officer	To complete elements of the environmental section of the Institutional Mapping task.
15/08/23	Meeting with Sustainable Food Projects Manager	To complete elements of the socioeconomic and environmental sections of the Institutional Mapping task.
11/10/23	Meeting with Head of Enterprise and Community Animation, Community and Partnership Development Manager and Community and Partnership Development Lead.	To provide an update on progress so far, confirm the challenge, agree pilot region presentation for Parma RUSTIK consortium meeting, and agree next steps for work in Monmouthshire.
15/11/23	Meeting with Community and Partnership Development Manager, Community and Partnership Development	Discussion of research questions to inform the data experiment.

Date	Activity	Description
	Lead and Data and Performance Insight Manager	

Reflections from Cycle 1

Overall, Cycle 1 was very positive in Monmouthshire. There have been several good opportunities to meet with MCC colleagues, who are keen to be involved in the project, and the RUSTIK tasks have given us a detailed overview of the situation in Monmouthshire.

We are aware that all colleagues at MCC face time pressures, and that this is likely to continue. To ensure this does not create any difficulties in Cycle 2, Demelza will meet regularly with the Community and Partnership Development Manager, and with Aimee. This will ensure timely communication of both MCC's requirements, and RUSTIK's requirements.

Cycle 1 results

A comprehensive overview of the opportunities and challenges Monmouthshire faces, and the political context within which the local authority is operating, has been developed through the work completed for Cycle 1. All focus group participants agreed that the transition challenges in Monmouthshire are interlinked. They identified mobility (specifically the movement of people into and out of the county for work and education), demographic changes and transport as the most important challenges.

The Replacement Local Development Plan (full draft expected 2024) will ultimately guide Monmouthshire's approach to the three transitions; however, it is important to situate this local strategy in the wider governance context, as there are issues within the wider region which are beyond the Council's complete control, and the approach will be influenced by the regional and national policies listed in MCC's *Sustainability Appraisal Scoping Report Appendix 1 – Review of Plans, Policies, Programmes and Strategies* (2021c) for the Replacement Local Development Plan. The Community and Corporate Plan, approved in April 2023, will also play a significant role in guiding MCC's approach to the transitions, and the authority is now at a stage of working towards enabling strategies to deliver the high-level objectives that this Plan sets out. It sets out the Council's ambition for *"Monmouthshire to become a zero-carbon county, supporting well-being, health and dignity for everyone at every stage of life"* and includes six objectives with related goals, intended actions, and indicators of progress.

MCC has a team of data analysts and GIS officers who provide data and information services for staff and Councillors. Currently, each department within MCC owns and analyses the data themselves. Discussions in the focus group highlighted the issues associated with keeping data in silos; RUSTIK may be an opportunity to reframe how MCC uses data. In addition, RUSTIK is seen as an opportunity to gather more data on individuals' experiences of living and working in the county. Although this greater granularity is required to develop strategic interventions, this brings with it challenges relating to availability and privacy. Near-time data is required to support strategic decisions and address validity concerns.

MCC is positive about collaborations and the role they can play in ensuring sustainable transitions in the county. It is actively seeking solutions and searching for data which contribute to the development of strategic predictions and projects for the county. The conversations held with MCC to inform the RUSTIK tasks completed so far, in addition to the desk-based research on the region, have led to the development of a clear transition challenge, which is described in more detail in Part 2.

Part 2: Challenge and next steps

Living Lab challenge

The Monmouthshire Living Lab experiment will focus on understanding the drivers of demographic change, and ways to achieve better demographic balance through retaining/attracting younger working-age people to live and work in the county.

While demographic change is the main focus, MCC has recognised that the RUSTIK transition challenges are interlinked. Exploring reasons younger people stay, leave, arrive, or return, therefore, also offers an opportunity to examine other areas of concern in Monmouthshire, including transport and housing issues, income and social inequalities, and the changing skillsets needed for the environmental and digital transition.

Rationale

In its Well-being Plan (2018), MCC identifies youth out-migration as a challenge to long-term sustainable and thriving communities - 42% of total outward migration is by 15-29 year olds. It suggests that this is typically educationally and economically driven. Projected population growth is linked to an increased older population with an ongoing decline in working-age population (Monmouthshire County Council 2021b), and as a result, local public services and council resources are increasingly aligned with the needs of an ageing population, raising concerns in the authority that this could contribute to increased inequalities for younger residents. MCC would like to ensure older people are recognised as an asset to the county, whilst also ensuring the county is a viable place for younger people to live and work.

Working on this challenge will allow MCC to ascertain whether the reasons for which young people leave, stay, arrive, or return to the region are within, or beyond, their control. MCC identifies the following issues in its Well-being Plan, 2018-2022 (Monmouthshire Public Services Board 2018) and in the scoping report of baseline characteristics of the county (Monmouthshire County Council 2021b) towards the development of the Replacement Local Development Plan:

- High house price to income ratio (the highest in Wales), scarcity of affordable private rentals and lack of social housing identified as key challenges for younger people wishing to live and work in the county. As a consequence, they move away to access affordable housing (in turn leading to isolation and unmet care needs of some older residents whose families cannot afford to remain in the local area) or cannot afford to move to the county.
- Difficulties accessing further education and higher education due to poor public transport links.
- Low wages and low number and range of graduate-level jobs within the county, with those on higher incomes tending to commute out of the county.
- Risk of young people being trained in the wrong or outdated skills for future needs.

Where there is evidence that MCC has power to influence the reasons for which people are leaving, this may lead to the development of interventions or policies which address the issues.

Knowledge to date

MCC holds comprehensive demographic data. However, whilst this information shows us that the county is ageing, that younger people are more likely to leave, and that inward migration skews towards older people (Monmouthshire County Council 2021b), it does not demonstrate the reasons why this is the case. MCC believes key issues to be housing availability/affordability, educational/employment opportunities and income limitations, and the data experiment will test this reasoning through exploring in qualitative detail, younger people's views, and experiences about the county as an attractive and/or viable place to live and work; whether as 'stayers', returners, or new arrivals. It may be that this form of data offers individual insights into a range of as yet unknown reasons for people leaving, some of which may be beyond MCC's control, or variance in reasons for leaving/not returning or arriving, among different strata of the younger population.

The data experiment additionally addresses a knowledge gap by incorporating groups who are older than the usual policy definition of a 'young person' (up to age 25), but who are still relatively young (late 20s, 30s, 40s) and have a large proportion of their working lives ahead of them. MCC is keen that the qualitative research captures the views and experiences of this group (which may include both young families and people without children) to understand what could make Monmouthshire an attractive and viable home and place of work for this population group.

MCC is additionally interested in deepening its understanding of how inequalities in the county impact the county's younger residents (for example, noted increases in homelessness and difficulties meeting basic needs resulting in reliance on food banks), and increased qualitative understanding of these issues is expected to be an additional outcome of the data experiment.

Research question/s

- *For young people in Monmouthshire (16-25), what are the barriers they perceive to living and working in the county during their working lives?*
- *For younger working-aged people ('stayers', returnees, or arrivals) in the county (25-45) what makes Monmouthshire an (un)attractive and/or (in)viable place to live and work?*
- *For younger working-aged people outside the county (25-45) what makes Monmouthshire an (un)attractive and/or (in)viable place to live and work?*
- *What might Monmouthshire County Council do, or seek to influence, to increase the attractiveness and viability of living and working in the county for younger working-aged people?*

Policy relevance

MCC has two key strategies which contain objectives related to the challenge: the Replacement Local Development Plan (2023) and the Community and Corporate Plan (expected 2024). The former states that there has been limited engagement with young people during its preparation, and that this will be resolved in future iterations and focuses on ensuring communities are socially and economically sustainable by attracting and retaining younger people to rebalance Monmouthshire's ageing demographic. Outputs of the data experiment have the potential to inform this work and feed into future iterations of the RLDP. The Community and Corporate Plan

has six objectives to make Monmouthshire a fair place for everyone at every stage of life. Those relevant to the challenge are: a fair place, a thriving place, a safe place, and a learning place. As outlined above, MCC is now at the stage of developing enabling strategies to support the high-level objectives of the Plan, and the data experiment has potential to inform these developments where relevant to the identified challenge.

In addition, MCC's response will be influenced by the strategies developed by the Partnerships in which it is involved, including:

- Gwent Public Services Board - Wellbeing Plan for Gwent 2023-2028.
- Monmouthshire Integrated Services Partnership Board – Integrated Medium-Term Plan 2023-2026.
- Marches Forward Partnership functional agreement.
- Cardiff Capital Region – Strategic Business Plan 2019-2024 and additional programmes in key areas such as 'Homes for the Region' and 'Venture Graduates'.

Demographic change, and the challenges associated with this issue, are a contemporary concern across Wales. The Welsh Affairs Committee of the UK Parliament recently held an inquiry into the impact of population change in Wales. The question: *"Are young people leaving Wales? Why?"* was included in this call. It is clear, therefore, that exploring why younger people stay, leave, arrive or return will be relevant across Wales, and the data experiment completed in Monmouthshire may provide useful learning for other local authorities across the country.

Learning from this challenge may also contribute to MCC's obligations defined in the Well-being of Future Generations Act, including working better with people and communities and looking to prevent problems. In addition to their WFGA obligations, Gwent is committed to becoming a Marmot region. The Marmot Principles are a set of guiding policy and practice principles for statutory and public bodies to reduce inequity. There may be learning from this experiment which can be implemented to ensure inequalities are reduced across Gwent.

Emerging data needs

There is good data on demographic change in Monmouthshire. However, the reasons *why* this change is occurring are not as well documented. There is a perception that people are leaving Monmouthshire for a specific set of reasons (leading to particular interventions): RUSTIK data will confirm whether this is the case, or whether the reasons are beyond the scope of the Council's and partners' activities to retain/attract younger people.

MCC has identified 18-25-yearolds and young families as groups whose needs are less well understood, and who demographics-led prioritisation of resources has left less well-served. There is also a lack of data on the recruitment needs of local businesses, and the skills required as industries begin the transition to net-zero. More granular data, and data on individuals' circumstances, have been identified as useful additions to MCC's current data portfolio. Exploring how these areas could offer solutions which may influence people's decisions to stay in Monmouthshire may become a focus of the RUSTIK data experiment.

Data availability

Demographic data is available at LSOA level (areas with a population of between 1000 and 3000 individuals) from Census data which is collected every 10 years, and through annual mid-year

population estimates (available on Stats Wales, a free-to-use service providing Welsh data, up to 2020). This includes quantitative data on migration; however, the reasons for which people move are not captured.

Data on social inclusion and cohesion issues varies. Education data is available at MCC-level, and data is collected on a school-by-school basis. However, this is one area for which MCC buys in data too. The data it buys in offers more detail at a postcode level; without this data, quantitative data would be lacking. Housing market data for specific areas in the region is also accessed through a third party and collated in the Local Housing Market assessment (Monmouthshire County Council, 2020).

MCC also draws data from NOMIS, a website run by the Office for National Statistics, which provides official Census and labour market statistics at the Monmouthshire level. Again, however, data must be bought in to provide incomes at postcode level.

Limitations

There is a lack of data on the recruitment needs of local businesses, and the skills required as industries begin the transition to net-zero. More granular data and data on individuals' circumstances have been identified as useful additions to MCC's current data portfolio. Often, additions to MCC's data beyond that which is regularly updated depend on budget allocation, which means these updates are often tied to policy developments.

Capacities

MCC has a data analysis department and two GIS experts. These individuals are responsible for delivering information to Cabinet Members and other colleagues as required. Their capacities complement those of the research team, as much of the data they work with is quantitative. The data analyst with whom we worked on task 2.2. acknowledged that qualitative data is 'few and far between' and tends to be collected when there are new policy developments which require it.

The data surveys completed for task 2.2., in addition to the focus group arranged for task 1.2, demonstrated that MCC has access to a significant amount of data across each transition, and that this is accessed regularly to provide updates and predictions for Cabinet Members. However, the extent to which this data is shared between departments is limited; thus, there is a concern that datasets of interest may be missed by others.

Next steps

From our discussions with MCC colleagues, it is clear that qualitative data on individual experiences is required to understand the reasons why people choose to leave, stay, return, or arrive in Monmouthshire, and how effective ongoing and planned policy interventions around increasing affordable housing and opportunities for higher income employment may be, in addressing the need for improved demographic balance in the county. Therefore, Demelza and Aimee will work with MCC colleagues in January 2024 to identify groups to work with during the Living Lab data experiment and hold workshops with key stakeholders to determine our approach to the experiment in February and March 2024.

During this time, we will also consider how the findings from the experiment can be usefully embedded into Monmouthshire's strategies and consider options for sharing findings from the experiment with other local, regional, and national actors as appropriate. This will involve meeting

with other colleagues at MCC to understand how learning from the experiment might feasibly be taken forward.

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