Deliverable No. 2.1

RURACTIVE Conceptual framework for innovation

W2

RURACTIVE

Grant Agreement no.: 101084377
Project title: Empowering rural communities to act for change

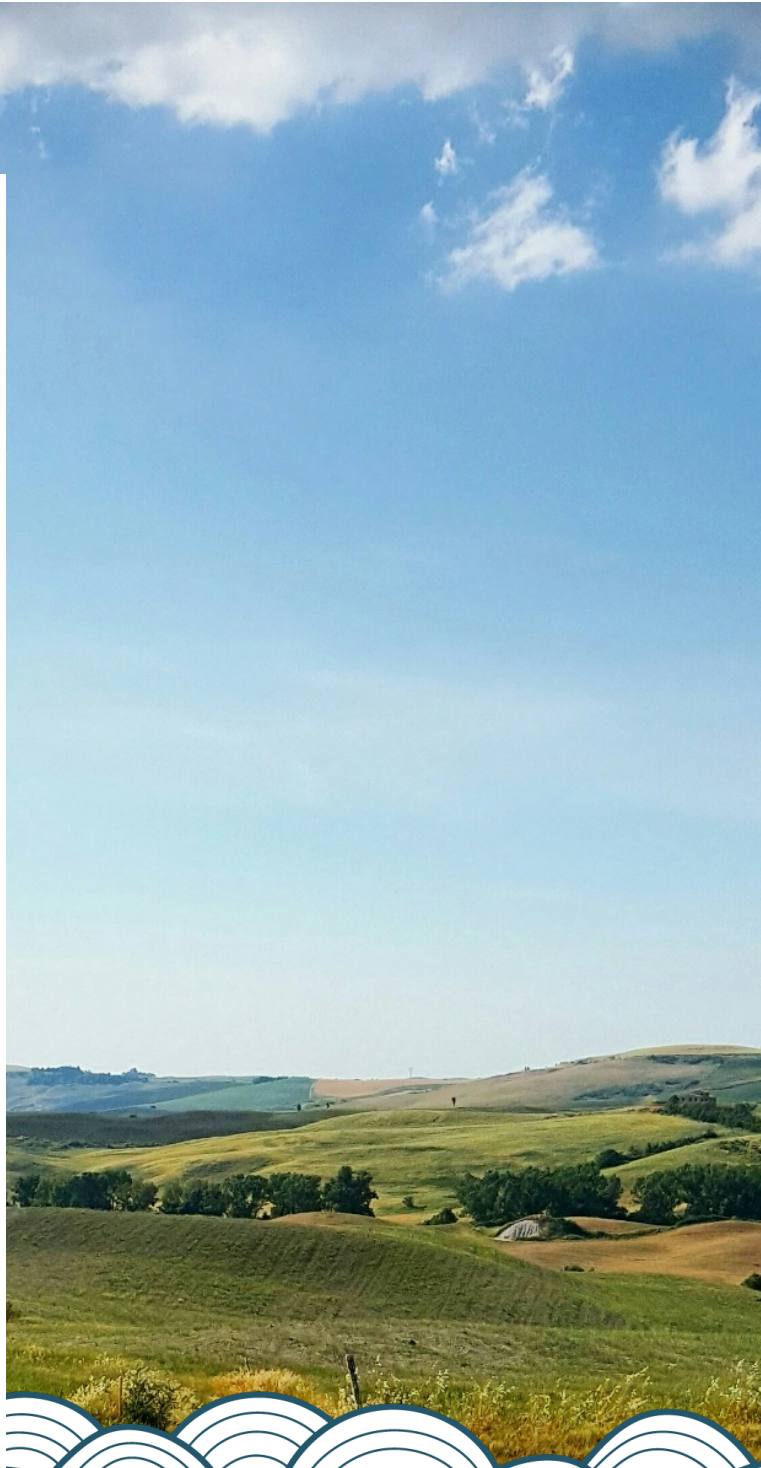
Contractual Submission Date: 31/05/2024
Actual Submission Date: 04/07/2024

Responsible partner: UNIBO

Co-funded by the European Union

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

UK Research and Innovation



Grant agreement no.	101084377
Project full title	Empowering rural communities to act for change
Project duration	01/09/2023 - 31/08/2027

Deliverable number	D2.1
Deliverable title	RURACTIVE Conceptual framework for innovation
Type[1]	R
Dissemination level[2]	PU
Work package number	2
Work package leader	JHI
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Internal reviewers	BF, GBIZ
Keywords	Conceptual framework; Rural Transition; Rural Development Drivers; Rural Innovation; Crosscutting Priorities

Acknowledgements:

This deliverable was crafted through collaborative efforts with the entire consortium. We extend our gratitude not only to the mentioned authors but also to all Technical Partners and Dynamos for their conceptual input and endorsement of the framework.

[1] Type: Use one of the following codes (in consistence with the Description of the Action):
R: Document, report (excluding the periodic and final reports)
DEM: Demonstrator, pilot, prototype, plan designs
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PU: Public, fully open, e.g. web
SEN: Sensitive, limited under conditions of the Grant Agreement

RURACTIVE has received funding from the European Union under the Horizon Europe grant agreement No. 101084377, from the Swiss State Secretariat for Education, Research and Innovation (SERI) under the contract number 23.00395, and from the UK Research and Innovation (UKRI), number 10069340.

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RURACTIVE Glossary

Beneficiaries: local communities, including specific groups at risk of exclusion, that will benefit from the solutions developed by the RIEs.

Crosscutting priorities: cutting-edge factors at the basis of rural sustainable transition, including Climate change adaptation and mitigation, Biodiversity, Social justice and inclusion.

Dynamos (Ds): 12 rural pilot areas, in 7 EU, 2 Associated Countries and Switzerland where the RIEs will be established. RURACTIVE Dynamos: D1-Northern Ostrobothnia, FI, PP: UOULU; D2- Südburgenland, AT, PPs: BAB, WAB; D3- Diputacion Zamora, ES, PPs: DZ, CARTIF, D4- North-East Scotland, UK PP: GBIZ, JHI; D5-Andalucia, ES, PP: BALAM; D6- Zagori, GR, PP: EMZ; D7- Zakarpattya, UA, PP: FORZA, D8- Fiastra Valley, IT, PP: BF; D9- Zadar, HR, PPs: URB, CZAD; D10- Abruzzo, IT, PP: BORGHI, D11- Gotland, SE, PPs: RG, UU; D12- Törbel, CH, PP: BFH.

Groups at risk of social exclusion and underrepresentation: Stakeholders at risk of exclusion due to factors like physical disabilities, age, ethnic origins, religious believes and other intersecting aspects. Historically, these groups have been underrepresented and largely excluded from decision-making processes, especially in rural areas. These groups encompass, but are not limited to: 1) Young People (aged 18-29 years); 2) Older people over the age of 65-75 (varying based on national or local retirement age criteria); 3) People with long-term physical, mental, intellectual disabilities, or sensory impairments; 4) Migrants, and individuals belonging to linguistic, ethnic, and religious minorities; 5) Long-term unemployed: individuals who have been jobless and actively seeking employment for at least a year; 6) LGBTQIA+ community (lesbian, gay, bisexual, transgender, queer or questioning, intersex, asexual and more based on sexual orientation or gender identity).

Innovation: the process of developing new solutions or applying them in a new context, that has a significant positive impact in transforming established practices, products, processes, actions, models of governance, decision making practices, and initiatives, while generating added value for rural communities and better responding to their needs.

Local Action Plan (LAP): the document (Del 4.2) detailing the strategic vision of each Dynamo to be implemented in their territories, including the solutions that have been co-developed in WP4 with the RIE stakeholders, their feasibility, financing and the challenges they respond to. The LAP will be the first step towards the implementation of solutions.

Local Community Trainer (LCT): individuals or groups (organizations or informal collectives) who possess digital competences and the attitude of changemakers, that will be trained during the co-development phase, to be then able to train local communities around digital skills.

Local Task Force (LTF): A group of selected stakeholders that are most actively involved in the RIE, consisting of stakeholders that have specific expertise or interest in one or more RDD or that can benefit the most from the project co-development activities.

Rural Innovation Ecosystem (RIE): communities of people, places and practices that share interests in one or more specific RDDs to be established in Dynamos' areas.

Rural Development Drivers (RDDs): Set of drivers that guide rural development. They include Sustainable multimodal mobility; Energy transition and climate neutrality; Sustainable agrifood systems and ecosystem management; Nature-based and cultural tourism; Culture and cultural innovation; Local services, health and wellbeing.

Solutions*: place based established practices, products, processes, actions, models of governance, decision making practices, initiatives, policies and plans made up by one or a combination of various forms of innovations that drive rural communities towards a sustainability transformation.
** Authors and RURACTIVE partners agreed on the change from community-led, as defined in the Grant Agreement, to place based solutions to encompass a greater number of solutions that might not be developed entirely or solely by local communities while retaining strong features of participation.*

Stakeholder: An institution, organization, group or individual that has some interest or impact in one or more of the RDDs of the project, either as possible contributors to the co-development and implementation of solutions, or as a beneficiary of such solutions.

List of Acronyms and Abbreviations

BAB: Bundesanstalt fur Agrarwirtschaft und Bergbauernfragen
BALAM: Asociacion BALAM API
BHF: Berner Fachhochschule
BF: APS Borgofuturo
BORGHI: BorghiIN Rete Di Imprese

CARTIF: Fundación Cartif
CZAD: Grad Zadar
DSS: Decision Support System
DZ: Diputacion De Zamora
EA: Ethics Advisor
EC: European Commission
EMZ: Zagori Eco Museum-Koinoniki Synetairistiki Epicheirisi Syllogikis Kai Koinonikis Ofeleias Oikomouseio Zagoriou
EURICE: European Research and Project Office GmbH
F6S: F6S Network Ireland Limited
FORZA: Forza Agency For Sustainable Development Of The Carpathian Region Nonprofit Organization
GBIZ: GrowBiz Scotland
IAAC: Institut d'Arquitectura Avançada de Catalunya
IE: Innovation ecosystems
JHI: The James Hutton Institute
KPIs: Key Performance Indicators
LAP: Local Action Plan
LCT: Local Community Trainer
LCP: Local Communication Plan
LTF: Local Task Force
LWS: Local Workshop
M: Month
PP: Project Partners
RDD: Rural Development Driver
RG: Region Gotland
RIE: Rural Innovation Ecosystem
UCD: University College Dublin, National University of Ireland
UNIBO: Alma Mater Studiorum_Università di Bologna
URB: Urbanex Doo
UOULU: Oulun Yliopisto - University of Oulu
UU: Uppsala Universitet
WAB: Wirtschaftsagentur Burgenland Gmbh
WP: Work Package

1. Executive Summary

This report introduces the RURACTIVE Conceptual Framework for innovation in rural areas, setting the minimum common ontology for the project implementation, and further describing the dataflow for collecting and describing solutions in the Solutions Catalogue (Task 2.2). The framework comprehensively constructs a conceptual matrix to organize knowledge, characterizing, systematizing and categorizing six Rural Development Drivers (RDDs) (Sustainable multimodal mobility, Energy transition and climate neutrality, Sustainable agri-food systems and ecosystem management, Nature-based and cultural tourism, Culture and cultural innovation, Local services, health and well-being); three crosscutting priorities, including Climate change adaptation and mitigation, Biodiversity, Social Justice and Inclusion; and four types of innovation, namely Digital and Technological, Technical, Social, Organizational and Governance, Financial and Business Models.

Even though this report contains a substantial amount of information on rural development, authors do not aim at systematically reorganising all the knowledge produced around sustainable transition of rural areas within the European context, but rather to contextualise it within the scope and the specific objectives of the RURACTIVE project, defining a common ontology based on shared principles and objectives. Building on existing theoretical background and knowledge, RURACTIVE wants to introduce innovative approaches for a sustainable and just transition, promoting community-based action for strong, connected, resilient and prosperous rural societies.

This report contributes specifically to RURACTIVE Specific Objectives TO1 that aims to map, systematize and enhance knowledge on smart and community-led practices, products, processes, actions, initiatives, policies and plans as a starting point to co-develop place-based and inclusive solutions in each Dynamo (WP4). Moreover, it supports rural communities to develop in a sustainable, balanced, inclusive way improving understanding of environmental, socio-economic, cultural, and demographic drivers contributing to reach the impact defined in the Destination 6 (Resilient, inclusive, healthy and green rural, coastal and urban communities) of Cluster 6) Food, Bioeconomy, Natural Resources, Agriculture and Environment) of the HorizonEurope program.

The framework detailed in this document has been co-constructed in *Task 2.1 Development of a conceptual framework for rural smart and community-led solutions,* exploiting the complementary and multidisciplinary expertise and skills of the project technical partners. At the same time, the framework has been developed in close collaboration with Dynamos, to make sure that the knowledge built around the framework would be shared and comprehensible to all partners. This is also because the framework sets the vocabulary as well as the operational steps to support different Tasks and WPs

within the project. Indeed, the Conceptual Framework is the backbone of the Solution Catalogue, the repository developed in Task 2.2, providing the conceptual scope and detailed structure for describing and organizing the solutions. RURACTIVE conceives **solutions** as *place based established practices, products, processes, actions, models of governance, decision making practices, initiatives, policies and plans made up by one or a combination of various forms of innovations that drive rural communities towards a sustainability transformation*.

Moreover, the factors identified in the framework will inform the analysis of the solution to be performed in T2.3. The knowledge built in WP2 through the catalogue is fundamental for WP3 and specifically Task 3.4, where such knowledge will be translated and made available to RURACTIVE Dynamos and all other interested rural communities, through learning modules and booklets, and Task 3.5, which will develop open and online MOOCs. The Framework is also the base for WP4, as far as it supports and inspires the co-development of solutions by Dynamos within the Multi actor RIEs. Moreover, indicators to be developed within the scope of WP 5 and particularly Task 5.1, are connected to the framework for the evaluation of transversal characteristics and crosscutting priorities. Finally, by establishing the base knowledge and structure for the Solutions Catalogue, the framework is also the conceptual departing point to construct and collect knowledge for the adaptive Monitoring Tool and a Decision Support Tool (DST) developed in WP6.

The document is structured in the following sections:

- **Introduction and Key Principles:** It introduces the main principles behind the development of the framework including a methodological note.
- **Conceptual Framework:** The first chapter presents and discusses the main features of the proposed Conceptual Framework, defining the RURACTIVE common ontology and extensively conceptualising the different components of it. This chapter includes and extensive description of each RDD.
- **Relationship with the Solutions Catalogue:** This third chapter describes the relationship between the conceptual Framework with the RURACTIVE Solutions Catalogue. It includes a description of the Solutions Catalogue, of the questionnaire for the collection of solutions and the associated guidelines to be developed in Task 2.2, including a description of the next planned activities.
- **ANNEXES:**

  ANNEX I-Conceptual Framework definitions: This ANNEX presents the Guidance for compiling the Questionnaire for the collection of solutions in the Catalogue. The Guidance, developed in Task 2.2 led by JHI incorporates all the definitions included in the Conceptual Framework, including the guiding questions associated to each definition to facilitate their understanding.

  ANNEX II-Conceptual Framework Matrix: The ANNEX presents the conceptual matrix utilised to set up and develop the Conceptual Framework.

2. Introduction and key principles

RURACTIVE aims to support rural communities and territories to transition towards vibrant centres for sustainable, balanced, and inclusive development based on innovation, local resources, grassroots action, creativity and social inclusion, resulting in attractive places for all people to live, work and stay. As recognised by the EC, 'rural areas will have a vital role to play in delivering the green transition and meeting Europe's ambitious climate and environmental targets' (EC, 2020a). This role is also acknowledged in the **Green Deal** and the **Long-Term Vision for Rural Areas**, with the latter emphasising how rural areas could embrace the emerging opportunities of the EU green and digital transitions and lessons learned from the Covid-19 pandemic. These accounts underscore the importance of rural areas in leading the way towards sustainable transition. Nevertheless, long-term challenges including contentious issues of food production versus land preservation, infrastructural bottlenecks, demographic structure and depopulation, education and capabilities factors are still unresolved and are affecting the possibilities of rural development that is just and inclusive (Huguenot-Noël & Vaquero Piñeiro, 2022).

To help make rural development socially and environmentally sustainable, RURACTIVE promotes community-led local development for the co-design and co-implementation of innovative solutions to address local challenges. To do so, RURACTIVE facilitates the establishment and strengthening of **Multi-Actors Rural Innovation Ecosystems (RIEs)** in 12 pilot areas, known as the **RURACTIVE Dynamos**, located in 7 EU countries, 2 Associated Countries, and Switzerland. Rural Innovation Ecosystems are defined by literature as "an array of diverse organisations (businesses, research organizations, business support intermediaries) and individuals (entrepreneurs, investors, policymakers, researchers, students), their linkages and modes of collaborating or networking together" (Marshall & Murphy, 2018). The RURACTIVE RIEs bring together various local stakeholders including SMEs, industries, authorities, universities, R&I centres, agencies, NGOs and associations, as well as community members, including groups that have previously been excluded by participatory process, such as the young (especially those not in education, employment or training), older adults, migrants, refugees, minorities, long-term unemployed individuals, disabled people and LGBTQ+. **RURACTIVE relies on a place-based participatory approach, with the aim of connecting a variety of stakeholders, facilitating**

the exchange of knowledge and expertise to establish multilevel networks while fostering collaboration, development and inclusion.

Participatory processes and place-based innovation are some of the leading concepts behind other concepts of innovation in rural areas such as that of **Smart Villages** or **Startup Villages**. **RURACTIVE proposes the implementation of an innovative participatory approach for activating RIEs, empowering local communities and involving them in co-developing smart and place-based solutions** (for more information see *Del 4.1 Activating RIEs for community-led development and empowerment*). Participation in this context refers to the need for identifying, engaging and empowering a wide range of local stakeholders sharing interest in establishing a RIE around one or more 'Rural Development Drivers' (RDDs). In line with the goals of the **EU Digital Agenda** set out in **Shaping Europe's Digital Future** (EC, 2020b) of technology that works for people, of a fair and competitive economy, and of an open, democratic and sustainable society, RURACTIVE wants to enhance the capacity of communities to co-develop, implement, and monitor place based solutions by addressing six integrated RDDs to innovate for societal change, Sustainable multimodal mobility, Energy transition and climate neutrality, Sustainable agri-food systems and ecosystem management, Nature-based and cultural tourism, Culture and cultural innovation, Local services, health and well-being. **Building on the overlaying principles of participation and inclusion,** stakeholders, including end-users and beneficiaries, are included in the development of innovative solutions. This ensures inclusive contamination and supports the faster and more efficient deployment of solutions and their sense of ownership by the local community. Moreover, RURACTIVE places significant emphasis on **women**, acknowledging their critical role in the development and sustainability of rural areas and unlocking women-led innovation, tapping into the unique perspectives and capabilities women bring to rural development.

The project fosters long-term sustainability by promoting multilevel governance, capacity building, place-based development, and inclusive processes. Digital connectivity, mutual learning and skill exchange are emphasised as crucial tools for economic diversification in rural areas, ensuring that all individuals, especially those at risk of being left behind, are equipped with digital skills and resources. This will be achieved through a variety of activities such as knowledge exchange, capacity building, training and networking. **Within RURACTIVE, all rural communities' members - leaving no one behind - will be included in the transition towards a sustainable, balanced, and inclusive development.**

This deliverable is embedded in the knowledge-building phase of the whole project. Specifically, it aims at reformulating and enhancing processes of innovation in rural communities, framing them within social justice, biodiversity and climate considerations whilst also addressing participation and inclusion. The operationalization of the Conceptual Framework is instrumental to the creation of a Solutions Catalogue of currently available rural place-based solutions for the collection of knowledge around RDDs, crosscutting priorities, innovation and characteristics (Task 2.2). The Conceptual Framework is

strictly linked with the development of the Solutions Catalogue (Task 2.2), to categorize solutions that are developed and implemented in rural communities and stimulate and inspire the development and implementation of Local Action Plans (LAP) of Dynamos in WP4 and WP5.

The Solutions Catalogue and the Conceptual Framework have a symbiotic design. The RURACTIVE Conceptual Framework is the backbone of the solutions' repository, providing the conceptual scope and detailed structure for describing and organising the solutions. In turn, the development of the RURACTIVE Solutions Catalogue has helped to refine the Conceptual Framework, making it comprehensive and flexible to capture a variety of solutions. The Solutions Catalogue will provide evidence that grounds the Conceptual Framework in the form of real-life examples with qualitative insights in line with the remit of RURACTIVE.

3. Conceptual Framework

The RURACTIVE framework for Innovation systematises the RURACTIVE concepts and methodology to support rural areas in enhancing their capacities to enable their just transition. Building on relevant literature and previous successful projects, RURACTIVE defines a minimum common ontology of concepts and definitions to inspire and support rural communities in achieving a sustainable, just and green transition that will leave no one behind. To establish the innovation process, the project builds its knowledge foundations in this conceptual framework, conceived both as a methodological and operational tool, developed around six core Rural Development Drivers (RDDs), three cross-cutting priorities and four types of innovations. The framework also includes characteristics such as adaptability, capitals and territorial context and impacts, with a strong focus on capacities to empower rural communities.

To build the RURACTIVE framework for Innovation, a series of methodological steps have been followed. Firstly, relevant knowledge has been gathered starting from the steps presented at the proposal stage and expanding through previous successful projects that have innovation at their core (e.g., **RURITAGE**, **SIMRA**, **DESIRA**, including those funded under call DTICT- 09-2020, **AURORAL**, **GRASS CEILING** and **dRural**) and other relevant academic literature and technical knowledge.
The framework has been co-constructed with the project technical partners. Each partner each partner was assigned a contribution based on their expertise and role in the relevant Tasks, working through different sets of revisions. Moreover, constant feedback was received by Dynamos and other partners through presentations both in Steering Committees and Dynamos Symposiums. Moreover, the close collaboration with Task 2.2 has allowed for the Framework to be tested in its operational capacity, by receiving feedback from Dynamos when inserting their solutions and reading the definition of the different elements constituting the framework.

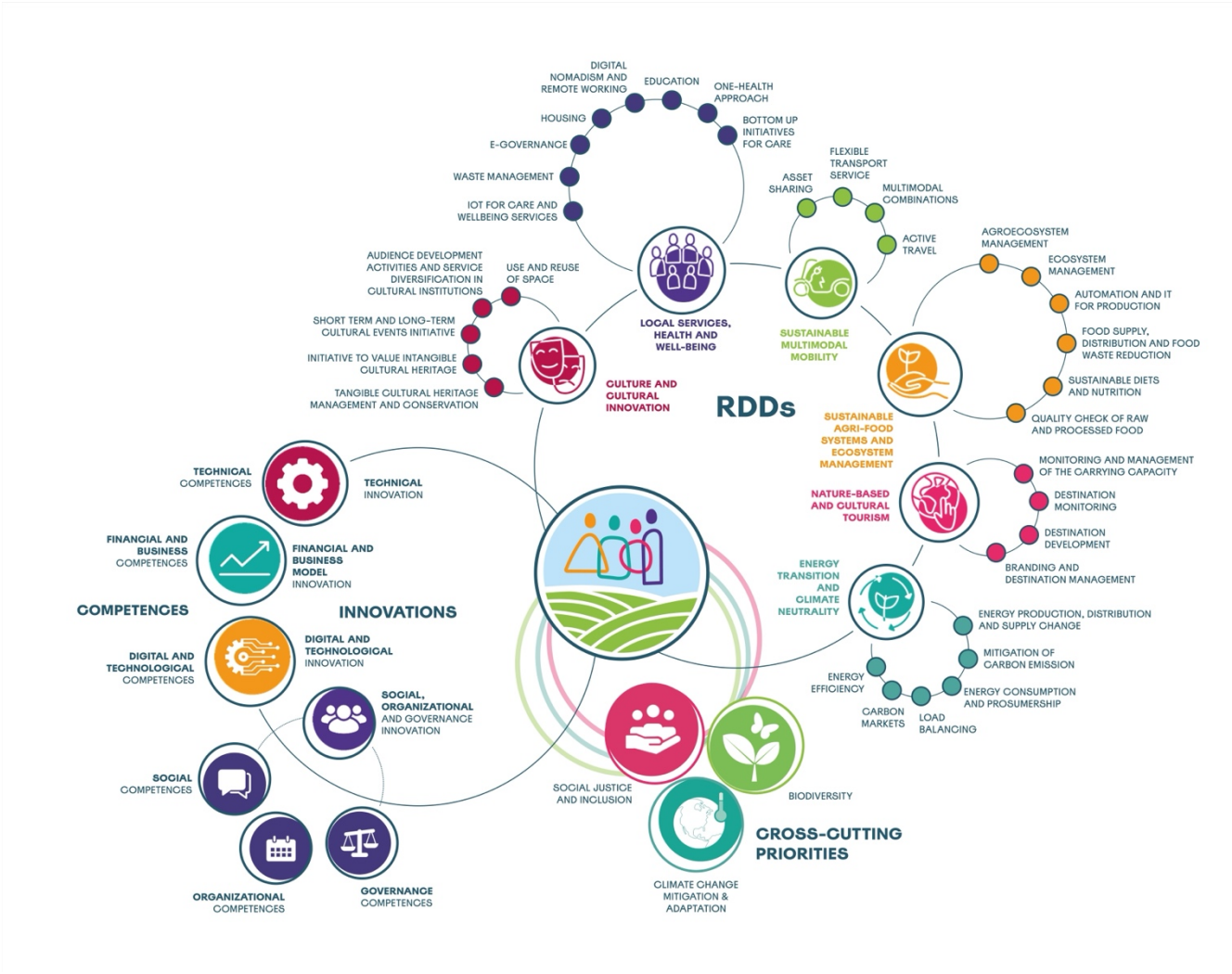
After agreeing on a common definition of *solution*, partners worked on the different components of the RURACTIVE Conceptual Framework, as shown in Fig. 1, and as listed below:

3. **The crosscutting priorities,** including **Climate change adaptation and mitigation; Biodiversity; Social justice and inclusion.**
3. **The Six Rural Development Drivers (RDDs)**, including **Sustainable multimodal mobility; Energy transition and climate neutrality; Sustainable agri-food systems and ecosystem management; Nature-based and cultural tourism; Culture and cultural innovation; Local services, health and well-being;** with relevant **sub-categories** for each one of them.
3. **Four types of innovation,** namely **Digital and Technological; Technical; Social, Organisational and Governance; Financial and Business Models.**
3. **Communities' competences (falling under human capital),** including **Digital and technological competences; Technical competences; Social; Organisational; Governance; Financial and Business competences**.

Moreover, each solution will be characterized and described in the catalogue according to the following additional fields, that are needed to potentially upscale the solution in other territories:

3. **Three characteristics**, including **Adaptability and replicability to other contexts; Key resources and capitals needed; Geographies and territorial context detailed.**
3. **Four Impacts,** including **Stronger, Connected, Resilient, Prosperous rural areas.**
3. **Challenges**.
3. **Other domains.**

Figure 1. RURACTIVE Conceptual Framework visualization



The following paragraphs detail the conceptualisation of the RURACTIVE Conceptual Framework for Innovation. It includes the rationale behind the elaboration of a common ontology constituted of elements and definitions that set the shared vocabulary of RURACTIVE.

3.1 Solutions

RURACTIVE conceives **solutions** as **place based established practices, products, processes, actions, models of governance, decision making practices, initiatives, policies and plans made up by one or a combination of various forms of innovations that drive rural communities towards a sustainability transformation.** This inclusive definition is crucial when addressing the multitude of actions carried out in diverse rural contexts using different methodologies and involving various actors.

To define solutions in this broader sense, RURACTIVE draws from and expands on attested definitions in relation to inspiring projects, ideas and good practices. Considering other European projects and repositories of rural knowledge (see for example **RURITAGE**, **RURALIZATION**, **Rural pact community platform)** successful practical examples gathered inn repositories and databases are defined as good practices. According to the European Commission the definition of **good practices** implies strategies, approaches and/or activities that have been shown through research and evaluation to be effective, efficient, sustainable and/or transferable, and to reliably lead to a desired result (EC,2021). Moreover, the **Interreg Europe programme manual** adds "an initiative (e.g. project, project, process, technique) undertaken in one of the programme's priority axes which has proved to be successful in a region and which is of potential interest to other regions". With an expanded understanding of good practices, RURACTIVE categorises solutions as a diverse range of projects, experiences, practices, ideas, models, and technical solutions aimed at empowering local communities.

The comprehensive definition of solutions has been tested and validated with technical partners and Dynamos to ensure it encompasses all possible configurations that solutions in rural areas may assume. Particularly noteworthy is the shift from defining solutions as community-led (as originally outlined in the GA) to being place-based, allowing for the inclusion of innovation processes developed and implemented locally, but that have not necessarily been built by the local community.

3.2 Crosscutting priorities

To ensure a sustainable transition of rural areas, RURACTIVE lies its foundation across three pillars, called hereafter **crosscutting priorities. These priorities are Climate change adaptation and mitigation, Biodiversity, Social justice and inclusion** and we consider them as the cutting-edge factors at the basis of rural sustainable transition.

Indeed, climate change impacts and biodiversity loss are two of the most important challenges and risks for human societies. Humans are claimed to be responsible for the **sixth mass extinction** (Cowie et al., 2022) and today, the IUCN Red List of threatened species accounts for 44.000 species a number that corresponds to the 28% of the total assessed species so far[3]. According to the World Wide Fund for Nature (WWF) population sizes of vertebrate species, for example, have declined by an average of **68% over the last five decades**.

[3] **https://www.iucnredlist.org/en**

If climate change is one of the main drivers of biodiversity loss, at the same time destruction of ecosystems undermines nature's ability to mitigate the effects of climate change, regulate greenhouse gas (GHG) emissions and protect against extreme weather events. Impacts of climate change over biodiversity thus accelerate change and increase vulnerability to it. There is an increasing recognition that, although the climate change and biodiversity crises are fundamentally connected, they have been primarily addressed independently and a more integrated approach is essential to tackle these two global challenges (Pettorelli et al., 2021).
Halting and reversing the loss of biodiversity and ecosystem services is now a top priority for the EU, next to climate action. Its response includes the **Biodiversity strategy for 2030**,that forms a core part of the **European Green Deal**, the blueprint to make Europe the first climate neutral continent by 2050.

Rural regions have an essential role in the transition to net-zero emissions economies and building resilience to climate change. Rural regions cover around 80% of the territory in OECD countries and associated natural resources, biodiversity and ecosystem services needed to sustain our lives. They produce food and energy, clean water and air, and sequester carbon. Simultaneously, there is an urgent need to transform emission-intensive activities in rural regions into environmentally friendly and net-zero alternatives, successfully reversing biodiversity decline and increasing the provision of ecosystem services (OECD, 2021).
In many countries, rural policies related to climate change tend to focus on agriculture, be fragmented and of limited scale. While the agricultural transition is important, there is scope to not only improve the performance of the sector but also broaden the policy approach beyond sectoral considerations, to support rural transition towards diversified adaptive and climate neutral models. This implies to reflect upon climate change and biodiversity impacts transversally through all the 6 RDDs. Moreover, people and communities of rural areas, being spatially marginalized, often in poorer socio-economic conditions, further away from health services with respect to European urban areas, will most likely not be fairly affected by the impacts of climate change. It is often noted that climate change is impacting the (global) poor more than the rich (e.g. Marino et al., 2012), but it is less frequently acknowledged that in addition to the spatially and socioeconomically uneven effects of global warming, significant regional within-country differences also exist (Weckroth & Ala-Mantila, 2022).

Moreover, different socio-cultural characteristics of the population (income, ethno-racial characteristics, age, gender, (dis)ability, and other axes of difference) define some groups of users as at risk of exclusion and more vulnerable to certain impacts of climate change because of their uneven participation in the decision-making process, or due to their higher vulnerability to specific climate change impacts (e.g. the elderly and heat waves). Indeed, diverse economically, socially, and racially disadvantaged social groups may not just be less adaptive to climate change conditions, but present diverse needs to be properly considered and tackled (Bertram & Rehdanz, 2015; A. Fischer & Eastwood, 2016; L. K. Fischer et al., 2018). Most of the current solutions have faced climate change, biodiversity

loss and social justice issues independently (IPBES, 2021), working in separate sylos. Within RURACTIVE, we strongly believe that practices, products, processes, actions, models of governance, decision making practices, initiatives, policies and plans aimed at supporting a just transition of rural communities should simultaneously address synergies between mitigating biodiversity loss and climate change, while also considering their societal impacts, offering the opportunity to maximize the co-benefits and help meet development aspirations for all (IPBES 2021).

The selected crosscutting priorities are transversally pivotal in each RDD, as mentioned explicitly in each extensive description below. Moreover, they will be crucial for the co-development of the Dynamos' solutions, to be carried out in WP4. Step 3 of the Inclusive Step by Step Guidelines for community-led co-development developed in Task 4.1 (for more information see *Del 4.1 Activating RIEs for community-led development and empowerment*) will make sure that Dynamos will take into consideration **Climate change adaptation and mitigation, Biodiversity, Social justice and inclusion** as factors to be necessarily included in the newly developed solutions.

3.3 RDDs

RURACTIVE has selected six Rural Development Drivers (RDDs,) namely Sustainable multimodal mobility, Energy transition and climate neutrality, Sustainable agri-food systems and ecosystem management, Nature-based and cultural tourism, Culture and cultural innovation, Local services, health and well-being as the main vectors driving sustainable and just innovation in rural areas. The drivers have been selected at proposal stage (GA, 101084377) and conceived as a methodological and operational tool to embed and categorise solutions that are developed and implemented in rural communities. In line with the **Long Term Vision for Rural Areas** (EC,2021) which identifies 10 shared goals and 4 areas of actions towards stronger, connected, resilient and prosperous rural areas by 2040, RURACTIVE elaborates six field of actions in which rural communities develop solutions towards a sustainability transformation. These drivers set out the aspiration for empowering rural communities to innovate for societal change, enhancing the capacity for communities to co-develop, implement, and monitor smart solutions.

The six RDDs selected within the Conceptual Framework are not isolated one from the other but rather integrated. Each RDD contributes to allowing or improving outcomes in other RDDs adding value, driving change and creating synergies with the other drivers of development. RURACTIVE acknowledges the need for a holistic approach to boost the sustainable, inclusive and balanced development of rural areas, by acting on the 6 RDDs and having the ambitions to innovate in each one of them, designing, prototyping, and implementing tailored solutions with end-users while enhancing their cross-sector integration in Dynamos. **Moreover, the RDDs are integrated and supported by three**

priorities (Climate change adaptation and mitigation, Biodiversity, Social justice and inclusion) that are identified as important and that affect and cut across all RDDs.

Sub-categories have been preliminary identified for each RDD to support a better definition of these drivers. The sub-categories are built upon the solutions mapped in the Dynamos at proposal stage, according to relevant literature and have been further refined during the project upon partners' expertise. These RDD sub-categories guide RURACTIVE partners in filling the Solutions Catalogue in Task 2.2. with practical examples in each field. Subsequently, they will support Dynamos in inspiring and driving the co-development of solutions within the local Multi-Actor RIEs, in Task 4.2.

The subcategories have been elaborated as follows:

- **Sustainable Multimodal Mobility:** Asset sharing; Ride sharing; Flexible transport service; Active travel (walking, cycling); Multimodal combinations; Travel planning.
- **Energy transition and climate neutrality:** Energy production, distribution and supply chain; Energy prosumership; Greening for mitigation of carbon emission; Carbon markets; Load balancing; Energy consumption and energy efficiency.
- **Sustainable agri-food systems and ecosystem management**: Agroecosystem management; Ecosystem management; Automation and IT for production; Food supply, distribution and food waste reduction; Sustainable diets and nutrition; Quality check of raw and processed food.
- **Nature-based and cultural tourism:** Branding and destination management (DMO + DMC); Destination development; Destination monitoring; Monitoring and management of the carrying capacity.
- **Culture and cultural innovation:** Tangible cultural heritage management and conservation; Valuing intangible cultural heritage; Short term and long-term cultural events initiative; Use and reuse of space (public, private, open space and buildings); Audience development activities and service diversification in cultural institutions.
- **Local services, health and well-being**: Connected devices for care and wellbeing services; E-governance; Digital nomadism and remote working; Employment and employability initiatives, Education; Public health and One-health approach; Bottom up initiatives for care; Housing; Waste Management.

Given the foundational role of RDDs within the RURACTIVE Conceptual Framework, this brief preliminary presentation of RDDs is integrated by a further conceptual delineation provided in the following section of this document. Building on the expertise of RURACTIVE technical partners, the following subchapters deepen the conceptual understanding of each of the six RURACTIVE RDDs. Partners contributed to conceptualisation of each RURACTIVE Rural Development Driver as follows: UNIBO led the Sustainable Multimodal Mobility RDD with contributions from VIF and UCD; UNIBO also led the Energy Transition and Climate Neutrality RDD with contributions from UU; JHI led the Sustainable Agri-food Systems and Ecosystem Management RDD with contributions from BIOAZUL, UNIBO, and UNIPI; UNIBO led both the Nature-based and Cultural Tourism and the Culture and Cultural

Innovation RDDs with contributions from UNIPI to both RDDs; finally CARTIF led the Local Services, Health, and Well-being RDD with contributions from UNIBO and UCD.
Each RDD is defined and described according to relevant literature and existing successful projects, integrating and contextualising whenever relevant the three crosscutting priorities (for the full definition of the crosscutting priorities in RURACTIVE see section 3.2 of this document).

3.2.1 Sustainable Multimodal mobility

In the European Union, cars remain the dominant mode of transportation, accounting for over two-thirds of all passenger journeys **(EC-DG MOVE, 2019).** However, with growing concerns about climate change and poor air quality, mobility needs to shift fast from a car-centered modality to a public transportation and on-demand-centered perspective (Frank et al., 2021)

This change represents a peculiar challenge for rural areas which have a long history of dependence on private vehicles. Their vast distances, low population density, and seasonal fluctuations in visitors often lead to limited and poor public transportation options, with long wait times and travel distances, whenever available (Cottrill et al., 2020; Fiorello et al., 2016; Næss et al., 2019). As a result, many rural residents continue to rely heavily on cars to access jobs, shops, healthcare, and other essential services (Berg & Ihlström, 2019; Brake et al., 2004; Velaga et al., 2012). This strong dependence on private vehicles contributes to carbon emission and loss of cultural and economic dynamism of rural areas on one hand, and on the other hand it further exacerbates social exclusion, especially impacting those without car access. Addressing this disparity is crucial for fostering a sustainable society, supporting healthier habits, and promoting the **just and inclusive** revitalization of rural communities. Local authorities recognize this responsibility, understanding that improved rural accessibility strengthens resident well-being, encourages **social justice and inclusion** and enhances regional attractiveness (Lättman et al., 2020).

At the European policy level, the interest in sustainable multimodal mobility of rural regions is gradually increasing. The Long-term Vision for the **EU's Rural Areas** (EC, 2021a) states that the development of rural regions is dependent on them being well connected between each other as well and with peri-urban and urban areas. The strategy stresses the need to improve access to a wider range of services for rural communities and to support public transport services and connections, ensuring the roll-out of digital infrastructures. **The EU Rural Action Plan** includes specific actions aimed at addressing the issues of rural mobility such as: i) supporting rural municipalities in identifying best practices building on the Commission's experience with urban mobility networks, ii) promoting the roll-out of digital platforms allowing people to use different modes of transport to reach their final destination (multimodal digital mobility services) and iii) developing rural revitalization platform as a one-stop shop for rural communities, rural project holders and local authorities alike to collaborate. **The EU Urban**

Mobility Framework includes specific actions to better integrate the urban, peri-urban and rural linkages in upgraded Sustainable Urban Mobility Plans (SUMPs). Particularly, the Framework highlights the priority to favour sustainable solutions including active, collective and public transport and shared mobility in cooperation with peri-urban and rural areas around the city, covering the whole functional urban area (city and its commuting zone), improving coordination among regions, cities and towns, and between urban and rural areas.

Despite the crucial role sustainable transport plays in connecting rural populations, promoting wellbeing, and achieving decarbonisation goals, research on sustainable rural mobility lags behind its urban counterpart. Conventional public transport can be rather inflexible, needs to be adapted to respond to the diverse user needs in rural areas, taking into consideration the different reasons, abilities, and opportunities to travel (Poltimäe et al., 2022).The last decade has witnessed an increase in the provision of new, both demand-responsive transport (DRT) and shared mobility solutions in rural areas (Poltimäe et al., 2022) including flexible and multimodal transport services that can adapt to the temporal and spatial patterns of the diverse mobility needs in rural areas. There are various solutions such as flexible transport services with minibuses, door-to-door DRT with "virtual" stops, shared taxis, carpooling, asset sharing, and ride-sharing that can enhance mobility for individuals in rural areas. Asset sharing and ride sharing services such as shared taxis, carpooling and bike sharing, flexible services with minibuses, door-to-door DRT with “virtual” stops, are some of the many solutions that can enhance mobility for all individuals in rural areas (**SMARTA**). Active travel – encompassing walking, cycling, and even horseback riding in specific contexts – presents a promising yet under-explored solution in rural regions. Specific benefits from active travel range from increasing health and wellbeing (Lim & Janicke, 2013), reducing greenhouse emissions (Heinen & Ogilvie, 2016), enhancing feelings of connectedness and belonging (Sullivan, 2010) and cost-effectiveness benefits for rural populations with lower-than-average incomes compared to urban centers.

Sustainable transportation modalities are essential for reducing greenhouse gas emissions and air pollution, which are significant environmental and health challenges worldwide. Furthermore, promoting sustainable multimodal transportation solutions **contributes to climate change mitigation and adaptation goals and to biodiversity protection**. By promoting active travel, expanding public transport options, encouraging carpooling initiatives and using multimodal solutions, the negative environmental impacts of transport on rural ecosystems are significantly reduced. Less reliance on private vehicles means less need for extensive road networks and land consumption (González-Leonardo et al., 2022). Consequently, this reduces habitat fragmentation allowing animal populations to thrive, maintaining healthy habitat and assuring ecological and social-ecological connectivity (Lambin & Meyfroidt, 2011). Rural sustainable mobility can be considered a “multiplier” that can allow or improve outcomes and enhance the value of other investments” (EC,2024), adding value to other projects in rural areas with economic, social, tourism or environmental goals at their core and supporting synergies with other RDDs (e.g. Nature-based and cultural tourism, Local services, health

and well-being). By increasing the connectivity of rural areas, sustainable mobility contributes greatly to 'Vibrant Rural Areas' by 'promoting employment, growth, social inclusion and local development" as outlined by the **CAP Strategic Plans**. The **Sustainable and Smart Mobility Strategy** (EC, 2020c) stresses the need of leaving no one behind and includes two specific goals looking at rural-urban and rural-rural connection. One of its flagships is "Making interurban and urban mobility more sustainable and healthier", emphasising that clearer guidance is needed on mobility management at local and regional level, including better urban planning, and connectivity with rural and suburban areas, so that commuters are given sustainable mobility options. Another goal is "Making mobility fair and just for all", stating that in rural, peripheral and remote areas, including the outermost regions and islands, improved public transport links are essential to guarantee unhindered access to mobility for all.

EU Research and Innovation has already worked on relevant roles of sustainable mobility in the EU to drive sustainable development and inclusive transition. Improving rural mobility, in particular sustainable shared mobility interconnected with public transport, is the focus of **SMARTA** project (GA. It consists of more than 30 mobility initiatives related to ride sharing, asset sharing and flexible transport services. This European project tackled the issue of rural mobility by examining the challenges and current practices across various countries. The project worked with specific locations to test innovative shared mobility solutions that integrate with public transportation. By closely monitoring these pilot programs, the consortium gained valuable insights to improve rural mobility policies and practices throughout Europe. Through the knowledge gained, **SMARTA** defined reliable guidance for policy makers, local authorities, and practitioners to develop suitable policies and efficient operational solutions for rural mobility. Other projects such as **Maas4EU**: focus on the integration of on-demand modes in conjunction with public transport, leading to the Mobility-as-a-Service (MaaS) concept. Similarly, the Horizon Europe project GEMINI developed and tested sustainable business models for New Mobility Services (NMS) to increase shared mobility solutions (MaaS and MaaC). The Horizon Europe project SOLUTIONSplus brings together highly committed cities, industry, research, implementing organisations and finance partners to establishes a global platform for shared, public and commercial e-mobility solutions to kick start the transition towards low-carbon mobility. Finally, a number of Interreg Europe projects have explored the issue of sustainable rural transport and can provide inspiring good practices. They include initiatives as DESTI-SMART, LAST MILE, MATCH-UP, and **OptiTrans,** focusing on route changes, on demand bus services, Vehicles sharing and analysis of user needs in public transport options to ensure inclusivity of vulnerable groups (e.g. older people), as well as reducing carbon emissions by reducing private motor vehicle use.

3.2.2 Energy transition and climate neutrality

As the EU strives to become the first carbon-neutral economy by 2050, a dramatic increase of green energy production is needed in the coming decades. The green energy transition and its boost to the

deployment of renewable energy can offer a unique opportunity for rural areas to benefit from their natural resources (Perpiña Castillo et al., 2024). 72% of the **production of renewable energy** takes place in rural areas, which will have a strong role in the energy transition. Rural areas could produce most of the renewable energy in the EU (78% of the untapped potential) (EC, 2021b).

The European Commission supports the regions' **just transition**, which means ensuring that regions are not left behind in the clean energy transformation by offering alternatives to coal and peat regions and supporting alternative (clean) transport as well as heating and cooling solutions. Besides, the European Commission is committed to ensuring that rural regions benefit from the new economic opportunities from renewable energies. **The Just Transition Mechanism (JTM)** is the key EU tool to ensure that the transition towards a climate-neutral economy happens in a fair way, leaving no one behind (EC , 2021a). In addition, the Commission is committed to ensuring that rural areas benefit from the new economic opportunities from renewable energy. In the clean energy package, particularly the recast renewable energy directive, renewable energy communities (RECs) are identified as an essential component of the energy transition.

The European Green Deal establishes an EU target of climate neutrality by 2050, with an intermediate target proposed for 2030 of at least 55% reduction of net GHG emissions compared to 1990 levels. The shift to climate neutrality will be achieved through implementing a range of policies, many of which concern rural areas (**LTVRA**). European energy markets currently rely on large power plants to generate most of the energy used in daily lives. This centralised energy system has a high dependence on external suppliers' foreign gas, oil, and coal imports. In response, the introduction of the **REPowerEU plan** has developed a comprehensive package of measures to save and produce clean energy, while diversifying the European energy supply towards an ambitious target of 45% renewable energy share by 2030. As outlined in the **Clean Energy Package (CEP),** the recasts of the Renewable Energy Directive 2018/2001/EU (RED II) and Internal Electricity Market Directive 2019/944/EU (IEMD) provide opportunities and guidance for energy communities to participate in the transition to a clean energy economy. The RED II establishes common principles and rules to remove barriers, stimulate investments, enhance citizen participation and reduce costs for installing renewable energy technologies. The IEMD creates common rules for the generation, transmission, distribution, energy storage and supply of electricity. **The Green Deal Investment Plan**, **with nature and biodiversity as a priority,** and Invest EU's natural-capital and circular economy initiative (worth 10 billion EUR over the next 10 years) offer significant opportunities to rural areas and communities to invest in new climate and environmentally friendly ways, providing finance to get projects started (EC, 2021a).

The deployment of renewable energy in rural areas under the EU's legal framework for energy can also contribute to the rural action plan envisaged in the Long-term Vision for the EU's Rural Areas (EC, 2021a). Supporting especially the 'resilient rural areas' pillar of the rural vision, the plan states that EU

funds can finance the renovation of buildings in rural areas and contribute to the European Green Deal's objectives by increasing energy efficiency and local renewable energy production. Energy transition and climate neutrality contribute to empowering rural communities, by providing job opportunities and diversifying economic activities, supporting synergies with other RDDs (e.g. culture and cultural innovation, health and well-being).

Rural development is no longer solely associated with agricultural production, and the governance of energy resources has the potential to provide a variety of social benefits. Currently, investments in urban areas have been greater than in rural areas, which can create inequity in the social systems that are put in place. Rural energy communities can help support rural development through building social benefits and capital (European Commission, 2022a). Energy communities are a form of collective action initiative that can provide a community with the ability to own and operate energy systems. By becoming active in the energy market, citizens are no longer merely consumers; they also become ***prosumers*** through self-generation and self-consumption (European Commission, 2022a). Energy community is an emerging framework intended to foster a just green transition for rural communities, where generated values and benefits can be retained locally, while also promoting democratic participation and citizen engagement. The concept of prosumers is increasingly getting attention not only in urban areas but also in rural ones, as prosumers are considered the new performers progressing towards a low-carbon future, where renewable-based power generation is essential to pave a path toward sustainable development. EU legislation does not distinguish rural energy communities from other energy communities and as such there are no specific laws or policies regarding them. According to Perpiña Castillo et al., 2024**rural energy communities** provide unique opportunities for rural areas to retain the value of their natural resources and benefit from the green energy transition through the production of renewable energy. Rural energy communities offer a variety of environmental benefits such as carbon reduction, increased renewable energy generation, increased resource efficiency, halting of biodiversity loss, and the creation of new routes for engaging people into the energy transition through increased energy awareness and literacy. Moreover, the energy local generation can increase its affordability, therefore helping to reduce volatility in energy markets. These communities are joint projects involving a variety of stakeholders such as citizens, farmers, agricultural businesses and local authorities, and are currently supported by the European Commission through various initiatives including the Rural Energy Community Advisory Hub and the Energy Communities Repository.

In the context of the emerging **carbon markets**, the **EU Emissions Trading System (ETS)** is currently the cornerstone of the EU's climate policy. In accordance with the polluter pays principle, it puts a carbon price on emissions from electricity and heat generation, energy-intensive industry and aviation within Europe. By relying on market forces, the EU ETS creates an incentive to reduce emissions where it costs less to do so. In parallel, it generates revenue to invest in climate action and energy transition (EC,2022b; EC 2016). Nevertheless, the use of carbon pricing instruments in the EU has historically been

limited to the energy-intensive manufacturing and power industries, through the introduction of the ETS. For the other economic sectors like transport, buildings, waste, agriculture, and small industry, some member states have adopted carbon taxation mechanisms as unilateral initiatives under the Effort Sharing Regulation (ESR), complementing those that were earlier set for purely national objectives (EEB, 2021). Overall, trading carbon emission rights as tradable commodities is a major institutional innovation in the carbon market's response to climate change and a number of policy guidelines are currently been developed to assist carbon market participants to make reasonable, profitable, resilient and overall sound investment decisions (Su et al., 2024).

At the same time, a wide range of carbon removal options available within the categories of nature-based and technology-based project solutions exist, where nature-based removals contain the widest variety of subcategories, including traditional forestry-based afforestation/reforestation, regenerative agricultural practices (soil carbon), mangrove restoration (blue carbon) and biochar (Hauman & Shah, 2022). All these possibilities can generate a number of opportunities for rural areas to develop and apply carbon removal methods via creating 'negative emissions' which is a term that refers to the process of recovering greenhouse gases from the atmosphere and then transporting and/or storing them (Iordan et al., 2023).

Relevant research includes methods and models to develop techno-economic-environmental-policy frameworks in close interaction with stakeholders (farmers and policymakers) to analyse the opportunities with multiple greenhouse gases mitigation and direct air capture against other negative emission technologies like Bio Energy and Carbon Capture Storage (**MGM-NEGAF project**). The Dept. of Earth Sciences UU (RURACTIVE technical partner) is also part of the MGM-NEGAF project and it is expected that it will utilises its results in the context of the energy transition and climate neutrality Regional Development Driver. This would include, for example, the identification and analysis of opportunities for the RURACTIVE dynamos to take part in such 'negative emissions' assessments and the leverage of the benefits of rural areas.

Energy supply in rural areas is an essential material basis for agricultural development. The development of agricultural energy microgrids, in particular, can give full play to the resource advantages of rural areas, promote the local consumption of wind and solar resources, assist grid **load balancing** services and solve the problems of insufficient power supply capacity and low reliability of power supply in rural areas (Y. Q. Zhang et al., 2024). Having said that, optimal renewable integrated rural energy planning for sustainable energy development and load balancing has been recently attracting attention by researchers and a number of standalone hybrid energy systems and configurations for rural and agricultural communities have been designed, developed and evaluated based on techno economic, environmental and policy related criteria (Mustafa Kamal et al., 2022).

Microgrids (MGs) and distributed energy resources (DER) specifically, have become much more integrated into the electrical systems of rural and remote areas in recent years to boost system productivity and offer consumers high quality power (Shahgholian, 2021). Solar photovoltaic (PV), fuel cells (FC), wind turbines, and energy storage devices like batteries and fast response storage devices like super capacitors (SC) are a few examples of these micro-sources suitable for application in small/medium size rural agricultural farms. The ability of such microgrids to generate renewable energy sources (RES) is increasing for both economic and environmental reasons, while also minimizing some types of air pollution, increasing energy supply diversity and lowering reliance on imported fuels (Shaker et al., 2023).The combination of these technologies that can both produce energy from local renewables and also balance the grid can be readily applied in rural areas for agricultural and domestic applications and it can be economically profitable (Siewierski et al., 2018). In addition to privately owned generation capacities, it could be feasible and profitable to sell/buy the excess energy to/from the closest neighbours, giving rise to "peer-to-peer" forms of energy trades. Despite that peer-to-peer trading has been widely discussed in the literature, the organisation of isolated markets with limited small capacities is still a subject of study and discussion in the power community, even though it has been assessed that such markets can lead to cost reductions up to 20% (Dudkina et al., 2022).

These are opportunities for rural areas and agricultural communities, are worth of exploring since they could provide solutions to both energy production from renewables and grid balancing. Nonetheless, there are currently issues such as an unreasonable energy consumption structure and low efficiency in renewable energy utilisation and it is quite urgent to propose an energy optimization solution to address these problems. Considering the advantages of renewable energy in rural areas and the diversified and decentralised energy consumption patterns of rural households, a rural housing integrated energy system (RHIES) can act as an energy hub that can include, for example PVs and biomass utilisation (waste-to-energy, biogas, etc.) through self-production and local consumption in order to balance the grid and feed it with affordable RES. It is, therefore, apparent nowadays that rural households could directly benefit from such RHIES with affordable energy and grid balancing (Han et al., 2024). Also, the social acceptance of such energy systems, including small wind turbines, is high given the existing relationship between load and production variations (López-González et al., 2020).

3.2.3 Sustainable agri-food systems and ecosystem management

Land and ecosystem management, and agricultural production, are at the core of some of the most pressing global challenges identified in the Sustainable Development Goals **(SDGs)**. **Sustainable agri-food systems and sustainable ecosystem management support building resilient communities in rural areas by providing job opportunities and adequate livelihoods for all while supporting synergies with other RDDs (e.g. energy transition, nature-based tourism).** However, while rural agri-food

systems and natural ecosystems are of primary importance for achieving global goals on food production (e.g. SDG 2) and ecosystem services (e.g. SDG 15), working simultaneously **towards social and environmental goals**, requires transforming agriculture, while reconciling conflicting objectives of food security and environmental conservation (Hunter et al., 2017; Schwarz et al., 2022). This is reflected in the transitions to agroecology, recognised in the setting up of the EU Partnership on Accelerating Farming Systems Transition: Agroecology Living Labs and Research Infrastructure, and broader transformation of food systems (Schwarz et al., 2022).

Rural areas are pivotal to human wellbeing and economic development: as providers of food, wood, water, raw materials and energy; as places of recreation; for protecting our climate; and for conserving biological diversity. As providers of services for all (including rural and urban dwellers), rural areas have a key role to play in the green transition. In turn, urban areas can contribute to rural development through market opportunities, employment creation, and the exchange of commodities, technologies, and knowledge. Thus, reciprocal rural-urban benefits can be increased through place based actions and programs implementation as well as through policy development to protect and restore rural ecosystem services (Gebre & Gebremedhin, 2019).

The link between ecosystem management and agri-food systems is recognised in the **EU Green Deal**, the components of the **Biodiversity Strategy 2030**, and the **Farm to Fork Strategy,** the latter of which aims to make food systems fair, healthy and environmentally friendly. The need for a food systems perspective on transitions to agroecological farming systems is envisaged by the **HLPE** (2019), and the Standing Committee on Agricultural Research **(SCAR)** (2023) in its Strategic Research and Innovation Agenda **(SRIA)** for the EU partnership on Accelerating Farming Systems Transition: Agroecology Living Labs and Research Infrastructures. The aim of the partnership is to "promote a European large-scale endeavour for an agricultural sector that is fit to meet the targets and challenges in relation to climate change, biodiversity loss, food security and sovereignty and the environment, while ensuring a profitable and attractive activity for farmers." (SCAR, 2023). This sets out how agroecological practices that contribute to sustainable ecosystem management in agriculture and throughout the whole food supply chain (including food production, processing, distribution, consumption and resource re-cycling) are considered crucial for **maintaining ecosystem health and contribute to social well-being of all rural communities**. It highlights the alignment of the partnership of agroecological approaches with delivering strategic impact of Horizon Europe, notably those of Sustainable food systems from farm to fork on land and sea, and an underlying increase in high quality digital services for all, as requirements for Inclusive growth and new job opportunities. **The European Green Deal** (EC, 2020) includes specific priorities in relation to environment protection, reflecting in particular in the protection of biodiversity and ecosystems, for example through restoring degraded ecosystems at land and sea by: increasing organic farming and biodiversity rich landscape features on agricultural land; halting and reversing the decline of pollinators; restoring EU rivers to a free-flowing state; reducing the use and risk of pesticides.

The EU Long-Term Vision for Rural Areas (EC, 2021a) includes, under "Resilient rural areas", the preservation of natural resources, the restoration of landscapes, and the greening of farming activities and supply chains, understanding that this will make rural areas more resilient to climate change, natural hazards and economic crises. The stock taking exercise by the European Commission to assess the contribution of the **CAP plans** to the LTVRA pointed out to the reformed CAP contributing to a higher degree of environmental and climate commitments, especially in the agri-food and forestry sector compared to the previous CAP period (EC, 2023).

Moreover, the potentially transformative **European Biodiversity Strategy to 2030** (EU, 2020) is very ambitious, establishing result-based climate and environmental indicators and targets, including the promotion of precision agriculture, organic farming, agroecology, agroforestry, low-intensive permanent grassland, and stricter animal welfare standards (Place *et al*., 2022). For example, the value of landscape features such us buffer strips, hedges, terrace walls and ponds is acknowledged with a target of at least 10% of agricultural area (as high-diversity landscape features) in order to provide habitats for wild animals, plants, pollinators and natural pest regulators. Nevertheless, the compounding effects of climate change contribute to widespread impacts in many aspects of biodiversity, including species distribution, phenology, population dynamics, community structure and ecosystem function. Climate change effects in rural areas, including damage to environmental assets (e.g. damage caused by wildfires), and yield reduction due to droughts, might be leading to, technological, technical, financial and social innovations in planning and land management to adapt land systems, management practices and crop types (e.g. agroecology). The H2020 project **SHERPA** (Rural Science-Society-Policy Interfaces), for example, identified that climate change mitigation policies are directing changes in land use towards renewable energy generation, woodland expansion, management of natural capital through restoring peatlands and carbon-rich soils, and changes in agricultural and land systems (Miller *et al*., 2023). **Within sustainable agri-food systems and ecosystem management**, the emergence of opportunities for sustainable development and transformations in rural areas can be identified along the provision of ecosystem services and the food value-chain from the management of ecosystems and agroecosystems, through to consumption towards more healthy and sustainable practices (e.g. OECD 2019; Kelemen 2020; Gliessman, 2016) with solutions that include, for example, biodiversity restoration, permaculture, no-tillage farming, organic production, plant-based products, alternative food networks, food councils and dietary change (European Commission, 2021c). These elements are reflected in the RURACTIVE RDD subcategories with respect to **ecosystem management, agroecosystem management, automation and IT for production, Food supply, Distribution and food waste reduction, sustainable diets and nutrition, Quality check of raw and processed food.**

Well-managed, rural landscapes (including agro-ecosystems, forests and other natural areas) help regulate water flows, capture carbon and air pollutants from the atmosphere, prevent soil erosion and

provide ecosystem services. However, the expansion in the production of food, feed, fibre and bioenergy of the 20th and 21st centuries took place at the cost of many other contributions of nature to quality of life, including regulation of air and water quality, climate regulation and habitat provision. Increased resource use is the main driver of the triple planetary crisis that involves climate change, the crisis of nature and biodiversity loss, and the crisis of pollution and waste (UNEP, 2024a). The demand for new resources is driving deforestation, changing patterns of land use, and destroying natural habitats around rural Europe. Extracting and processing materials, fuels and food is the reason for 90 % of biodiversity loss and half of all greenhouse gas emissions. Thus, there is a need for the **sustainable management of the ecosystems and the natural resources** of rural areas as key defining assets on which to build a sustainable and prosperous future for everyone, through practices that include forest and river and watershed management, ecosystem services management, biodiversity restoration, resource use efficiency.

The fundamental linkage between land use sectors and the variety of services offered by ecosystems, includes the ones produced in rural areas by agroecosystems, such as regulation of soil and water quality, carbon sequestration, support for biodiversity and cultural services, stressing the necessity of the **sustainable management of agroecosystems** to support the transition of rural communities. However, depending upon management practices, agriculture can also be the source of numerous disservices, including loss of wildlife habitat, nutrient runoff, sedimentation of waterways, greenhouse gas emissions, and pesticide poisoning of humans and non-target specie (Power, 2010). One of the lines of transformation identified in agroecosystems is the restoration of “ecological health” in agricultural systems, production methods that optimise and circularly use resources while restoring community stability and multiple landscape use should be employed (Altieri et al., 1983). Some Horizon 2020 projects explored specific aspects of sustainable management of agrosystems with a view to support the extension of sustainable practices across European rural areas. Examples include the project **SUPER-G** (Developing sustainable permanent grassland systems and policies), which looked into the management of permanent grasslands for supporting biodiversity and delivering ecosystem services across Europe; the project **LANDMARK** (LAND Management: Assessment, Research, Knowledge base), that focused on developing a framework for soil management to support sustainable food production; and the project **CIRCASA** (Coordination of international research cooperation on soil carbon sequestration in agriculture), that focused on soil organic carbon sequestration in agriculture and develop an open collaborative platform on the topic.

Agroecosystem management can be implemented through different approaches aimed at improving agroecosystems sustainability, resilience and regeneration, including for example approaches that relay on automation and IT for production. Amongst these approaches, **agroecology** is identified as one of the most promising (Wezel et al., 2018), reflected in the EU Farm to Fork Strategy and the creation of the partnership on agroecology, noted above. Diversified agroecological systems have scope for

resilience due to disturbances including extreme events such as drought, floods or hurricanes, and to resist pest and disease outbreaks. It offers the potential for environmental ecosystem regeneration, and favourable potential for farms to benefit from a positive socio-economic performance by the adoption of agricultural practices (Mouratiadou et al., 2024). Agroecological diversification can also strengthen ecological and socio-economic resilience, by creating opportunities for new rural markets and value chains. Agroecology contributes to sustainable and resilient food production systems in terms of ecosystems' maintenance and improved land and soil quality. Agroecology depends on context-specific knowledge, therefore agroecological practices are tailored to fit the environmental, social, economic, cultural and political context (FAO, 2018). Practice knowledge available within rural communities and actors in agroecological farming systems, as well as the farmers' capability to innovate and adapt through on-farm experimentation, sharing and mutual learning, are recognized as a core component of agroecology. Agroecology also depends on equitable access to land and natural resources, which is an essential component of social justice, placing a strong emphasis on social values, such as dignity, equity, and inclusion, all of which contribute to the improved livelihoods targets of the SDGs. Currently, there are a number or active Horizon 2020 and Horizon Europe projects focusing on different aspects of advancing the transition to agroecological and sustainable agriculture in Europe. For example, **AGROMIX** (Agroforestry and mixed arming systems – Participatory research to drive the transition to a resilient and efficient land use in Europe) investigates transforming landscapes for resilient land use in Europe through participatory research, with a focus on regenerative practices such as agroforestry and other agroecological solutions, bringing together farmers, researchers and policymakers. **CONSERWA** (Evidence-based support for transition to agroecological weed management in diverse farming systems and European regions) is working on testing agroecological practices and evaluation of their performance for the substitution of chemical herbicides. **ENFASYS** (Encouraging Farmers towards sustainable farming systems through policy and business strategies) is focused on finding effective policy interventions and business strategies that can support farmers towards more sustainable farming systems.

Processing of Agri-food is also important in rural areas, usually linked to processes of product differentiation anchored in quality and place branding. Requirements of the green transition would be accelerating or pushing the increased use of digital and advanced technologies in the manufacturing processes in the food supply change (OECD 2023). Along the supply chain, establishing **short food supply chains** is one of the priorities identified by the Global Consultations report that presents the most relevant parameters for successfully transformed food systems (Bereza et al.,2024). A localised approach, privileging local and seasonal food production and consumption, should be preferred to reduce food miles, and enhance local economic stability, food affordability, and culturally appropriate food for all individuals ((Bereza et al., n.d.; De Schutter et al., 2020; Recanati et al., 2019). Acknowledging urban-rural linkages as crucial forces driving resource and food flows, the City Region Food System approach gained momentum as a premise to stimulate the transition towards more

sustainable food systems (Forster et al. 2015). Cities are typically intended as consumption sites, attracting 80% of food produced in the world (EAT, 2022) and burdening rural areas (Säumel et al., 2022), which are instead deemed mainly as production sites (Arthur et al., 2022; Weerabahu et al., 2022). Indeed, the **EU Rural Development funding** (under the CAP), the **Cohesion Policy** and the **LEADER** approach represent opportunities to implement alternative food system initiatives, by tackling rural development challenges in an integrated way (e.g.: resilient SMEs, rural employment, collaborations between local farmers and public catering facilities, and participatory decision-making) (Peters, 2012).

The Horizon 2020 project **ROBUST** (Unlocking Rural-Urban Synergies) explored linkages between rural and urban areas, being sustainable food systems one of its communities of practice areas. Project insights explored for example municipal food strategies and local food branding.
Within agri-food systems, **food loss and waste** (FLW) sit as one of the main challenges to address and so, reducing FLW is one of the SDG targets (Target 12.3), as it represents a major concern entailing economic costs, environmental burdens, and the paradox of hunger. Considering FLW along all the food value chain stages, there is a need to address the problem at both an individual and a systemic level. In 2019, the **EU Platform on Food Losses and Food Waste** published the Recommendations for Action in Food Waste Prevention. Among others, tackling FLW was integrated as part of climate action strategies and programmes also at the regional and local level. Some of the recommendations included scaling up FLW prevention actions in the food supply chain, by also promoting cross-sectoral cooperation (e.g. food redistribution networks integrating farmers and their cooperatives); promoting lifelong learning and other type of educational and awareness raising initiatives preventing food waste among consumers; supporting data availability and monitoring on FLW; strengthening capacity for innovation, promoting circularity and new market opportunities, also through research and innovation as well as financial instruments. A promising solution might be represented by Public-Private Partnerships, which by taking a Target-Measure-Act approach, aim to develop structures for multistakeholder collaboration on FLW reduction (UNEP, 2024b). Examples of ongoing European wide research on the topic include the Horizon 2020 project **LOWINFOOD** (Multi-actor design of low-waste food value chains through the demonstration of innovative solutions to reduce food loss and waste) and the Horizon Europe projects **FOLOU** (Bringing knowledge and consensus to prevent and reduce Food Loss at the primary production stage), **CHORIZO** (Changing practices and habits through open, responsible, and social Innovation towards zero food waste) and **BREADCRUMB** (Bringing Evidence-based food chain solutions to prevent and reduce food waste related to marketing standards, and deliver climate and circularity co-benefits).Outside market channels, it is also important to acknowledge the part played by food self-provisioning (FSP) strategies, usually connected to small farms, and critical source of food for many people in rural areas, including sometimes the most vulnerable groups, providing multiple benefits for farmers and communities, including sustainable practices across Europe (Pinto-Correia et al., 2021). Beyond FSP, the Horizon2020 project **SALSA** shed

light into the overall role of European small farms in rural areas and their contribution to European food systems (Rivera et al., 2020).

Finally, a further look into food consumption points toward transformation for **sustainable diets and nutrition**, to address the increasing spread of unhealthy diets. Overweight hits more than 20% of Europeans and over the 20% are obese, with rising non-communicable diseases, often related to unhealthy diets (WHO, 2018). In 2019, the EAT-Lancet Report, claimed for a "Planetary Health Diet" by 2050 (Willett et al., 2019). Healthy diets are based on nutrient-rich foods (e.g.: vegetables, fruits, whole grains, beans, nuts and seeds) and are poor in fats, free sugars, and salt (WHO, 2018). Nevertheless, people at risk of poverty or social exclusion often do not have economic access to such healthy items and tend to replace them with cheaper convenience foods with negative consequences in terms of inequality, food insecurity and increasing EU governments' public healthcare costs (Davis & Geiger, 2017; Placzek, 2021). Moreover, overall access to and affordability of healthy diets is better, and levels of food security are higher in cities than in rural areas (FAO,2023). Thus, the shift to sustainable and healthy food choices in rural areas is a complex challenge. Consumers are not always in control of what to choose but are dependent on contextual factors such as the configuration of the food environment and the food system at large. The interventions to change the food environment can come out of either private or public solutions and policies and might alter the incentives for various actors in the food system and trigger additional changes, for example in marketing practices or consumer behaviour. The FAO Background paper for The State of Food Security and Nutrition in the World (FAO, 2023) stresses the opportunities for both urban and rural areas to access affordable healthy diets when sustainably transforming agri-food systems across the rural–urban continuum. At European level, the EU Food 2030 framework initiative (Bizzo et al 2023) fosters a multi-actor and systemic approach to research and innovation tackling nutrition for sustainable and healthy diets among the four thematic areas and indicate 11 pathways for action for the concrete beneficial contribution of research and innovation in a systemic interdisciplinary and transdisciplinary perspective.

3.2.4 Nature-based and cultural tourism

The globalisation process, along with the rapid advancement of modern mass communication technologies, has enhanced the movement of goods, people, ideas, and capital. Consequently, tourism has emerged as one of the most dynamic, resilient and rapidly expanding industries worldwide, achieving a steady 4% annual growth rate in arrivals up to 2019, with the rate of growth predicted to continue in the future (UNWTO, 2020). As the tourism industry continues to grow, its impact on the economy, environment, and society also increases.

The World Tourism Organization **(UNWTO)**, defines cultural tourism as a type of tourism activity in which the visitor's fundamental motivation is to learn, discover, experience, and consume the tangible

and intangible cultural attractions of a destination (UNTWO, 2019). Within RURACTIVE, nature-based tourism would be considered a supplementary category of cultural tourism as it builds upon natural capital and natural heritage of a specific destination. Cultural-tourism is one of the largest and fastest-growing global tourism markets today, estimated to have a 39% of all general tourism activities (European Commission, 2019c; OECD, 2009). However, while thinking of local distinctiveness as a resource, there is a risk of marketisation of everyday life, traditions, and culture, that can over time endanger authenticity, sense of place, and community (du Cros & McKercher, 2015; Pendlebury et al., 2009). As a result, the potential impact of unsustainable cultural tourism could have detrimental social, economic, and environmental effects for the local community and over time degrade the value of the initial distinctiveness of place. In this sense, new trends see cultural tourists progressively searching for the "everyday" experience that replaces the "exceptional" (Richards, 2011; Richards & Russo, 2016): the idea of living like a local is the new "authentic" cultural object. Visitors become, then, "temporary/global citizens or nomads" (Kannisto, 2014) and both the tourist and the resident start performing different roles implying reciprocity, which opens up an "in-betweenness" space that does not belong neither to the usual reality of the tourist or the local (Mansfeldt, 2015). This might represent both an opportunity and a risk for local communities and proper management and awareness of the phenomenon is, therefore, needed, also to define the new cultural tourism (Richards, 2018)

One key change seen during and after the COVID-19 pandemic is the shift from mass tourism towards less crowded tourist destinations, with increased interest in rural and proximity tourism (Santos et al., 2020).In the EU in 2021 43.8% of beds in tourism accommodation were in rural areas, with people prioritising secluded destinations reachable by car (Sajn et al., 2023). Rural areas are particularly suitable for nature-based and cultural tourism, responding to the willingness of travellers to learn about and experience the rural context while escaping from cities and tourist crowds. Increasing urbanization and the rise of sedentary, indoor pastimes (such as television, the Internet, and video games) have been linked to a reduction in informal, outdoor recreation, with potentially serious consequences for childhood development, mental and physical wellbeing, and environmental knowledge and concern (Balmford et al., 2009).Many see this as a major challenge for biodiversity conservation(Balmford et al., 2009): if people no longer experience and know their natural environments, how can they be expected to care about them? In this sense, relational values reflect the qualities of the relationships between humans and nature, such as care, social bonding, place attachment and spiritual meanings. Within RURACTIVE, we argue that understanding relational values is vital for nature conservation, and we identify how incorporation of these values may function as leverage points for achieving more sustainable nature-based and cultural tourism options. There is indeed growing evidence that wildlife and nature-based tourism can be a valuable pathway to transform the environmental knowledge, attitudes and behaviours of tourists, if complemented by effective conservation messaging and proactive interpretive experiences. The emergence of innovative forms of sustainable tourism and the broader distribution of tourism activities can cater to these

evolving preferences while simultaneously addressing various negative impacts of mass tourism (Santos et al., 2020;Sajn et al., 2023).

Nevertheless, rural communities, as well as urban, still struggle to manage tourism in a sustainable and smart way and to align decision-making with local communities' needs and tourists' desires and expectations. Moreover, tourism can generate additional negative consequences associated with rural areas including physical damage to the landscape and surrounding ecosystems, pressure on local infrastructures, and increased costs for services and housing for residents (Sajn et al., 2023). Between 2009 and 2013, tourism's global carbon footprint has increased from 3.9 to 4.5 $GtCO_2e$, four times more than previously estimated, accounting for about 8% of global greenhouse gas emissions. Transport, shopping and food are significant contributors. The rapid increase in tourism demand is effectively outstripping the decarbonization of tourism-related technology. Lenzen et al., 2018, foresee that due to its high carbon intensity and continuing growth, tourism will constitute a growing part of the world's greenhouse gas emissions. The correct management of rural tourism has been a major research concern over the last few decades (Karali et al., 2024).Sustainable tourism needs to be based on community participation as a basis for its development also because all analyses on tourism show that the cordiality and goodwill of the local people are estimated high on the list of positive aspects of a destination (Ottaviani et al., 2023).The implementation of sustainable tourism activities and actions should become a result of the consensus of the local community and stakeholders with efficient utilisation of local human capital and local resources, especially those with unique value as in the case of cultural and natural heritage (Ottaviani et al., 2023).

Much research has shown that excluding communities from decision-making processes could lead to tourism development in contrast to the preferences of some groups and lead to unsustainable tourism paths and impacts (Ottaviani et al., 2023). In some places such as more marginalised, rural, or peripheric areas, local communities could prefer not to attract huge businesses and big external investors to their local areas even though they could bring job opportunities and could prefer having control over local tourism activities. These types of discussions and sharing opinions from the public can only happen by promoting diversity and inclusion in participatory tourism development processes. By including accessibility and Universal Design principles from the beginning, and by committing to equality, tourism companies and business models may become more sustainable, attract new visitors, and can employ people with functional diversity, generating business opportunities and greater product differentiation.

While nature-based and cultural tourism are largely increasing in the share of tourists and movement in the last decade, climate change has impacted and will impact nature-based and cultural tourism destinations, seasonality and tourists flow, by altering weather patterns and influencing the supply of outdoor recreation resources, for instance (McCreary et al., 2019). To respond to all these challenges,

in 2022 the European Commission forwarded the transition pathway for tourism, which contributes heavily to create more resilient EU tourism sector and to make the green and digital transition of tourism sector more fluid. Later of the same year 2022, The European Council launched the **European Agenda for Tourism 2030.** The agenda highlights the importance of tourism sector across Europe for the overall economic development and stresses out the vulnerability of the tourism sector regarding global crises, such as the COVID-19 pandemic (The Council of European Union 2022a). The agenda's main objectives are to make Europe's tourism sector more sustainable economically, environmentally, culturally and socially. These two documents contribute heavily to lay out the foundation of European policy on tourism (Sajn et al., 2023). The **LTVRA**, the **Transition Pathway for Tourism** (EC, 2020e) and the Communication from the Commission - Europe, the world's No 1 tourist destination – a new political framework for tourism in Europe (EC, 2010) set the foundation for tackling these challenges through the implementation of innovative solutions by provisioning services based on local resources that can be valued and organized to enhance tourism services.

The increasingly relevant role of cultural and nature-based tourism in the EU research and innovation path – that mostly included digitisation and sustainability is acknowledged by the increased investment in R&I priorities for funding. Some Horizon 2020 projects tackle the topic of managing cultural tourism sustainably. The **INCULTUM** project fosters training and capacity building of local stakeholders by involving them in innovative participatory approaches (community-based tourism and cultural participation) resulting in new sustainable and collaborative strategies for local promotion and a series of innovations in rural and marginal territories in Europe. Similarly, **SmartCulTour** aimed at supporting regional development in all European regions with important tangible and intangible cultural assets, including those located in rural peripheries and the urban fringe, through sustainable cultural tourism. Finally, **Be.CULTOUR** project goal is to co-create and test sustainable human-centred innovations for circular cultural tourism through collaborative innovation networks/methodologies and improved investment strategies. It targets deprived, remote, peripheral or deindustrialized areas and cultural landscapes as well as over-exploited areas. Based on the collaboration of heritage innovation networks, the project aims at launching long-term initiatives addressing inclusive economic growth, communities' wellbeing and resilience, nature regeneration as well as effective cooperation at cross-border, regional and local levels.

3.2.5 Culture and cultural innovation

While culture is recognised to be a fundamental dimension of sustainable development (4th pillar) both in urban and non-urban areas, rural areas are still far from being seen as cultural hubs and centers for creativity. According to **UNESCO** data, the cultural and creative sector is one of the most powerful engines of development worldwide. It accounts for more than 48 million jobs globally –almost half of which are held by women – representing 6.2% of all existing employment and 3.1% of global GDP. It is also the sector that employs and provides opportunities for the largest number of young people under

the age of 30. At European level, culture and creative sectors cover approximately 7,5% of the overall number of jobs (Pasikowska-Schnass, 2021,). Even though there are no exact figures around the share of residency of such creative workers, most of the creative industries are located in urban and peri urban areas where they generate most of their production and works. Nevertheless, place-strengths of rural areas, such as quality of life, peculiar culture landscape and heritage, can attract and retain creative workers and has the potential to generate sustainable high-quality enterprise and employment opportunities eventually contributing to people quality of life and rural economy diversification (White 2013; Selada et al., 2011). These culture-related notions are linked not only with entrepreneurial, space and place concepts, but also with people and community. Culture-based creativity is associated to the ability of people, mainly artists, to think imaginatively or metaphorically and to trigger the collective development of new visions, ideas, products, or solutions (Conticelli et al. 2021).The contribution of art and culture in developing cultural and creative employment and enterprises and in revitalising deprived territories has been recognized not only in urban are-as but also in rural contexts, spanning a variety of activities, from informal activities and art practices to creative business enterprises (Duxbury, 2011;Conticelli et al. 2021). Moreover, the potential of creative industry for revitalisation and diversification of the economy, also in view of attracting young people to stay, return or move towards rural areas, play a crucial role in shaping new vibrant rural poles of lives.

In 2005, the Council of Europe adopted the Framework **Convention on the Value of Cultural Heritage for Society,** with a series of principles as suggestions to guide actions towards the conservation and valorisation of cultural heritage. The aims of the Convention, signed by several EU Member States, are: i) the recognition of the right for all to participate in cultural life; ii) the collective responsibility towards cultural heritage; iii) the goal of conservation and sustainable use of cultural heritage in relationship with human development and quality of life and iv) the role of cultural heritage in the construction of a peaceful and democratic society promoting sustainable development and cultural diversity. Moreover, the Convention originated the concept of “Heritage Community” as a self-organised, self-managed group of individuals interested in progressive social transformation of relationships between peoples, places and stories, with an inclusive approach based on an enhanced definition of heritage. Besides several initiatives, the Council also promoted the **Faro Convention Network,** involving researchers and civil society organisations, to discuss and research upon cultural heritage-related territorial, economic development, knowledge and education, and social development and make recommendations for community-based actions. Moreover, in 2007, the European Union launched the **European Agenda for Culture**. The overall objectives of this agenda were to promote cultural diversity and intercultural dialogue, promote culture as a catalyst of creativity, and the promotion of culture as an element of international relations (Yenbou, 2022). Two years after the publication, the European Commission (2018) launched the **New European Agenda for Culture** (NEAC) which is an enhanced and up-to-date version of the European Agenda for Culture. The New European Agenda for Culture has three different strategic areas and two transversal dimensions: i) Social dimension – harnesses the

power of culture and cultural diversity for social cohesion and well-being ii) Economic dimension – supports culture-based creativity in education and innovation, for jobs and growth iii) External dimension – Strengthens the European Union's cultural relations iv) Transversal area iv) Protecting and valorising cultural heritage v) Digital innovation and strategy (EC, 2018).

The Framework for Action on Cultural Heritage is built around five pillars, which strengthens the cultural heritage across the European Union. The Framework targets to enhance inclusivity across the Europe, accessibility and participation sustainability, smart solutions, resilience of the endangered heritage, supporting research and knowledge transfer and by reinforcing international cooperation between different countries and actors across Europe (EC, 2019b). In this line, as already highlighted in some of the RURACTIVE solutions collected at a proposal stage, the use of digital, technological and social innovations can make culture accessible to a wide range of groups including young people, women, migrants, old people, and people with disabilities, and improve the quality of life for all in rural areas.

Europe fosters culture and creativity also through its flagship programme. The **Creative Europe Programme** funds actions able to reinforce cultural diversity and tackle the challenges of the cultural and creative sectors in Europe. In the 2021-2027 programming period it counts on a € 2.44 billion budget, almost doubled from the previous programme (2014-2020). It is divided into 3 strands: Culture, Media and Cross-sectoral and it focuses on innovation, collaboration and EU-level cooperation, mobility of involved actors, access to funding, and actions that address specific needs in the culture and creative sectors. Several funded projects are in rural areas: these are often community-led or foster the active cultural activation of local communities. In some other cases, through art and cultural initiatives, they aim to tackle the climate change crisis (e.g.: **ALILASUS** - Art Living Lab for Sustainability – a cross-European living lab aiming to facilitate innovation ecosystems to get Nature-Based Artistic Solutions) or they address people at risk of exclusion (e.g.: young NEET; women) by creating new capacities for their personal and professional development (e.g.: **Storytooling** – a lab to create new heritage stories around post-industrial and rural heritage towns).
Furthermore, the European Union is enhancing its cultural sector with the release of the **Work Plan for Culture covering the years 2023 to 2026**. The Work Plan for Culture was published in late 2022 and it covers four different priority areas, which all enhances and strengthens European Union's cultural sector (Council of the EU, 2022b). The first priority aims to empower the cultural and creative sectors by ensuring fair and just working conditions for all cultural and creative professionals. The second priority aims to enhance participation and the overall role of culture in society. The objective of the third priority is to unleash the power of culture by strengthening the ecosystems around culture and creative sectors (Council of the EU, 2022b).

In line with this, the **New European Bauhaus** initiative aims at connecting the **European Green Deal** with a renewed way to conceive local living spaces, by creating a bridge between the world of science and technology, art and culture, with the aim of merging i) sustainability, from climate goals to circularity, zero pollution, and biodiversity; ii) aesthetics, quality of experience and style beyond functionality; iii) inclusion, from valuing diversity to securing accessibility and affordability. It does it through a dedicated platform for experimentation and connection and funding initiatives. The nexus between climate and the cultural and heritage sector is also highlighted in the **UNESCO 2022 Declaration** around threats to heritage and culture posed by wildfires, floods, storms and mass-bleaching events. UNESCO working group stressed that climate change puts also living heritage – oral traditions, performing arts, social practices, festive events and traditional knowledge – at risk. As climate change leads to displacement and forced migration, entire ways of life risk being lost forever. UNESCO highlighted that intangible cultural heritage practices, including traditional land and water management practices, traditional food security strategies, and the use of traditional architecture and building materials, can help communities mitigate and adapt to a changing climate. Cultural and natural heritage sites can serve as a refuge, both physical and psychological, for communities during and after climate-related emergencies. These sites can also act as assets for recovery and reconciliation in the wake of intercommunal conflicts linked to climate change. Others noted that creativity is essential for finding new solutions to environmental challenges, and that artists and cultural institutions have an enormous role to play in inspiring climate action.

The climate and nature crisis also highlights the need to re-think the way we how we make, give and receive art so that we cultivate biodiversity and protect habitats, move beyond minimizing impacts into understanding how we can restore nature and ecosystems, and connect with the deeper world we are a part of. Research and Innovation already worked over the strength of culture, art and cultural heritage as a driver of sustainable development and inclusive transition. For instance, the **RURITAGE project**, one of the reference initiatives in this RDD, worked closely with 36 rural communities around the world to prove that regeneration through Cultural and Natural Heritage is possible. More specifically RURITAGE has been a four-year-long EU-funded research project, initiated in June 2018, which strived to enable rural regeneration through heritage. The aim of the project was to sustainably enhance local heritage for regional and community development. The intention was to regenerate rural areas with the help of the Systemic Innovation Areas (SIA) framework: a tool used to identify unique heritage potential within rural communities. The recognised SIAs are Pilgrimage, Resilience, Sustainable Local Food Production, Integrated Landscape Management, Migration and Art and Festivals. All the solutions developed in the project are collected into the **RURITAGE DSS** and will be the foundation of the solutions catalogue developed in RURACTIVE. Moreover, closer look will be given to the **INSITU project** (GA 101061747) that combines research and experimental actions to advance the innovation-related practices, capacities, and potential of cultural and creative industries (CCIs) based in non-urban areas of the EU countries.

3.2.6 Local services, health and well-being

The sustainable development of rural areas is directly affected by the lack of access to basic services such as housing, healthcare, or e-governance in combination with ageing and depopulation. As people get older, living at home can expose them to potentially dangerous situations when performing everyday actions or simple tasks due to physical, sensory or cognitive limitations. This could compromise the residents' health, a risk that in many cases could be reduced by early detection of the incidents (Gómez-Ramos et al., 2023) Moreover, it is often necessary for rural residents to travel long distances to access both health and social services, yet the absence of public transportation in rural settings can make access to services difficult for non-drivers (Dahan-Oliel et al., 2010).

While improving sustainable multimodal mobility would largely support a more equal health access for rural dwellers, the EU Long Term Vision (LTVRA) aims to revitalise rural areas by providing efficient, accessible and affordable public and private services, including personalised healthcare solutions (**EC, 2021)**.This vision highlights the crucial role of access to health services in promoting health equity, supporting economic development, facilitating preventive and early intervention and influencing the decision to reside in rural areas. Therefore, improving access to health services across rural Europe goes beyond providing a basic right to healthcare. It is a multidimensional challenge that influences various aspects of rural life and therefore requires an integrated response. The increasing number of aging people in western countries is one of the most significant economic, social, and medical issues of current times. The European population is aging particularly fast as a result of prolonged life expectancy and a decline in birth rates and when in need of assistance, in most cases, one member of the family (e.g., spouse, daughter, or son) assumes the role of the main care provider, often supported by formal care services(Schaffler-Schaden et al., 2021). Family caregivers are critical to home care and they are particularly important in rural areas due to the lack of service providers. According to L'heureux et al., 2022 family caregivers provide 75–90% of the care to people living in the community, greatly supporting patients' quality of life; nevertheless, rurality also has an impact on family caregivers that are exposed to a greater risk of loneliness and social isolation (B. Zhang et al., 2021). Supporting caregivers in rural areas is a novel but raising issues and developing solutions to support caregivers would largely increase their wellbeing and quality of life; example and solutions may come from the **RURALCARE** project, a Spanish project funded by the European Commission, from the rural **Health information hub** of the United States and contacts can be created with the **EUROCARERS** network to facilitate policy uptake and solutions dissemination.

The care and well-being services are being transformed by the technology enabling seamless connection of healthcare providers, patients, and medical devices, and improving the effectiveness and precision of healthcare services. IoT applications for elderly care encompass wearable sensors, smart home devices, and telehealth systems, enhancing the well-being, safety, and healthcare management of elderly individuals (Nissar et al., 2024).

Despite health issues and poor services in the healthcare sector, other public services related with overall quality of life of rural dwellers may be related to the lack of digital access to administrative and governance related services, low participation, housing services and internet connection.

While RURACTIVE do not have the ambition to face and solve all the issues related with low- or poor-quality public and private services in rural areas, e-governance, access to internet and digital technologies and housing issues will be integrated in this RDD. E-governance, supported by IoT, enables effective knowledge management, sharing, and collaboration between domains and divisions at all levels of the organisation, as well as between government and citizens (Ahmed et al., 2023). For instance, smart cities use IoT devices to improve utilities, such as waste and water management. Although most of the found literature refers to cities, the RURACTIVE project is facing the analysis of which of these technologies are suitable to be transposed and adapted to the rural environment. In the housing sector, IoT is being used to create smart homes that provide residents with greater comfort, convenience, and security. Smart home devices like thermostats, lighting systems, and security systems can be controlled remotely using smartphones or other devices. IoT in social housing could enable and empower residents and their communities, resulting in greater wellbeing and improved engagement between residents and landlords (Lyn et al., 2020).

The rise of digital nomadism and remote working is another trend that can support rural revitalization, whether properly planned and managed, and can be facilitated by ICT technologies. Remote workers can stay connected and productive regardless of their location thanks to technologies like virtual private networks (VPNs), cloud storage, and video conferencing tools, enabling employees to work from anywhere. These tools have had a chance to shine with the influx of remote workers caused by COVID-19 (Hermann & Paris, 2020). IoT technologies are paramount in driving the remote work revolution forward in sectors including healthcare, supply chain, and manufacturing.
Real-time communication and collaboration between teachers and students are transforming the education sector. Such technologies are also enabling personalised learning, where teachers can create customized lesson plans and learning experiences tailored to each student's individual needs, not leaving anyone behind (Shemshack & Spector, 2020). Furthermore, devices like tablets and smartboards are making classrooms more interactive and engaging.

The healthcare sector is responsible for around 5 % of greenhouse gas emissions worldwide and can play a key role in reducing global warming (Or & Seppänen, 2024).This process may encompass a great range of actions that include demand-side solutions (patient education, awareness raising and minimisation of avoidable demand) and supply-side solutions (waste and energy management, regulation and incentives for carbon free medical products). Sustainable development, energy efficiency, and public health are interrelated parameters that can transform a system or an

environment for the benefit of people and the planet. The integration of sensors and smart devices should promote energy efficiency and ensure that sustainable development goals are met.

Relevant examples of projects related to this RDD are:

- **EIAROB:** Ambient intelligence ecosystem for the support of long-term care at home using social bots (Innovation Projects GSS-Next Gen).
- **AIROSO:** Integrating robotics into society (RTI2018-096652-B-I00)
- **Social&Smart-SANDS:** Exchange information between households appliances (FP7 Project 317947)

3.4 Innovation

RURACTIVE supports a successful sustainable and just transition of rural areas, by encouraging various innovations as the key to unlocking opportunities in rural regions (EU, 2021, OECD, 2023). Within RURACTIVE, **innovation refers to the process of developing new solutions or applying them in a new context, that has a significant positive impact in transforming established practices, products, processes, actions, models of governance, decision making practices, and initiatives, while generating added value for rural communities and better responding to their needs**. Innovation stands as a critical driver of progress and resilience in the pursuit of sustainable rural development within the European Union and a key to creating new opportunities in the rural economy (Atterton, 2016).

Innovation is a versatile concept that encompasses the development of new products and processes, along with their integration, adaptation, and dissemination. RURACTIVE describes rural innovation as the process of both developing novel solutions and reimagining existing ones to address emerging needs or challenges within rural contexts**.** To address the many challenges stemming from evolving socio-economic dynamics and environmental pressures within rural communities, promoting innovation through good-practice initiatives has become increasingly important. Moreover, innovation encompasses a wide variety of interconnected forms that help to reshape the way rural communities operate and interact. To be effective, innovation needs to be conceived in different and interconnected ways and understood as a holistic system, an inclusive multi-actor and multi goals process that fosters sustainable change (Huguenot-Noël & Vaquero Piñeiro, 2022; EESC, 2022). By prioritising social justice, well-being for all, and climate and nature's priorities over economic growth, innovation can improve society, to deal with inequality and exclusion, but also to enable rural society to develop greater capacity for responsiveness to change, also building resilience (Bock, 2016).

RURACTIVE categorises four forms of interconnected innovation: i) digital and technological, ii) technical, iii) social, organisational and governance, iv) financial and business models. By embracing

innovation across various dimensions, rural development solutions generate added value and empower communities to grow and become more engaged and cohesive entities. This is evident in the EU's rural vision's flagship initiative on research and innovation for rural communities, which aims to advance knowledge and foster innovation in rural areas, creating an environment conducive to growth and attracting innovators (**LTVR – Stronger**). RURACTIVE leverages these forms of innovation to enable the establishment of a RIE that enhances inclusive, participatory and community-based transition. Throughout the promotion of innovation in rural communities, RURACTIVE is especially committed to an inclusive approach to the intersecting social categories of gender, ethnicity, age, disability, and social exclusion, to ensure the societal relevance and quality of the project's research and innovation results.

3.4.1 Digital and technological innovations

This category of innovation is based on the use of digital technologies to newly develop or improve digital or non-digital products, processes, marketing methods or organisational methods**. Digital and technological innovations are fundamentally reshaping rural communities, revolutionising ways of interacting, communicating, working, and travelling.** Nevertheless, rural areas are still characterized by a considerable digital divide (at a gap of 14% in 2019) (EC, 2021), both in terms of access to quality digital connectivity and in digital skills. As highlighted by the EU, the lack of digital skills in many rural areas, where less than half of the households in sparsely populated areas have at least basic digital skills (only 20% have above digital skills), mirrors socio-economic inequalities between these areas and urban areas **(EU, 2023**). An analysis of learning needs and gaps, including digital needs within EU rural communities has been carried out in RURATCIVE within Del.3.1 Learning needs and gaps of rural communities.

In the 'Shaping Europe's digital future' strategy' (EU, 2020b), the European Commission highlights that the digital transition should work for all, putting people first and opening new opportunities for businesses. For this reason, the LTRV considers that *"digital infrastructure is an essential enabler for rural areas to contribute to and make the most of the digital transition"*. The use of digital technologies has the potential to drive economic growth in rural areas through job creation, adoption of new business models, and enhancement of added value within the community; furthermore, digital technologies can play a role in promoting transparency in governance, fostering social innovation, and positively impacting the social and environmental aspects of the local area (EU,2021a). The LTRV sets up a flagship initiative that focuses on sustainable digitalisation, Rural Digital Futures, in which digital and technological innovation plays a key role in improving digital connectivity and supporting the development of digital technology. Within the LTRV the pivotal and crosscutting role of digital innovation is highlighted by embedding digital connectivity and digital skills in each of the four actions of the LTRV Action Plan to make rural areas Stronger, Connected, Resilient and Prosperous.

By stressing the capacity of digital innovation to promote socio-economic development in a sustainable way and increase digital skills for bridging the gap between urban and rural communities, digital innovation develops synergies with all the other innovations considered in RURACTIVE, and particularly with social innovation. Within RURACTIVE we consider the role of digital innovation in developing new or improved digital technologies and infrastructures but also in improving digital skills, employment and management of rural communities and their capacity for digital participation. This is not only relevant for the collection and co-development of solutions, but it is actively addressed within the project in Task 3.3 Supporting Dynamos in overcoming the digital divide, and Task 3.4 Empowering rural communities to act for change through training and capacity. Through the selection of Local Community Trainer (previously addressed in the GA as Local Community Champions), the set-up of training programs and of open educational resources (MOOC) rural communities are supported in exploiting the possibility given by digital tools and solutions to trigger rural development, specifically looking at the elderly, women, the young and other groups at risk of exclusion and underrepresentation.

3.4.2 Technical innovations

Technical innovation plays a pivotal role in reshaping industries, services and driving progress. **RURACTIVE defines technical innovation as the implementation of newly developed or improved products, processes, or techniques.** RURACTIVE recognizes that sustainable rural development is not only driven by digitalisation, technological improvements and datafication but also by technical transformation driven by knowledge and research that might for example consider new or rearranged tools and instruments, upcycling and recycling, improved technical production and transformation processes. The enhancement of technical skills, employment, and management is also a crucial element, aiding in enhancing efficiency, sustainability, and competitiveness across industries. The European Commission recognises the economic and societal benefits of technical innovation, aligning with its goals of sustainable rural development and addressing contemporary rural challenges **(LTRV, 2021).**

3.4.3 Social, organisational and governance innovations

Social, organisational and governance innovation entails new or differently configured ideas, products, services, processes and models that simultaneously respond to social needs, including those of groups at risk of exclusion and underrepresentation, whilst enhancing well-being through transformative changes in social interactions such as the mobilisation and participation of actors and stakeholders (**BEPA, 2010**; Murray et al. 2010; **SIMRA**). Social innovation has many dimensions, including the development of new organisational methods and models, as well as political governance structures. These aspects are crucial in promoting community participation and empowerment, as they

help to build the capacity of the community to engage in collective decision-making processes (Jungsberg et al., 2020; Lindberg & Portinson Hylander, 2017). Social innovation reflects the role of social relationships in realising societal outcomes. Adaptive social innovation can help stabilise a disadvantaged group in relation to the mainstream society or reduce regional disparities. Transformative social innovation escalates across and can eventually alter or replace existing institutions (Kluvankova et al., 2021). By improving social, organisational and governance systems, rural communities are better equipped to collectively address social challenges and achieve sustainable development.

The adoption of innovative organisational and governance approaches is emphasised in EU literature to enhance democratic processes and promote contextually appropriate rural development solutions. The marginalisation and segmentation of rural areas has generally fostered the formation of smaller, more unified communities which show much greater cohesion when compared to their urban counterparts. Consequently, they provide more favourable conditions for organisational and governance innovations to become commonplace (Georgios & Barraí, 2023). The movement away from Fordist modes of governance in the last couple of decades has enabled increasingly flexible systems which combine bottom-up and top-down approaches, facilitating greater collaboration and skill development (Jones & Little, 2000). Further, the development of new forms of participatory or collective decision-making processes, or the restoration and update of traditional but unconventional forms, are often highly effective in rural areas as they are designed to combat specific contextual challenges (Pollermann et al., 2014). Pivotal to this success is the growth of old and new partnerships within and between sectors, geographical areas and levels of governance. Numerous comparative studies of EU rural regions have already identified indicators which foster socially innovative governance, most notably: decentralised governing systems, transparency and discourse dissemination, prevalent interregional networking, and organisational stability (Georgios & Barraí, 2023).

Moreover, social innovation, can be considered as a process, rather than encompassing only new or improved outcomes. Social innovation as a process, supports the implementation of novel sustainable solution to public needs (Neumeier, 2016) and includes the interaction among actors to reconfigure societal practices and to enhance outcomes on societal well-being for all (**SIMRA**). The dynamic interactions of these collaborative processes are at the core of the RURACTIVE principles of co-development and inclusion and enables the networks of interaction and activities of the RIEs, as explained in detail in Del. 4.1. Therefore social, organisational and governance innovation are the means to realise sustainable rural development with collaborative solutions that address rural challenges. This encompasses a diverse array of initiatives in the rural context including, digital platforms fostering social connections, improved accessibility to healthcare services, and initiatives to foster collaborative governance models. Lessons gleaned from past growth strategies highlight the need to rethink traditional approaches and focus on collaborative efforts that prioritise rural citizen participatory processes to effectively address challenges such as biodiversity, climate change, and

social inclusion. **RURACTIVE aims to leverage community-led and participatory innovation initiatives in rural areas to enhance their development while explicitly acknowledging their level of social innovation**. **Specifically, RURACTIVE incorporate social justice and inclusion as a crosscutting priority, ensuring inclusion, diversity and representativeness of the solutions that are collected in the Solutions Catalogue (Task 2.2) and the ones to be co-developed (T4.2).**

3.4.4 Financial and business model innovation

Innovation plays a crucial role in financial and business models as it enables actors to identify new ways to create value, target diverse markets, optimise value chains, devise revenue mechanisms, foster value networks, and establish competitive strategies. **RURACTIVE defines financial and business model innovation as the implementation of products, services and business processes that affect economic, financial, societal and even cultural dimensions of the market and organisational ecosystem (Financial Innovation and Monetary policy, European Central Bank, 2003).**This includes developing new models, implementing existing ones, as well as empowering and training actors towards creating new ones.

RURACTIVE challenges current financial and business models which have become unsustainable due to limited resources and projected demographic changes and promote innovative approaches to support sustainable development in rural areas. Examples include transitioning from a Linear Economic model to a Circular Economy model. This requires shifts in mindset towards lifecycle thinking among policymakers, businesses, consumers, and financiers. However, innovations like this can minimise resource use, maximise product lifecycle and recycling, and promote sustainable growth and job creation (Goovaerts et al., 2018). Accessing finance for innovative models might be difficult, therefore innovations including policy interventions, new local financing instruments and other forms of sourcing are crucial to support a successful transition of rural areas and unlock economic and environmental benefits. Although each RDD might have its own accessible financing structures at a supranational level (e.g. **HORIZON**, **CAP**, **New European Bauhaus**) in RURACTIVE we address more local and bottom-up initiatives, including, but not limited to, social enterprises, cooperatives and crowdfunding.

The overall effects of innovation are hard to measure as they are not unidimensional, rather they can be viewed as coming from an array of sources encompassing numerous solutions and taking into consideration a high degree of uncertainties and risks (Schmidt et al., 2022).

Further, the implementation of innovative solutions requires a combination of local and expert knowledge and innovation processes to produce knowledge flows that allow problem solving (Bruckmeier & Tovey, 2008). As we already have highlighted, skills and knowledge of rural stakeholders have a pivotal role in allowing innovation to spread, solutions to be implemented and replicated within different rural communities. This is the reason why in RURACTIVE competences enhancement and knowledge exchange between Dynamos is prioritised as a means of accelerating and ensuring innovative rural development that is just and sustainable for all.

3.5 Characteristics

In order to ensure that the solutions outlined in the Conceptual Framework serve as a valuable resource for those looking to implement rural innovation in real-world scenarios, the RURACTIVE Conceptual Framework highlights three key **characteristics**. These include *Adaptability and replicability to other contexts, Key resources and capitals needed, Geographies and territorial context.* By addressing these characteristics, the framework addresses the enabling conditions for effectively transferring information, replicate solutions and fostering collaboration among diverse rural areas in order to facilitate the co-development of solutions.

3.5.1 Adaptability and replicability to other contexts

In alignment with the understanding of replicability outlined in smart cities strategies by the European Commission (Ruess, 2021) and the urban replication trajectory of the **RUGGEDISED** project (2016-2022), RURACTIVE views replicability not as the exact copy of the same solution in a different contexts but rather as its adaptation to different conditions and environments. Drawing on concepts from urban environments and applying them to rural settings, adaptability and replicability in RURACTIVE encompasses the ability to transfer a solution successfully implemented in one rural location to another, with the aim of achieving the same, or enhanced, objectives and comparable results.

RURACTIVE evaluates replicability through two key dimensions. *Firstly, it assesses the longevity of solutions beyond the initial project phase, gauging their effectiveness over time. Secondly, it considers the essential data required to potentially replicate these solutions, including information on target groups/actors involved, methodologies and implementation processes, tool accessibility, patents and publications related to the solution, and the ability to connect with the original implementer of the solution.* This comprehensive approach ensures that replicability in RURACTIVE is not only feasible but also sustainable in diverse rural contexts.

3.5.2 Key resources and capitals needed

Assessing the development potential of collected solutions is a complex task that involves considering various factors such as financial considerations, availability of material ad immaterial resources, and knowledge. These factors are defined as key resources and capitals needed to successfully implement the solutions and are mobilized in different ways by rural communities to achieve transformation.

Recognising the critical role of community involvement and participation, RURATCIVE is guided by the 'Community Capitals Framework' (Emery & Flora, 2006 Flora et al., 2016), which views communities as systems with different capitals, flows, and interactions driving development. By emphasizing the concept of a 'community of interest' (Flora et al., 2016), RURACTIVE highlights the significance of

knowledge and resource sharing among rural stakeholders in diverse territorial contexts who have a common interest in promoting rural sustainable development.

In the context of RURACTIVE, six forms of capitals are identified as crucial for the development and implementation of solutions: *natural, cultural, human, social, financial, and built capital*. These capitals are interconnected and have a reciprocal influence on each other, leading to the generation of additional resources within the rural community. As discussed in the following section of this report (3.5.2.1 Competences), the skills and capabilities of individuals are integral to leveraging resources and driving successful rural co-development processes. Human capital, in particular, plays a vital role in RURACTIVE as it encompasses the competences that empower rural actors to actively participate in developing and managing location-specific solutions within their local Multi-Actor Rural Innovation Ecosystems (RIEs).

The definition of capitals in RURACTIVE draws upon relevant literature (Emery & Flora, 2006; Flora et al., 2016, Gkartzios et al., 2022, Egusquiza et al., 2021) and incorporates the expertise of technical partners. Briefly, capitals are defined as follows:

Table 1. RURACTIVE capitals' definitions

Cultural	*Cultural capital reflects the way people "know the world" and how they act within it, as well as their traditions and language. Cultural capital influences how creativity, innovation, and influence emerge and are nurtured.*
Natural	*Natural capital refers to those assets that abide in a location, including weather, geographic isolation, natural resources, amenities, and natural beauty.*
Built	*Built capital refers to housing, transportation infrastructure, telecommunications infrastructure and hardware, utilities, heritage buildings and infrastructure.*
Social	*Social capital reflects the connections among people and organisations or the social "glue" to make things, positive or negative, happen. Bonding social capital refers to those close ties that build cohesion within a community. Bridging social capital refers to associations between organisations and communities. Governance and political capital are included here as the ability of people to find their own voice and to engage in actions that contribute to the well-being and development of their community.*
Human	*Human capital is understood to include the skills and abilities of people to develop and enhance their resources and to access outside resources and bodies of knowledge to increase their understanding, identify promising practices, and to access data for community-building*

Financial	*Financial capital refers to the financial resources available to invest in community capacity-building, to underwrite the development of businesses, to support civic and social entrepreneurship, and to accumulate wealth for future community development*

3.5.2.1 Competences

In RURACTIVE the skills and capabilities of individuals are integral to leveraging resources and driving previously addressed forms of innovation towards a successful rural co-development processes. In the landscape of rural innovation, competences are essential for empowering rural actors to actively participate in the development and management of place-based solutions within their local Multi-Actor Rural Innovation Ecosystems (RIEs). In the Framework, competences are categorized within human capital (see Capital paragraph in the current section of this document). Within RURACTIVE Human capital is understood to include the skills and abilities of people to develop and enhance their resources and to access outside resources and bodies of knowledge to increase their understanding, identify promising practices, and to access data for community-building (Egusquiza et al., 2021). The importance of investing in rural actors` development and of creating supportive environments that enables them to leverage their competences effectively is an integral part of building human capital. Human capital, therefore, includes not only the inherent skills and abilities of individuals but also the capacity-building efforts and the organisational or societal frameworks that facilitate their growth and utilisation. Competences therefore play a pivotal role in defining human capital. Competences are in RURACTIVE the qualitative aspects of an individual's ability to perform tasks effectively. They include knowledge, skills (both technical and soft skills), abilities, attitudes, and behaviours necessary for effective task performance. In the context of human capital, competences highlight the expertise and capabilities individuals possess and can develop to contribute to the success of an organization or community (Melnykovych et al.,2024).

Competences within RURACTIVE are understood to be very complex to assess in relation to solution already implemented. Therefore, competences in the Solutions Catalogue will be assessed only for the solution implemented directly by whoever is completing the catalogue (first-hand knowledge) and for the solutions newly developed by Dynamos. Extensive information on competences can be found in Del. 3.1 Learning needs and gaps of rural Communities (Melnykovych et al.,2024).

The recognition of learning needs in rural areas operated in *Task 3.1 Understanding learning needs* and *gaps for enhancing rural community-led innovation*, encompass the essential knowledge, skills, a set of information, attitudes, and technical and behavioural capabilities and competences that individuals, communities, and organisations in rural settings must acquire to identify, create, and implement innovative solutions addressing local challenges and capitalising on available opportunities. Addressing

these learning needs in RURACTIVE involves the development of targeted training initiatives as well as capacity-building efforts tailored to the unique context of Dynamos rural environments, fostering a culture of innovation and empowering local stakeholders to navigate and contribute to the dynamic landscape of rural territories. The role of Competences within the Framework is enhanced as they are the basis to support multilevel, transdisciplinary and cross sectorial knowledge and determine the capacity building needs to support the implementation of smart solutions in Dynamos. To do so, RURACTIVE fosters multi-directional knowledge exchange between actors, supports transfer and exchange, knowledge and competence transfers among Dynamos, Technical Partners (TPs), all rural communities and external stakeholders through digital/online and face-to-face/in-situ training and capacity building.

Competences are summarised in the following figure:

Table 2. Summary of competences

Digital and technological competences	Information and data literacy Digital communication and collaboration Digital content creation Digital safety and cybersecurity Digital technologies for problem solving Digital technologies for rapid prototyping
Technical competences	In RURACTIVE, technical competences to promote innovations in rural areas are distinguished according to the main rural development drivers (RDDs) and its cross-cutting priorities. RDD: Sustainable multimodal mobility RDD: Energy transition and climate neutrality RDD: Sustainable agri-food systems and ecosystem management RDD: Nature-based and cultural tourism RDD: Culture and cultural innovation RDD: Local services, health and well-being
Social	Communication and dissemination Community-building, collaboration and engagement Adaptability and resilience Environmental and social justice advocacy
Organisational	Leadership and strategic management Operational management

	Sustainable viability
Governance	Institutional frameworks and new governance practices Conflict mitigation and mediation Participatory decision-making and policy engagement
Financial and business competences	Entrepreneurial skills and funding acquisition Financial accounting and controlling New / innovative business models Business strategy, planning, positioning and performance

3.5.3 Geographies and territorial context

To further specify the adaptability of solutions to different territorial contexts, RURACTIVE identify the key features of a territory, including geographic specificity and socio-economic performance. This includes categories that are geographical but also categories that are defined by demographic factors, a mixture of geographical factors and economic factors and trends.

To ensure consensus over territorial classifications, RURACTIVE builds on the operational territorial classification developed by the European Commission. The classification combines elements from the OECD classification with the new urban-rural typology developed by the European Commission and it is based on the relationships between rural and urban centres and the proximity to urban centres as factors conducive to economic performance and development potential (Mantino et al., 2023). According to **EUROSTAT**, the urban-rural including remoteness typology classifies all NUTS-3 regions according to criteria based on population density and population distribution (urban-rural), combined with a distinction between areas located close to city centres and areas that are remote (a region is considered close to an urban centre if half the population can reach an urban centre of at least 50,000 inhabitants in less than 45 minutes and is deemed remote if this is the case for less than half the population. This classification generates the four categories of NUTS-3 regions that are utilized in the RURACTIVE Conceptual Framework: i) urban or predominantly urban regions; ii) intermediate regions close to an urban centre; iii) remote intermediate regions; iv) predominantly rural regions close to an urban centre; and v) remote predominantly rural regions.

Moreover, the Framework identifies the key geographical features of the territory where the solution is applied, providing the categories of island, archipelago, coastal areas, mountain areas, hilly, flat, river flood plain. RURACTIVE draws upon the delineations of geographic characteristics recognized by the European Commission, in particular upon the Territories with Geographical Specificities addressed by the **ESPON BRIDGES** project. The project recognizes four categories of territories with geographic specificity- Mountain areas, Islands, Sparsely populated areas, Coastal areas- at the level of Local Area Unit (LAU), corresponding to municipalities or communes in most European countries (Gløersen et

al.,2019). RURACTIVE acknowledges four additional categories, to encompass the specific territorial features represented by each Dynamo.

The Framework also considers the scale of application to ensure transferability and replicability of solutions. RURACTIVE recognizes six scales of application of solutions, based on both the built environment and administrative division levels, including *Building, Intra-municipality, Municipality, Sovra-municipality, Province/ district, Region*. With regard to the administrative levels, RURACTIVE builds upon EUROSTAT administrative units, tailoring them to the scale and granularity of rural areas and taking into account administrative differences in the Dynamos. This approach facilitates the collection of data from Dynamos using tailored statistics and place-based data sources to establish a baseline and evaluate the impact of deployed solutions in WP5, Task 5.1.

3.6 Impacts

All these aspects that determine the success of solutions in rural development are evaluated in RURACTIVE utilising impacts that reflect the four areas of action emerging from the **LTVRA**. The Framework establishes the conceptual connection between stronger, connected, resilient and prosperous rural areas by 2040 **(LTVRA)** and the monitoring system of KPIs and evaluation procedures in order to compare and appraise the effectiveness, impact and validity of the implemented actions (WP5).

RURACTIVE is supporting rural areas in enhancing their capacities to enable their just and sustainable transition, in line with the aims of the **LTVRA** and the **SDGs**. This support starts from the co-recognition by rural communities of local capitals and resources, and the identification of socioeconomic, climate-related and environmental challenges. Drawing on the identified drivers, the crosscutting priorities and the forms of innovation, RURACTIVE is committed to fostering stronger, interconnected, resilient, and thriving rural areas as identified in the LTVRA:

- **Stronger and healthier,** through the provision of local services for rural welfare, co-developed using digital tools, through social innovations and taking into account social justice and cohesion;
- **Connected,** by enhancing physical and digital infrastructure and improving sustainable multimodal mobility, also increasing digital skills for use and interaction of community-led digital innovations;
- **Resilient,** by fostering green recovery and through the provision of services that protect agri-food systems and ecosystems and solutions for carbon neutrality, while enhancing social innovation;

- **Prosperous and thriving,** by fostering economic diversification and revitalisation of cultural & creative sectors, nature-based and cultural tourism, agri-food and agroecology, energy transition for climate neutrality.

These four categories, or areas of action, have been analysed and corresponding keywords and sub-categories have been identified that will be used as a base for clustering the KPIs in WP5 (Task 5.1). In this document impacts connected to the four areas are mentioned throughout the document and particularly within the extended definitions of each RDD. More information on the impacts, including KPIs, Early Warning Indicators (EWIs) and methodology, will be provided in *Del 5.1 Dynamos' baseline and monitoring programme to be submitted by M12 within Task 5.1.*

3.7 Challenges

Even though rural areas can now more than ever offer opportunities for an inclusive and sustainable growth, rural development still faces a wide range of challenges, related to demographic composition , connectivity, climate change and disasters and others. These challenges directly affect the possibilities of rural development, hindering job creation, pressuring basic services, health and social care providers, further affecting gender inequalities, societal changes and land use conflicts (**EC, 2021**;Huguenot-Noël & Vaquero Piñeiro, 2022; Perpiña Castillo et al., 2024). According to the LTVRA rural areas face major challenges, that include " issues relating to demographic change, such as the loss of population from remote rural areas, lower levels of gross domestic product (GDP) per capita, poor access to services, and issues concerning connectivity". Moreover, "A lower proportion of households in rural regions have access to next generation broadband compared to the EU average. Tertiary education and basic digital skill levels are lower in rural areas and a significant gap exists between male and female employment rates. The share of young people aged 15 to 29 years neither in employment nor in education or training is higher in rural areas" (**EC, 2021**).

The specific rural challenges defined in RURACTIVE include socioeconomic, climate-related and environmental aspects that hinder rural areas capacities to enable their just and sustainable transition. In line with LTVRA, RURACTIVE identifies 9 preliminary challenges: **Poverty and exclusion (C1); Services and infrastructure (C2); Low education and skills (C3); Digital Divide (C4); Climate change and Natural disasters (C5); Ageing (C6); Gender Gap (C7); Over tourism and Uneven development (C8); Depopulation (C9); Unemployment (C10).**

The challenges incorporated in the Framework are linked to ongoing 'mega-trends' that are shaping rural areas, ranging from high vulnerability to adverse climate events and the reliance on traditional means of transportation to the lack of adequate digital infrastructure and capacity to effectively deploy new technologies (**LTRV, 2021**; Huguenot-Noël & Vaquero Piñeiro, 2022). Although specific for rural areas, they necessarily include a certain degree of simplification in order to constitute a shared base

that allows comparison between different rural contexts. Nevertheless, challenges will be further implemented and refined in practice with local challenges defined by stakeholders in the solutions co-development phase within WP4, Task4.2. Moreover, challenges will be used as the base for the Call for innovators led by F6S in task 4.3 to allow Innovators to develop tailored technological solutions that respond to local needs.

3.8 Other domains

Finally, the Framework also contains five must have strings of description, including a numerical identifier (Code), a location associated to the solution (Address), a description in free text containing the main features of the solution.

4. Relationship with the Solutions Catalogue

The operationalization of the Conceptual Framework is instrumental to the creation of a Solutions Catalogue of currently available rural smart and community-led solutions for the collection of knowledge around RDDs, crosscutting priorities, innovation and characteristics (Task 2.2).

The Solutions Catalogue and the Conceptual Framework have a symbiotic design. The RURACTIVE Conceptual Framework is the backbone of the solutions' repository, providing the conceptual scope and detailed structure for describing and organising the solutions. Also, the development of the RURACTIVE catalogue has helped to operationalise the framework and refine it to make it comprehensive and flexible to capture a variety of solutions, and the Catalogue will capture and provide evidence that grounds the Framework in the form of real-life examples with qualitative insights in line with the remit of RURACTIVE.

4.1 RURACTIVE Solutions Catalogue

The RURACTIVE Catalogue, which is under development at the time of writing this deliverable, is designed to be a unique repository of information on rural community-led solutions with the aim of being a useful source of inspiration and insights for anyone interested in rural innovation in practice, from practitioners to policy-makers.

The Catalogue provides stakeholders and the general public with summaries of examples of solutions which can be used to:

- Disseminate information about the project;
- Enable analysis and interpretation of solutions with respect to the dimensions in the RURACTIVE Framework, such as:
    - RDDs
    - Crosscutting priorities
    - Types of innovation
    - Geography
    - Scale, and Characteristics explored in other parts of the project that are also aligned with the Framework (e.g. competences (RURACTIVE D3.1), analysis of EU policies (RURACTIVE T2.4), enabling conditions and barriers (RURACTIVE T2.3);
- To illustrate the diversity of community-led solutions across rural Europe, aiming to include information on at least 500 solutions.

An example of how the Catalogue can be used by stakeholders will be modelled in the Dynamos in the "Learning from others" workshop (December 2024) developed within RURACTIVE T.3.4.

The Catalogue consists of a set of tools (an online questionnaire with accompanying guidance to collect solutions, and a database that records and organise the solutions) that have been developed in parallel with the Conceptual Framework and building on it.
Information about the solutions that populate the Catalogue is collected via an online questionnaire developed to capture a large number of solutions. A guidance document to support the process of adding solutions to the RURACTIVE Solutions Catalogue was also developed, building on the Conceptual Framework.

The Catalogue dataset will be integrated in the RURACTIVE Decision Support Tool (RURACTIVE T6.3) and so also within the Digital Hub for Rural Innovation (RURACTIVE Task 6.1).

4.2 Solutions collection and testing workflow

Information about the solutions that populate the Catalogue is collected via an online questionnaire developed to capture a large number of solutions. A guidance document to support the process of adding solutions to the RURACTIVE Solutions Catalogue was also developed, building on the Conceptual Framework.

The questionnaire and associated guidance

Dimensions and categories in the Catalogue have been developed by adapting the Conceptual Framework to a format of structured (closed) and unstructured (open-ended) questions that allow solutions to be classified based on the dimensions included in the Conceptual Framework, while also provide detailed qualitative insights on each of those dimensions. Closed questions offer several options and respondents are asked to select those that best apply to the solution they are adding. The options are worded to match the elements considered in the Conceptual Framework. Closed questions are usually accompanied by an open-ended question with a view to collecting more details about the selected option in the respondent's own words, which will provide evidence about the shape that the conceptual framework elements take in the specific solutions. Questions were written to be as clear and short as possible, avoiding jargon but using the common vocabulary set by the conceptual framework (e.g. using "societal goals" instead of "cross-cutting priorities"). Each potential question was assessed carefully by the team's leading the development of the Catalogue and the Conceptual Framework and wording was carefully reviewed to maximise clarity.
The questionnaire was developed building on several rounds of consultation, including a test stage with partners who had not been involved in the design of the questionnaire, and a practice workshop. The

test stage was instrumental to identify and address consistency and clarity problems in the questionnaire and in certain aspects of the Conceptual Framework. The questionnaire version that built on the results of the test was used in a practice workshop with members from across the consortium as part of the knowledge exchange activities at the in-person meeting in Gotland in April 2024. In this workshop, participants went through the process of replying to questions in Sections 2 (description of the solution), 3 (RDDs), 4 (forms of innovation), 5 (societal goals), 6 (competences) and 7 (other characteristics) of the questionnaire and discussed them in small groups. Feedback was collected by workshop facilitators and processed by the team developing the catalogue, to identify and address remaining issues. Building on this feedback, a final version of the questionnaire was produced (V5) and launched for starting data collection and a final list of small changes to be reflected in the Framework was provided.

The guidance document that accompanies the questionnaire provides definitions and examples of terms used in the catalogue and steps through each section of the questionnaire, providing additional explanations and examples for the terms used in each question, as well as response options. The guidance was developed in parallel with the questionnaire, following the same rounds of consultations and tests, and was refined to accommodate changes in the questionnaire and feedback received during the practice workshop.

The database

Solutions collected via the online questionnaire will be gathered in an Excel database. It consists of a set of linked tables describing solutions and their features, linked to the categories in the Conceptual Framework, along with relevant metadata.

In the main table, each row shows the information of a specific solution, with columns representing general solution identifiers and descriptors and elements of the RURACTIVE Conceptual Framework.

There are secondary tables for each dimension in the Conceptual Framework (e.g. RDDs), listing all their potential descriptors (e.g. list of topics under each RDD) according to the possible responses included in the questionnaire. It is designed building on the Framework Matrix (see ANNEEX I) to ensure consistency in the way data is recorded and facilitate the future integration of the Catalogue dataset into the RURACTIVE Decision Support Tool.

Timeline of data collection and next steps

Data collection started on the 29th of April 2024, after the rounds of consultation, test stage, and practice workshop described above, and will be rolled-out in several campaigns with different data collection strategies and that will target different types of contributors and solutions (and of data on solutions).

Data collection strategies include:

a) reporting, by project partners, of previously developed or ongoing solutions in the Dynamos territories, or in territories or thematic areas adjacent to technical partners. There will be two main phases of data collection for this strategy: Spring-Summer 2024 and Autumn-Winter 2026/2027. Within this strategy we anticipate to hold specific campaigns calling for submission of solutions with specific features in order to ensure the collection of data needed to support other RURACTIVE tasks. In this regard, data collection kicked off with a campaign targeting solutions that could provide information on competences for RURACTIVE Task 3.1 (29 April-10 May), and a call for the submission of solutions led by women or gender minorities that will provide data for Task 2.3 is planned for June 2024. The second phase of data collection (2026/2027) will be targeted to collect initiatives developed in the context of the RURACTIVE RIEs (RURACTIVE Tasks 4.3 and 4.4).
b) data harvesting from relevant datasets from previous EU-wide research projects funded by the Horizon 2020 programme on which RURACTIVE builds, in order to consolidate information in a unique dataset. The datasets targeted are the **SIMRA Catalogue of Social Innovation Diversity in Rural Areas** (Valero and Bryce 2020), **the RURITAGE Practices Repository** (Egusquiza et al. 2022), and the **DESIRA Inventory of digital tools for agriculture, forestry, and rural areas** (Bacco 2022). Moreover, data are collected from databases funded under call DTICT- 09-2020, **AURORAL**, **GRASS CEILING** and **dRural**. This strategy will be completed during the 2024 Spring-Summer campaign.
c) Online surveying through the wide dissemination of the Catalogue Questionnaire with external participants beyond the RURACTIVE consortium, and in particular, within the Additional Dynamos (RURACTIVE Task 5.5). The design, materials and plan for this strategy -which will be rolled-out in the second phase of data collection (Autumn-Winter 2026/2027)- will be reviewed in advance by the Research Ethics Committee of the James Hutton Institute.

There will be several versions of the Catalogue along the life of the project. RURACTIVE Solutions Catalogue.V2.X (RURACTIVE D.2.2) will be delivered and fully integrated within the Decision Support System (DST) and Rural Innovation Hub (RURACTIVE Tasks 6.3 and 6.1) in May 2027 and archived at the end of the project. A previous version (RURACTIVE Solutions Catalogue.V1.X will have some internal and external dissemination and use during the life of the project, but while delivered in October 2024 for being included in the preliminary version of the DST and to be used in other project activities (e.g. Task 2.3, Task 4.3).

A subset of 35 solutions included in the catalogue will be prepared for the EIP-AGRI (The agricultural European Innovation Partnership) common format of "practice abstracts" for broad dissemination to practitioners. These practice abstracts will be delivered in two batches: first batch in February 2025, with solutions from the first data collection phase (RURACTIVE D2.5), and second batch in February 2027, with solutions from the second data collection phase (RURACTIVE D2.6).

5. Concluding remarks

This deliverable has presented the RURACTIVE Conceptual Framework for innovation in rural areas elaborated in Task 2.1, defining the common project ontology and the dataflow for collecting and describing solutions in the Solutions Catalogue (Task 2.2). This report is the first step in the knowledge building stage of the project, to map, systematize and enhance knowledge on rural place-based solutions (WP2) and inspire the co-development of place-based and inclusive solutions in each Dynamo (WP4). The collaborative work of project partners led by UNIBO has driven the construction of a conceptual framework and an operational matrix to organize knowledge around the six RDDs, the three crosscutting priorities and the four types of innovation, supported by the other elements described in this document.

As highlighted in the previous sections of this deliverable, the Conceptual Framework sets both the vocabulary of the project and the conceptual scope and detailed structure for describing and organizing the solutions collected and organized in the Solutions Catalogue, the repository developed in Task 2.2. The factors identified in the Conceptual Framework will also inform the analysis of the collected solution to be performed in Task 2.3. Moreover, a strong collaboration with other WP is established. In particular, WP3 and specifically Task 3.4, will translate the knowledge developed in Task 2.1 and make it available to RURACTIVE Dynamos and all other interested rural communities, and Task 3.5, will develop open and online MOOCs. The Conceptual Framework is also foundational for the co-development of solutions by Dynamos within the Multi actor RIEs in WP4, as well as for the indicators to be developed within the scope of WP 5 and particularly Task 5.1. Finally, the Framework is also the conceptual departing point to construct and collect knowledge for the adaptive Monitoring Tool and a Decision Support Tool (DST) developed in WP6.

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Annexes

Annex I: Conceptual Framework definitions- Guidance for compiling the Questionnaire

RURACTIVE Solutions Catalogue
Guidance for adding solutions

Version V6 11/06/2024

Summary of changes 11/6/24: Q2.1 – Information added about how to identified solutions that might be linked (or part of a wider initiative); Q2.15 – Changed from multiple choice to single choice.

Introduction

This guidance document is designed to support the process of adding solutions to the RURACTIVE Solutions Catalogue via the data entry questionnaire:
https://hutton.qualtrics.com/jfe/form/SV_6rQk0SrN5g04dLM

It provides definitions and examples of terms used in the catalogue.

We begin by defining some general terms used throughout the questionnaire. Then, we step through each section of the questionnaire, providing additional explanations for the terms used in each section.

An alphabetical index is provided at the end of the document to assist with finding specific words and phrases.

If you have any questions or feedback about the guidance, please let us know and we will be happy to discuss:

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Contents

General terms

- **Solution:** Place-based established practices, products, processes, actions, models of governance, decision making practices, and initiatives made up by one or a combination of various forms of innovations (digital and technological, technical, social, organisational and governance, financial and business models) that drive rural communities towards a sustainability transformation.
    - Process: a series of steps required to reach an end goal
    - Practice: the application of an initiative or action
    - Initiative: a single comprehensive strategy for reaching long-term goals
    - Action: a specific activity or step that is performed for short-term goals
    - Product: an item, good or service obtained through a production, creation or delivery process
    - Models of governance: organisational leadership, how leaders and members interact with other parties, and how policy and procedure are designed, implemented and reinforced.

- **Innovation:** The process of developing new solutions or applying them in a new context, that has a significant positive impact in transforming established practices, products, processes, actions, models of governance, decision making practices, and initiatives, while generating added value for rural communities and better responding to their needs. Forms of innovations are digital and technological, technical, social, organisational and governance, financial and business models.

- **Social innovation:** The reconfiguration of social practices, in response to societal challenges, which seeks to enhance outcomes on societal well-being and necessarily includes the engagement of civil society actors.
  (*Source: Polman, N. B. P., Slee, B., Kluvankova, T., Dijkshoorn-Dekker, M. W. C., Nijnik, M., Gezik, V., Soma, K., 2017. Classification of Social Innovations for Marginalized Rural Areas. Deliverable D2.1, Social Innovation in Marginalised Rural Areas (SIMRA) Grant agreement 677622, p.32.*)

Overview of the form

The data entry questionnaire is an online form hosted in Qualtrics, which is a secure platform.

The form has been designed so that, if you start filling the questionnaire but do not finish, you can leave and come back to it later. Qualtrics will remember your information if you access it using the same browser (unless you have cleared your cookies in the meantime!).

The questionnaire has 8 sections, with questions designed to collect information about one solution at a time (1 questionnaire = 1 solution). If you want to submit more than one solution, you will need to start a new form. There are also some questions about the person filling the form that will help us to keep a record of contributions and will allow us to know who to contact if there is need for any clarification or follow-up.

Mandatory questions are marked with an asterisk (*). Non-mandatory question might be left blank if the question is not applicable or the answer is not known. However, we would encourage you to consider the question and all the options carefully and answer as many questions as possible. The word limit is generous (20,000 characters); please use as many words as you need.

Questions are numbered so you can easily refer to this guidance document for help on specific questions. In some sections you might notice that question numbers are not sequential or that you are missing some numbers. This is because the order and number of the questions that you are shown depend on your answers to previous questions.

At the end of the questionnaire, you will find space for you to expand on any point or include anything else about the solution that you might want to highlight about it and that might not have been covered in the questionnaire.

Section 1. About you

The first section is all about you. It asks:

- 1.1 Are you:
  - Part of an official RURACTIVE technical partner organisation
  - Part of an official RURACTIVE Dynamo organisation
  - A stakeholder in one of the RURACTIVE Dynamos
  - Other (please specify)
- 1.2 Your name*
- 1.3 Your organisation*
- 1.4 Your email address
- 1.5 What is the source of the information about the solution that you are going to provide?
  - Own knowledge – I am/was directly involved in the solution
  - Published information about the solution (e.g. solution website)
  - Already existing repository/database/catalogue
  - Other (please specify)
- 1.6 Please provide the name of the repository, database or catalogue where you acquired information about the solution and a link to the relevant page.
  - Name of repository
  - Link to repository page about the solution

Section 2. Description of the solution

- 2.1 Title: Please enter the title of the solution in English, and if appropriate, in the local language. If it does not have an official title, please make one up that summarises its main purpose. For cases when you are breaking the description of a wider initiative in several entries that are interconnected, please consider giving related solutions a common identifier in the title (e.g. the same prefix, for example 'Eco Farm: [Solution Name]'), so they can be linked), and add a comment in the last question at the end of the questionnaire (Q8) explaining how they are linked.
    - English title*:
    - Local language:
- 2.2 Location: Please enter details of the location where the solution has been implemented, including the village/town (where appropriate), the region and the country.
    - Village/town
    - Region
    - Country
- 2.3 Your relationship to the solution: please tick what your relationship to the solution is. (tick all that apply)
    - I was/am the innovator/entrepreneur or was part of the innovation/entrepreneur team behind the solution
    - I was/am a stakeholder in the solution (e.g. collaborator, partner)
    - I was/am a beneficiary/user/customer of the solution
    - I heard about the solution through my networks
    - I am researching the solution as part of the RURACTIVE project
    - Other. Please detail below
- 2.4 Lead organisation name: What is the name of the organisation that led implementation of the solution?
- 2.4.1 If the lead organisation is not located in the same place where the solution is, please indicate where the location of the lead organisation, including the village/town (where appropriate), the region and the country.
    - Village/town
    - Region
    - Country
- 2.4.2 Lead organisation type: Please select the type of organisation that led implementation of the solution. Choose from:
    - Local public body (e.g. local council)
    - Regional or national public body
    - Local association / NGO
    - Regional / national / international association / NGO
    - Local business / enterprise
    - LEADER project / Local Action Group

- Informal group (e.g. family/neighbours)
- Other (please explain)

- 2.4.3 Women-led innovation: Please select the option that to the best of your knowledge best describes the gender identity of the team members leading the solution and provide details. Choose from:
    - Woman or group of women
    - Transgender person or group
    - Man or group of men
    - People of different genders led by a woman
    - People of different genders led by a transgender person
    - People of different genders led by a man
    - Other (e.g. option for self-identifying)

- 2.5 Other organisation(s) involved: Please list any other organisations involved in implementing the solution. Please enter each organisation in a new box. New boxes can be added by clicking the add button. This question can be left blank if no other organisations were involved.
- 2.6 Beneficiaries. Please indicate which groups are targeted or supported by the solution? Tick all that apply.
    - Women
    - Young people
    - Older people
    - People with disabilities
    - Migrants and minorities
    - Long-term unemployed
    - People without access to the internet
    - General public
    - Other specific groups not listed above. Please detail.
- 2.7 Website: If there is a website or page associated with the solution, please enter the address here.
- 2.8 Aim: Please briefly describe the aim of the solution, that is, what it wants to achieve. The word limit is generous (20,000 characters); please use as many words as you need.
- 2.9 The story of the solution: Please provide a short description of the story and main features of the solution. Consider questions such as: How did it start? Were there any obstacles that challenged its development? What factors or conditions helped to make it possible? Has it evolved/changed since it first started? What has it achieved? The word limit is generous (20,000 characters); please use as many words as you need.
- 2.10 Impact: Please describe any intended or unintended impacts, both positive and negative, that the solution might have had.

- 2.11 Did the solution continue after it was first implemented?
    - Yes (please explain)
    - No (please explain)
    - Don't know
- 2.12 Has the solution been changed or adapted since it was first implemented?
    - Yes, it has experienced important changes/adaptations (please explain)
    - No, it has remained more or less the same
    - Don't know
- 2.13 Challenges: Which of these challenges does the solution address? Please tick all that apply and provide a short explanation in the "Please provide more details" box.
    - Poverty and exclusion
    - Services and infrastructure
    - Low education and skills
    - Digital divide
    - Climate change and natural disasters
    - Ageing
    - Gender gap
    - Over tourism and uneven development
    - Depopulation
    - Unemployment
    - Other (please describe)

    (Main source/sources: A long-term Vision for the EU's Rural Areas – Towards stronger, connected, resilient and prosperous rural areas by 2040)

Geography and territorial context

- 2.14 What are the key geographical features of the territory where the solution is applied? Please tick all of the features that apply.
    - Island (e.g. when the solution is implemented in a unique island)
    - Archipelago (e.g. when the solution is implemented across several islands that form an archipelago)
    - Coastal area (of the mainland or larger islands)
    - Mountain area (located in a mountain range or mountain area widely recognised as mountainous at least at national level)
    - Hilly (e.g. rolling landscape but not proper mountainous)
    - Flat landscape (e.g. plateau)
    - River dominated landscape
    - Flood plain
- 2.15 What are the key territorial features of the territory where the solution is applied? Please tick the type of region that is the best match. Please tick one option only. *Note that these options are*

based on the NUTS-3 classification and are defined by demographic aspects and proximity to cities (urban-rural remoteness).[1,2]

- Intermediate region, close to a city. These are areas that are in some form of transition from strictly rural to urban. These areas often form the immediate urban-rural interface and may eventually evolve into being fully urban. They are considered close to a city when more than half of the region's population can reach a city of at least 50 000 inhabitants in less than 45 minutes.
- Intermediate, remote region. These are areas that are in some form of transition from strictly rural to urban but are considered far from a city as less than half of its residents can drive to the centre of a city of at least 50 000 inhabitants within 45 minutes.
- Predominantly rural region, close to a city. These are sparsely settled areas without significant large city or town, considering all communes and municipalities with low population size or density. The countryside refers to certain forms of landscapes and land uses where agriculture and natural areas play an important part. They are considered close to a city when more than half of the region's population can reach a city of at least 50 000 inhabitants in less than 45 minutes.
- Predominantly rural, remote region. A predominantly rural region is considered remote if less than half of its residents can drive to the centre of a city of at least 50 000 inhabitants within 45 minutes.

- 2.16 What is the territorial scale of application?
  - Building (The solution affects only to what happens within a specific building/piece of land.)
  - Municipality (The solution is developed within a unique rural community/village/town).
  - Local/county (The solution is developed across two or more neighbouring rural communities/villages/towns that are geographically close to each other and have strong economic/administrative ties.)
  - Regional (The solution is developed across two or more rural communities/villages/towns that are in the same wide geographical or administrative region even if they are not strongly connected to each other.)
  - National (The solution is developed across the country.)
  - International (The solution is developed in rural places in different countries.)
- 2.17 Are there geospatial data or maps relating to the solution?
  - Yes (please explain)
  - No

[1] Further information about the NUTS classification is available here: https://ec.europa.eu/eurostat/web/nuts/overview

[2] See OECD AND ESPON framework: Applying the Degree of Urbanisation. A methodological manual to define cities, towns and rural areas for international comparisons" was issued in 2021 (EUROSTAT, 2021), and https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:Regional_typologies_overview&oldid=394702); "RUSTIK. Exploring the rural-urban continuum". Methodological framework to define Functional Rural Areas and rural transitions.

Section 3. Rural development drivers (RDDs)

3.1 Sustainable multimodal mobility

Although sustainable transport services are key for the connection and wellbeing of rural inhabitants and for decarbonisation goals, sustainable rural mobility has so far received less attention than urban mobility. Planning and provisioning of mobility services, such as demand-responsive transport and shared mobility, with the involvement of local stakeholders is key to answering site-specific challenges of rural areas and granting mobility solutions for all rural inhabitants.

(Main sources: A long-term Vision for the EU's Rural Areas - Towards stronger, connected, resilient and prosperous rural areas by 2040; SMARTA 1 Rural Mobility Matters)

The questionnaire asks whether the solution concerns the following forms of sustainable multimodal mobility:

- Asset sharing (e.g. bike, e-scooter, car sharing). Asset sharing allows for short-term, flexible access to a vehicle, bicycle, or other mode of transportation that has joint ownership or is owned and made available or rented out by an organisation.
- Ride sharing (e.g. carpooling, e-hitchhiking). Ridesharing allows aggregation of the mobility demand for sharing a ride in the same vehicle (e.g. carpooling), free or for a fare, and/or using the same service (e.g. taxi) together with other people.
- Flexible transport service (e.g. community minibuses, demand-responsive transport, services offering route deviations or request stops). These include:
    - Services offering route deviation or request stops.
    - Demand-responsive services that provide transport as requested to/from a particular place at a particular time, e.g. via community minibuses.
- Active travel (e.g. walking, cycling). Active travel means making journeys in a way that involves physical activity.
- Multimodal solutions. This refers to solutions that involve moving between two or more forms of transport, e.g. bus, train, ferry, car.
- Travel planning (e.g. planners that allows you to choose the fastest way of transport)

3.2 Energy transition and climate neutrality

While attention has been put on climate neutral strategies in cities, rural areas are often neglected by climate action despite playing a crucial role in the green transition, including through the generation of renewable energy and facilitation or management of principal carbon sinks (soil and peat carbon, woodland expansion). In the rural context the energy transition is supported through the development of community-led solutions, including the creation of sustainable energy communities of prosumers, protection of carbon sinks by investing in Nature-Based Solutions (NBS), development of farm biogas/biofuel, efficient renewable energy use through forecasting services, extending the uptake of smart grids and smart meters to empower prosumers, promoting behavioural awareness and change.

(Main sources: A long-term Vision for the EU's Rural Areas - Towards stronger, connected, resilient and prosperous rural areas by 2040)

The questionnaire asks whether the solution concerns the following aspects of energy transition and climate neutrality:

- Energy production, distribution and supply change (e.g. solar- and wind power).
- Energy consumption and prosumership (e.g. smart meters, small-scale renewable).
- Greening for Mitigation of carbon or other greenhouse gas emissions (e.g. tree planting, carbon sinks).
- Carbon markets (e.g. carbon taxes and regulations, market-based instruments such as carbon emissions rights and soil/peat carbon investment).
- Load balancing (e.g. intelligent automation, cloud load balancing).
- Energy consumption and energy efficiency (e.g. smart appliances, efficient infrastructure design, energy reuse, home insulation schemes, energy efficient lighting, heating/cooling and transport).

3.3 Sustainable agri-food systems and ecosystem management

While rural agri-food systems and natural ecosystems are of primary importance for food production and ecosystem services, rural areas are still facing challenges in achieving sustainable agri-food transformations. Introducing nature-based and digital solutions for the whole food supply chain (including food production, processing, distribution, consumption and resource re-cycling), as well as for agroecological practices that contribute to sustainable ecosystem management, is crucial for maintaining ecosystem health and contribute to social well-being of all rural communities. Sustainable agri-food systems support building resilient communities by providing job opportunities and adequate livelihoods for all while supporting synergies with other RDDs (i.e., nature-based and cultural tourism).

(Main sources: A long-term Vision for the EU's Rural Areas - Towards stronger, connected, resilient and prosperous rural areas by 2040; Interreg prog. SHAREs; Covenant of Majors)

The questionnaire asks whether the solution concerns the following aspects of sustainable agri-food systems and ecosystem management:

- Ecosystem management (e.g. forest and river and watershed management, ecosystem services management, biodiversity restoration, resource use efficiency).
- Agroecosystem management (e.g. regenerative agriculture and agroecology, pest management, irrigation management).
- Automation and IT for production (e.g. IT machinery and sensors, manufacturing control systems).
- Food supply, distribution and food waste reduction (e.g. farm to table, logistic and food transport, traceability food waste and food loss interventions for prevention and reduction, food waste recovery and redistribution; farmers markets).
- Sustainable diets and nutrition (e.g. food security across the urban-rural continuum, promotion of affordable, sufficient, nutritious, safe, adequate, and diversified diets in the rural context).
- Quality check of raw and processed food.

3.4 Nature-based and cultural tourism

With an increasing interest in rural and proximity tourism raised during and after the COVID-19 pandemic, rural areas remain particularly suitable for nature-based and cultural tourism, responding to the willingness of travellers to learn about and experience the rural context.

Cultural tourism refers to According to “movements of persons for essentially cultural motivations such as study tours, performing arts and cultural tours, travel to festivals and other cultural events, visits to sites and monuments, travel to study nature, folklore or art, etc.” (UN World Tourism Organisation).

Rural communities still struggle to manage tourism in a sustainable and smart way and to align decision-making with local communities' needs and tourists' desires and expectations. These challenges can be tackled through the implementation of innovative solutions by provisioning services based on local resources that can be valued and organised to enhance tourism services.

(*Main sources: A long-term Vision for the EU's Rural Areas - Towards stronger, connected, resilient and prosperous rural areas by 2040; Behavioural changes in tourism in times of Covid-19, JRC)*

The questionnaire asks whether the solution concerns the following aspects of nature based and cultural tourism:

- Branding and destination management (e.g. Destination Management Plans; hospitality and marketing strategies; hospitality and catering/gastronomy services; marketing and distribution platforms; open services for nature and cultural discovery based on spatial data; dynamic visitor yours (Virtual/Augmented Reality tours).
- Destination development (e.g. developing cultural and nature-based routes and paths; new nature-based tourism and recreation options; innovative combinations of nature conservation and tourism; quality guidelines for eco-tourism).
- Destination monitoring (e.g. monitoring of tourism flows, profiling and understanding tourists’ behaviours through IT solutions (e.g. big data analysis)).
- Monitoring and management of the carrying capacity (e.g. sensors and measures for regulating it).

3.5 Culture and cultural innovation

While culture is recognised to be a fundamental dimension of sustainable development (4th pillar) both in urban and non-urban areas, rural areas are still far from being seen as cultural hubs and centres for creativity. Both tangible heritage and intangible heritage, represented by arts, festivals, music, artisan and crafts, dance and local traditions, are crucial assets for sustainable and inclusive innovation. The use of digital, technological and social innovations can make culture accessible to a wide range of groups including young people, women, migrants, old people, and people with disabilities, and improve the quality of life for all in rural areas.

(Main sources: A long-term Vision for the EU's Rural Areas - Towards stronger, connected, resilient and prosperous rural areas by 2040; The role of culture in non urban areas of the European Union)

The questionnaire asks whether the solution concerns the following aspects of culture and cultural innovation:

- Tangible cultural heritage management and conservation (e.g. services for improving accessibility of vulnerable people and groups at risk of exclusion; digital and infrastructural innovations for museum accessibility (cognitive and physical), protecting assets at risk of deterioration).
- Valuing intangible cultural heritage (e.g. rural way of life-based programs; enhancing cultural identities and diversity through community-based performing arts).
- Short term and long-term cultural events initiative (e.g. Artistic residencies, festivals, traditional celebrations).

- Use and reuse of space (public, private, open space and buildings) (e.g. Rural regeneration and community engagement through aggregative creative centres (hubs) for rural youth (non-formal/informal learning).
- Audience development activities and service diversification in cultural institutions (e.g. museums, archives, libraries).

3.6 Local services, health and well being

This RDD relates to solutions that focus on improving local services (e.g. education, housing, waste management) or improving health and social care for local residents. Lack of access to basic services such as housing, healthcare, or e-governance in combination with ageing and depopulation, are key issues that inhibit the sustainable development of rural areas. The introduction of innovations such as digital platforms for managing a wide range of services, or solutions for further increasing the provisioning of services, can mitigate barriers to accessing care and improve quality of life and wellbeing of all rural inhabitants.

(Main sources: A long-term Vision for the EU's Rural Areas - Towards stronger, connected, resilient and prosperous rural areas by 2040)

The questionnaire asks whether the solution concerns the following aspects of local services, health and well-being:

- Connected devices for care and wellbeing services (e.g. remote patient monitoring, ingestible sensors).
- E-governance (access to government services via technology, e.g. form and document digitalisation, self-service resources).
- Digital nomadism and remote working (e.g. facilities and community-nomads exchange platforms).
- Employment and employability initiatives (initiatives aimed to improve the labour market conditions, and create employment opportunities, e.g. work-life balance initiatives, job creation.)
- Education (e.g. e-learning, but also other forms of knowledge exchange).
- Public health and one-health human, veterinary and environmental approach (e.g. sensors for disease monitoring and control, precision dairy farming). The One Health approach is a collaborative approach in the sectors of public health, veterinary science, and environmental science, that acknowledges the interdependencies between the health of people, animals, and the environment. Solutions aim to design programs, community-based activities, and policies through a coordinated approach to achieve optimal health outcomes for humans, animals, and ecosystems.
- Bottom-up social innovation initiatives for care (e.g. volunteer companions and caregivers, medical entrepreneurship). These are initiatives aimed at involving and empowering individuals and communities to play a key role in driving solutions to create sustainable local impacts on healthcare and wellbeing.
- Housing (e.g. supported housing, combatting homelessness, inclusive housing, smart homes).
- Waste management (e.g. door-to-door collection services, recycling initiatives, community composting systems).

Section 4. Forms of innovation

Here we ask you to describe the kinds of innovation behind the solution. These could be tangible, such as digital/technological or technical innovations, or less tangible, involving social, organisational or governance innovations, or new financial and business models.

Digital and technological innovation

We define digital and technological innovation as the use of digital technologies to newly develop or improve digital or non-digital products, processes, marketing methods or organisational methods.

(Main sources: EU monitor, shaping the digital transformation, 2023)

The questionnaire asks the following questions about digital and technological innovation:

- 4.1 Does the solution use new digital technologies or digital products, processes or techniques? Yes or No.
- 4.1.1 Please describe the new products, techniques or digital technologies that the solution develops/ improves (open text).
- 4.1.2 If the solution has an API (Application Program Interface) or other interface so that it can be accessed online (e.g. a booking platform, a digital app), please enter the link and provide a description. This question refers to digital artifacts that are more than just a traditional webpage in which to find information about the solution. Examples of APIs include digital stores, booking systems, messaging applications, and smartphone apps. If your solution has developed or uses a specific API, please include the specific link to the API below (it might be a particular URL link within the general website) and briefly describe its purpose, technical features if known, how it is used and by whom.
    - Link:
    - Description:
- 4.1.3 This question asks you to describe in what ways the solution is digitally and/or technologically innovative:
    - Is the solution developing new digital technology or infrastructure? (Please explain)
    - Is the solution improving already existing digital technology and infrastructures? (Please explain)
    - Is the solution improving digital skills, employment and management? (Please explain)
    - Is the solution increasing already existing digital participation? (Please explain)
- 4.1.4 How mature is the technology used by the solution? Please indicate the maturity of the technology used by the solution on a scale from 1 to 10. 1 indicates the lowest level of maturity (the solution has just started to be investigated) and 10 indicates the highest (the solution is on the market). Note that this scale is based on the Technological Readiness Level (TRL), a tool to determine the degree of maturity of an innovation project (technology or product) which was developed by NASA and adopted in the EU Horizon Europe programme, which funds RURACTIVE.
    - 1 - Basic Research: basic principles are observed and reported
      Lowest level of technology readiness. Scientific research begins to be translated into applied research and development. Examples might include fundamental investigations and paper studies.

- 2 – Applied Research: technology concept and/or application formulated
  Once basic principles are observed, practical applications can be formulated. Examples are limited to analytic studies and experimentation.
- 3 – Critical function, proof of concept established
  Active research and development is initiated. Laboratory studies aim to validate analytical predictions of separate components of the technology. Examples include components that are not yet integrated or representative.
- 4 – Laboratory testing of prototype component or process
  Design, development and lab testing of technological components are performed. Here, basic technological components are integrated to establish that they will work together. This is a relatively "low fidelity" prototype in comparison with the eventual system.
- 5 – Laboratory testing of integrated system
  The basic technological components are integrated together with realistic supporting elements to be tested in a simulated environment. This is a "high fidelity" prototype compared to the eventual system.
- 6 – Prototype system verified
  The prototype, which is well beyond that of level 5, is tested in a relevant environment. The system or process demonstration is carried out in an operational environment.
- 7 – Integrated pilot system demonstrated
  The prototype is near, or at, planned operational system level. The final design is virtually complete. The goal of this stage is to remove engineering and manufacturing risk.
- 8 – System incorporated in commercial design
  Technology has been proven to work in its final form under the expected conditions. In most of the cases, this level represents the end of true system development.
- 9 – System ready for full scale deployment
  Here, the technology in its final form is ready for commercial deployment.
- 10 - Market introduction
  The product, process or service is launched commercially, marketed to and adopted by a group of customers (including public authorities).

4.1.5 Technical innovation

We define technical innovation as the implementation of newly developed or improved products, processes or techniques.

The questionnaire asks the following questions about technical innovation:

- Is the solution developing new technical processes or products?
- Is the solution implementing technical innovations into existing processes or products?
- Is the solution increasing technical skills, employment and management?

4.2 Social, organisational, and governance innovation

We define social, organisational and governance innovations as new or differently configured ideas, products, services, processes and models that simultaneously meet social needs, including the ones of vulnerable groups, and wellbeing through actors' mobilisation and participation.

Social innovation reflects the role of social relationships in realising of societal outcomes. Adaptive social innovation can help stabilising a disadvantaged group in relation to the mainstream society or reduce regional disparities. Transformative social innovation escalates across and can eventually alter or replace existing institutions.

(Main sources: Bureau of European Policy Advisers – BEPA (2010), Empowering People, Driving Change, Social Innovation in the European Union)

The questionnaire asks the following questions about social, organisational and governance innovation:

- Is the solution responding to neglected or new social needs?
- Is the solution implementing collective actions or generating closer or new social relations?
- Is the solution generated by new forms of participatory or collective decision-making?
- Is the solution generating new forms of participatory or collective decision-making or restoring/updating traditional but unconventional forms of decision-making?
- Is the solution implementing or contributing to existing/conventional forms of governance or policies?
- Does the solution include the development of new partnerships or the extension of existing ones?
- Does the solution implement or enlarge an existing organisational model by including new additional expertise or skills?
- Is the solution contributing to the establishment of a social enterprise or cooperative?

4.3 Financial and business models innovation

We define financial and business model innovation as the implementation of products, services and business processes that affects economic, financial, societal and even cultural dimensions of the market and organisational ecosystem (the network of organisations involved in delivering the innovation).

(Main sources: Financial Innovation and Monetary Policy, European Central Bank, 2023; RescueME)

The questionnaire asks the following questions about financial and business models innovation:

- Is the solution developing new financial and business models?
- Is the solution implementing existing financial and business models?
- Is the solution applying any kind of circular economy approach? (The circular economy is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible to extend the life cycle of products while reducing waste to a minimum. It also aims to provide high-quality, functional and safe products, that are efficient and affordable, and last longer.)
- Is the solution empowering actors towards potentially developing new financial and business models (social enterprises, entrepreneurships, etc.) including training?

Section 5. Societal goals

5.1 Challenges and goals

The questionnaire asks you to consider the following list of social and environmental challenges and goals, and select those to which your solution contributes:

- Climate change adaptation (adjusting, preparing and responding to actual or expected climate change impacts)
- Climate change mitigation (making the impacts of climate change less severe by reducing the emissions, enhancing their sinks, and removing greenhouse gases from the atmosphere)
- Protecting biodiversity (the variety of ecosystems, species and genes in the world or in a particular habitat)
- Social justice and inclusion (ensuring that all citizens have equal opportunities and resources necessary to participate fully in economic, social and cultural life)

5.2 Climate change adaptation

Climate change adaptation is the process of adjusting, preparing and responding to actual or expected climate change effects and taking appropriate action to prevent or minimise the damage they can cause, or taking advantage of opportunities that may arise. It is not a one-time emergency response, but a series of proactive measures to deal with the nexus of hazard (e.g. drought, sea level rise), exposure (e.g. less water in the South), and vulnerability (e.g. poverty or lack of education). Adaptation measures include, for instance, infrastructure changes, as well governance, behavioural and economic shifts.

(Main source/sources: European Environment Agency; Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change; European Climate Law)

The questionnaire asks the following questions about climate change adaptation:

- Does the solution consider future scenarios/impacts of global warming and changing weather patterns?
- Does the solution consider possible/ current/ future (negative or positive) impacts of climate change?
- Is the solution focused on climate-related disaster risk reduction?

5.3 Climate change mitigation

Climate change mitigation refers to actions or activities that make the impacts of climate change less severe by reducing the emissions, enhancing their sinks, and removing greenhouse gasses (GHGs) from the atmosphere. Mitigation includes reducing the GHGs emitted from energy production and use, land use, and methods to mitigate warming, for example, by carbon sinks which remove emissions from the atmosphere through land-use or other (including artificial) mechanisms.

(see: European Environment Agency; Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change)

The questionnaire asks the following questions about climate change mitigation:

- Is the solution explicitly linked to goals for achieving climate neutrality by 2050 (e.g. as part of a government programme) or at least considers current climate targets at international/EU/national/local level?

- Is the solution mitigating, preventing or reducing the emission of greenhouse gases?
- Does the solution aim to remove greenhouse gasses from the atmosphere (e.g. carbon capture)?
- Is the solution improving the measurement, monitoring or reporting of greenhouse gas emissions or related factors?
- Does the solution involve participating in EU trading e-carbon market?
- Does the solution raise awareness, improve education or implement skills relating to climate change mitigation?
- Does the solution address (over) consumption, and carbon intensive lifestyles?

5.4 Biodiversity

Biodiversity refers to the variety of ecosystems, species and genes in the world or in a particular habitat. It has intrinsic value, and it is instrumental l to human wellbeing, as it delivers ecosystem services, or the services that nature supplies that sustain economies and societies.

We define ecosystem services as the benefits provided to humans by nature, whether directly or indirectly. They are sometimes considered in terms of four types: provisioning, e.g. food and water; regulating, e.g. pollination, climate regulation, water purification, flood control; supporting, e.g. soil formation, oxygen production, nutrient cycling; and cultural, e.g. recreation, relaxation, spiritual wellbeing.

(Main source/sources European Commission, Directorate-General for Environment, EU biodiversity strategy for 2030; Nature Restoration Law)

The questionnaire asks the following questions about biodiversity:

- Does the solution increase biodiversity in the local area?
- Does the solution help to prevents or minimises negative impacts on local biodiversity?
- Does the solution contribute to conservation or protection of local biodiversity?
- Does the solution contribute to restoration of biodiversity, reduction of pressure on ecosystems or ensuring their sustainable management?
- Does the solution contribute to implementing policies, creating new networks or societal approaches to biodiversity?
- Does the solution raise awareness, improve education or implement skills relating to biodiversity?
- Does the solution measure the impact on biodiversity over time?

5.5 Social justice and inclusion

Social inclusion and justice seek to ensure that all citizens have the equal opportunities and resources necessary to participate fully in economic, social and cultural life and to enjoy an equitable environment and a standard of living and well-being. It encompasses, but is not restricted to, social integration, better access to the labour market, equal access to facilities, services and benefits, as well as involvement in policies and investments, developing and implementation of solutions for human wellbeing. List of groups at the risk of exclusion is mentioned in section 2.6.

(Main source/sources : European network for rural development; European Foundation for the Improvement of Living and Working Condition)

The questionnaire asks the following questions about social justice and inclusion:

- Does the solution take into account data that represent and include groups at risk of exclusion?

- The solution is/was designed and/or implemented through a participatory process (e.g. co-creation)
- Does the solution invest in/support services that maintain or enhance a work-life balance?
- Does the solution enhance the accessibility, use and quality of information and communication technologies (ICT)?
- The solution includes/targets/supports one or more groups at risk of exclusion
- Does the solution encourage education, training and employment opportunities for all, including vulnerable groups at risk of exclusion, in rural areas?

5.6 Which stakeholders were involved in the participatory process? Tick all that apply and please explain.

- Policy stakeholders
- Researchers
- Stakeholders in the industry/services/investors domain
- Stakeholders in the public/user domain
- Stakeholders from the third/voluntary sector (e.g. NGOs, charities, non-profit organisations)
- Others

Section 6. Competencies

6.1 Please select the areas of competency that are required to implement the solution This will further expand sections related to each one.
The broad areas of competency are:

- Digital and technological
- Technical
- Social
- Organisational
- Governance
- Financial and Business

For each selected competency, you are asked to select the proficiency level of the competency required to implement the solution using the following indicators:

- **Foundational competencies (Basic).** At the basic level of competencies, an individual involved in a solution implementation is expected to have fundamental knowledge and should be capable to implement tasks, yet with occasional guidance or external assistance. On a competency scale ranging from 1 to 6 (where 1 represents the lowest and 6 - the highest level of competencies), the foundational or basic level corresponds to 1 and 2 on the scale.
- **Intermediate competencies (Moderate**). At the intermediate level of competencies, an individual engaged in a solution implementation is expected to have moderate level of proficiency within the subject area. They are capable of handling more complex tasks without assistance, though may occasionally seek support or guidance from experts when encountering unfamiliar or difficult situations. On a competency scale ranging from 1 to 6 (where 1 represents the lowest and 6 - the highest level of competencies), the intermediate (moderate) level corresponds to 3 and 4 on the scale. This means that there is enough expertise and a higher degree of competency and understanding compared to the foundational level, but there is still room for further growth to improve expertise.
- **Advanced competencies (Expert)**. At the advanced level of competencies, individuals involved in a solution implementation is expected to have a high degree of understanding and competencies in the subject area. They are capable of handling complex tasks and implementing them independently and can navigate through unfamiliar or challenging situations without needing external assistance. On the competency scale from 1 to 6 (where 1 represents the lowest and 6 - the highest level of competencies), the advanced level corresponds to 5 and 6. This means a high/expert level of skill and expertise.

6.2 Digital and technological competencies

Digital and technological competencies encompass knowledge, skills, abilities, attitude, and behaviour required to effectively utilise digital tools, including artificial intelligence (AI), as well as emerging technologies to develop or improve digital or non-digital products, services, practices or processes.

The questionnaire asks whether the following digital and technological competencies were required to implement the solution:

Table 1. Digital and technological competencies

Competency	Definition	Examples
Information and data literacy	Competencies needed for effectively searching and utilising digital information. These competencies involve filtering information (e.g. official information/ policies, evidence from grey sources), locating and retrieving digital data, assessing source relevance (credibility, recognise fake news and disinformation), as well as managing, organising, and storing digital data, information, and content. This involves also utilising AI technologies for data analysis and information retrieval.	▪ Browsing, searching, and filtering data, information, and digital content ▪ Evaluating and structuring data, information and digital content ▪ Managing data, information and digital content
Digital communication and collaboration	Competencies encompass interacting, communicating, and collaborating using digital technologies. This involves engaging in different community activities or businesses through digital platforms. Additionally, managing one's digital presence, identity, and reputation is a crucial aspect of these competencies.	▪ Interacting through digital technologies ▪ Sharing data and information through digital technologies ▪ Engaging citizenship through digital technologies ▪ Collaborating through digital technologies ▪ Awareness of netiquette (behavioural norms and know-how, as well as cultural and general diversity in digital environments) ▪ Managing digital identity (including in social media)
Digital content creation	Competencies involve creating and editing digital content (including webpages), enhancing and incorporating information into existing knowledge bases, and ensuring compliance with copyright, licensing, and AI regulations	▪ Developing digital content in various file formats for websites ▪ Integrating and re-elaborating digital content ▪ Understanding and applying copyright and licenses ▪ Programming skills and knowledge of web development languages (e.g., HTML, CSS, JavaScript)
Digital safety and cybersecurity	Competencies entail protecting devices, content, personal data, and privacy in digital environments, protecting physical and psychological health while using digital tools, and understanding impacts of digital technologies and	▪ Protecting devices ▪ Protecting personal data and privacy ▪ Protecting health and well-being ▪ Protecting the environment ▪ Considering ethical aspects

	their use, as well as understanding (the importance of) common cybersecurity threats (and maintaining security hygiene).	
Digital technologies for problem solving	Competencies essential for utilising technologies and tools/ apps/ software to address challenges and find possible solutions, e.g. using decision-support systems, cloud computing and internet of things.	▪ Knowing the main functions of the most common digital devices (e.g. computer, tablet, smartphone) to identify and troubleshoot problems related to these devices and their services ▪ Adjusting and customising digital environments to personal needs (e.g. accessibility) ▪ Knowing how to use digital technologies to help turn one's idea into action (e.g. master video making to open a channel to share recipes and nutrition tips for a specific dietary style) ▪ Using data analytics tools to analyse data, identify trends, and make data-driven decisions to improve the efficiency and effectiveness of transportation systems ▪ Cloud computing and internet of things
Digital technologies for rapid prototyping	Competencies in utilising digital software, coding environments and digital fabrication technologies for rapidly prototyping ideas and products to promote innovation and accelerate the digital transition in rural areas.	▪ Recognise basic programming concepts and develop digital coding for the creation of applications and machines ▪ Understanding the principles of rapid prototyping techniques such as 3D printing, CNC machining, and laser cutting. This includes knowledge of digital design, materials, processes, and the limitations and strengths of each technique ▪ Knowing electronic circuits design and digital tools for prototyping products ▪ Being able to find and interact with open-source repositories to share, reuse, and accelerate prototyping processes

6.3 Technical competencies

Technical competencies encompass knowledge, skills and abilities required to perform specific tasks, operations, or functions within a particular sector and /or industry. These competencies are mainly associated with hard skills and practical know-how to develop or improve products, services, practices or processes in a particular sector and /or industry.

Note: while digital and technological competencies focus on skills related to digital tools and technologies to develop or improve digital or non-digital products, services, practices or processes, technical competencies include a broader range of ***specialised hard skills and knowledge specific to a particular field or industry*** *(e.g. know how to install solar panels; how to engineer and equip a tourists' path; skills on implementing precision agriculture; skills in designing and engineering transportation infrastructure, etc).*

In the questionnaire, technical competencies to promote innovations in rural areas are presented according to the main rural development drivers (RDDs) and cross-cutting priorities:

Table 2. Technical competencies

Competency	Definition	Examples
Sustainable multimodal mobility	Technical competencies in sustainable multimodal mobility are the practical know-how required to develop or enhance products, services, practices, or processes for designing, implementing, and managing transportation systems, ensuring sustainable, smart, and resilient mobility solutions that address the diverse mobility needs of rural communities.	▪ Analysing transportation needs and developing plans for sustainable mobility solutions considering population density and age, geographical features, transportation infrastructure and integrated electronic ticketing systems ▪ Designing and implementing demand-responsive transportation systems that optimise route planning and scheduling to efficiently serve rural areas ▪ Establishing and managing shared rural mobility services and voluntary citizen initiatives, such ridesharing and asset-sharing programs to reduce vehicle emissions and promote cost-effective transportation ▪ Implementing strategies to promote active travel modes like walking and cycling with engineering suitable infrastructure improvements, educational campaigns, and community engagement initiatives ▪ Applying Intelligent Transport Systems (ITS), apps, data management, business models, service integration, MaaS, marketing, etc.
Energy transition and climate neutrality	Technical competencies in energy transition and climate neutrality, involve practical know-how required to develop or enhance products, services, practices, or processes within energy production, distribution, and supply chain	▪ Planning and developing community-led renewable energy initiatives ▪ Selecting technologies for rural energy production tailored to the specific characteristics of the territory, including bioenergy production

	management ensuring the transition towards climate neutrality, energy efficiency, and energy resilience. This includes assessing energy consumption patterns, promoting prosumership, and establishing rural energy communities using appropriate technologies tailored to local characteristics/ resources of the territory.	▪ Conducting techno-economic analyses to evaluate the feasibility and cost-effectiveness of various energy transition solutions ▪ Integrating renewable energy sources into existing energy grids, including understanding grid stability, storage technologies, and grid management ▪ Applying low-carbon and renewable energy sources to improve energy efficiency (including in buildings) ▪ Utilising the voluntary carbon market to promote energy resilience, leveraging carbon credits to incentivise investments in renewable energy projects and energy-efficient technologies
Sustainable agri-food systems and ecosystem management	Technical competencies in sustainable agri-food systems and ecosystem management – encompass practical know-how required to develop or enhance products, services, practices, or processes in agriculture and ecosystem management. They are essential for implementing innovations in the agri-food sector while ensuring the sustainable management of natural ecosystems in response to climate change, biodiversity loss, and concerns for social justice and inclusion.	▪ Planning and implementing agri-food management (precisions agriculture, agroecology, pest management, and irrigation management, agricultural productivity while preserving ecosystem health and biodiversity) ▪ Using precision agriculture technologies such as GPS-guided tractors, sensor-based monitoring systems to optimise crop yields and resource efficiency ▪ Planning and implementing sustainable ecosystem management (skills in forest, river, and watershed management in the context of biodiversity loss, ecosystem services management, biodiversity/ forest restoration, efficiency in resource use (bioeconomy, circular economy, etc) ▪ Optimising land-use planning ▪ Planning and implementing zero-waste food supply (farm-to-fork logistics) ▪ Implementing farm sustainability (e.g. CO2 measurement) ▪ Planning and implementing quality check of raw and processed food ▪ Running bio and organic farming, as well as carbon farming

Nature-based and cultural tourism	Technical competencies in nature-based and cultural tourism encompass practical know-how required to develop or enhance products, services, practices, or processes in rural tourism. These competencies related to know-how in branding and destination management, creation of user-friendly platforms for hospitality and marketing, methods and technology in monitoring and managing the carrying capacity of rural tourism destinations (through IT solutions such as big data analysis), application of spatial data for nature and cultural discovery and catering/gastronomy services (e.g. using drones for delivery), creation of cultural and nature-based routes and paths with elements on awareness building e.g. on climate and biodiversity.	▪ Branding and destination management ▪ Creating user-friendly platforms for hospitality and marketing ▪ Utilising spatial data for nature and cultural discovery ▪ Providing hospitality and catering/gastronomy services ▪ Creating cultural and nature-based routes and paths with awareness building on climate change and biodiversity loss ▪ Monitoring and managing the carrying capacity of rural tourism destinations ▪ Managing, preventing and mitigating overtourism
Culture and cultural innovation	Technical competencies in culture and cultural innovation encompass practical know-how required to develop or enhance products, services, practices, or processes to promote local culture and cultural innovations in rural areas / effectively manage, preserve, and promote both tangible and intangible cultural heritage in rural areas.	▪ Competencies for utilising 3D Modeling and Virtual Reality ▪ Accessibility management for diverse groups, such as people with disabilities (e.g. WCAG Web Content Accessibility Guidelines for designing websites accessible to users with disabilities, including screen readers and keyboard navigation) ▪ Competencies, tools and techniques for enabling cultural accessibility and heritage management ▪ Competencies in platforms management /dissemination both tangible and intangible cultural heritage ▪ Creating and coordinating short-term and long-term cultural events considering local expectations and preferences
Local services, health and well being	Technical competencies in local services, health and well-being encompass practical know-how required to develop or enhance	▪ Designing and managing tools for emergency preparedness and response (forest fires, floods, extreme weather events, etc)

	products, services, practices, or processes care and wellbeing.	▪ Health monitoring of rural people at risk of exclusion ▪ Promoting healthy diet and lifestyles for people at risk of social exclusion ▪ Preparing guidelines for sustainable housing and circular economy, responses to climate change vulnerability of rural and remote areas ▪ E-Governance Platforms for government services and information access, emergencies and hospital /care access

6.4 Social competencies

Social competencies encompass knowledge, skills, abilities, attitudes, and behaviours required to effectively engage, communicate, and collaborate with rural actors and communities. They enable rural actors to mobilise and involve diverse stakeholders, including policymakers and vulnerable groups, in developing innovative solutions that meet social needs and address challenges such as climate change adaptation and mitigation, biodiversity loss, as well as social justice and inclusion.

The questionnaire asks whether the following social competencies were required to implement the solution:

Table 3. Social competencies

Competency	Definition	Examples
Communication and dissemination	Competencies essential for effectively interacting and communicating, exchanging information through various channels (verbal, storytelling, presentations, project pitching to different audience, language skills for preparation of written materials for e.g. digital platforms, face-to-face interactions, discussion /focus group moderation, facilitation, etc.). Notes: Effective communication and dissemination skills are essential for engaging rural actors and communities in collaborative efforts, mobilising support for social and environmental initiatives, and promoting inclusive decision-making processes. This includes the ability to tailor communication strategies to the	▪ Verbal communication skills e.g. storytelling techniques and ideas pitching, clear and articulate expression of ideas and information ▪ Presentations tools and approaches for delivering engaging / elaborating key informative messages to diverse audiences, structure presentations for clarity and impact ▪ Language skills - writing clear and compelling content (in native language and in English) for project acquisition, dissemination at different platforms, social media, preparation reports, etc ▪ Using active listening techniques to understand the challenges and co-create solutions ▪ Adapting communication style to accommodate diverse cultural backgrounds via mentoring and coaching

	needs and preferences of diverse audiences, leverage appropriate channels and technologies for reaching target groups, and convey complex concepts in accessible and culturally sensitive ways. Dissemination involves sharing knowledge and best practices, building networks and partnerships, and empowering stakeholders to take actions towards addressing societal challenges and promoting well-being in rural areas.	
Community-building, collaboration and engagement	Competencies required to build trust, mobilise support, built network, engage rural actors in collaborative efforts for social and environmental initiatives and promote inclusive decision-making processes.	▪ Engaging, moderating, facilitating group activities and dialogues ▪ Teamwork and leadership skills (ability to build and nurture interdisciplinary teams, leverage individual strengths, and facilitate productive teamwork) ▪ Competencies on facilitation and co-creation of projects ▪ Facilitating participatory decision-making processes and fostering a sense of ownership and empowerment within the community ▪ Cultural competence and diversity management (sensitivity to cultural norms, values, and traditions) ▪ Skills in promoting inclusivity, fostering cross-cultural dialogue, and addressing barriers to participation ▪ Conflict resolution and mediation - skills in identifying and addressing conflicts within the community, including interpersonal conflicts and disagreements (constructive dialogue, mediate disputes, and find mutually acceptable solutions to conflicts) ▪ Networking and partnership building ▪ Know how to leverage networks and resources to support innovation, access funding opportunities, and scale up successful initiatives. ▪ Skills in building and maintaining strategic partnerships with diverse stakeholders, including government agencies, non-

		profit organisations, businesses, and academic institutions
Adaptability and resilience	Competencies needed to adapt to changing circumstances (e.g. in Covid or war/conflicts times) and overcome challenges by bringing new approaches. It involves being flexible, innovative, thinking out of the box, and proactive in responding to unexpected events or disruptions. These competencies include know how to transform established practices in new way, abilities to take a window of new opportunities, bringing traditional habits to create space for new habits	▪ Know how to transform established practices in new way ▪ Know how to adapt to changing situations by bringing new ideas ▪ Thinking out of the box
Environmental and social justice advocacy	Competencies to comprehend and address environmental and social issues in rural contexts. In RURACTIVE, this includes understanding and acknowledging the cross-cutting priorities climate change mitigation and adaptation, biodiversity, as well as social justice and inclusion, while also possessing the competencies to effectively tackle these (challenges).	▪ Advocating for environmental policies and regulations that promote sustainability and social equity ▪ Organising community-led initiatives to address environmental degradation/ biodiversity loss and social injustices ▪ Collaborating with local stakeholders to develop sustainable tourism strategies that respect and protect natural and cultural heritage ▪ Educating and raising awareness among rural communities about the importance of environmental conservation and social justice issues ▪ Mobilising public support and engagement for initiatives that promote environmental and social justice in rural areas

6.5 Organisational competencies

These competencies relate to the knowledge, skills, abilities, attitude, and behaviour required to effectively organise, coordinate and manage, projects, products, services, processes or people.

The questionnaire asks whether the following organisational competencies were required to implement the solution:

Table 4. Organisational competencies

Competency	Definition	Examples
Leadership and strategic management	Competencies essential for effectively managing and overseeing a project or community initiative, including establishing a strategic direction, partnerships, scale-up projects and ideas, fostering more innovation etc	▪ Leadership skills ▪ Strategic direction-setting ▪ Willingness to take on risks
Operational management	Competencies essential to efficiently manage daily operations within an organisation, project or initiative. This includes coordinating activities, allocating and optimising processes to achieve operational objectives and deliverables. Operational management focuses on the practical implementation of plans and strategies, monitoring performance metrics, and making necessary adjustments to be resilience and adaptable to changes.	▪ Project management ▪ Customer Relationship Management (CRM) ▪ Marketing strategies and digital marketing ▪ Sales techniques and strategies ▪ Human resources management ▪ Product and service development
Sustainable viability	Competencies required to plan and implement projects, products, services and processes in a way that ensures long-term viability and benefits for the community, environmental sustainability, achievement of UN Sustainable Development Goals (SDGs), financial sustainability, ESG (Environmental, Social, Governance) reporting, and adherence to the "green agenda," etc.	▪ Know how to ensure financial sustainability ▪ Know how to ensure environmental sustainability (integrate UN SDGs, “green agenda”, ESG, etc. ▪ Know how to ensure long-term viability and engagement

6.6 Governance competencies

Governance competencies encompass knowledge, skills, abilities, attitude, and behaviour required to ensure effective governance, policymaking and implementation of initiatives.

The questionnaire asks whether the following governance competencies were required to implement the solution:

Table 5. Governance competencies

Competency	Definition	Examples
Institutional frameworks and new governance practices	Competencies essential for understanding and assessing institutional frameworks and ensuring ethical, legal, and other regulatory compliance. They also involve skills to evaluate and assess policies (local, regional, national) aimed at addressing rural challenges, promoting "green agendas". This also includes knowledge of new governance practices.	▪ Understanding of organisational structures, policies, and procedures that govern decision-making processes, roles, and responsibilities within an institution or community ▪ Familiarity with ethical principles, legal requirements, and regulatory standards ▪ Ensuring labour law compliance ▪ and ethical guidelines ▪ Adhering to environmental regulations ▪ Ensuring transparency and accountability ▪ Knowledge of new governance practices
Conflict mitigation and mediation	Competencies required for conflicts mitigation through dialogue, negotiation, mediation, and consensus-building.	▪ Mediating land use conflicts ▪ Resolving disputes in a community project ▪ Facilitating dialogue between stakeholders
Participatory decision-making and policy engagement	Competencies required for gathering and analysing information, assessing risks, and making informed decisions, as well as setting strategic priorities for rural development and participating in decision making and policy formulation.	▪ Organising inclusive decision-making forums ▪ Developing a participatory process for establishing rural energy community ▪ Co-creation of carbon farming ▪ Developing a participatory process for forest landscape restoration

6.7 Financial and business competencies

Financial and business competencies encompass knowledge, skills, abilities, attitude, and behaviour required to implement products, services, practices or business processes that affect economic, financial, societal, environmental and even cultural dimensions of the market and organisational ecosystem.

The questionnaire asks whether the following financial and business competencies were required to implement the solution:

Table 6. Financial and business competencies

Competency	Definition	Examples
Entrepreneurial skills and funding acquisition	Competencies needed to successfully secure financial resources for initiatives, projects, or organisations. In the context of rural areas, where funding opportunities may be limited and competition for resources is high, these competencies play a crucial role in supporting innovation, sustainable development, and community well-being.	▪ Grant writing ▪ Financial forecasting to anticipate future performance ▪ Budgeting (budgeting principles and financial management practices to develop project budgets, track expenses, and ensure compliance with funding requirements. This involves accurately estimating costs, allocating resources efficiently, and maintaining financial records) ▪ Risk management and mitigation risks
Financial accounting and controlling	Competencies required for analysing financial data, preparing, and interpreting financial statements, and reporting to ensure sound financial controlling and sustainability.	▪ Bookkeeping ▪ Financial analysis and reporting ▪ Budget preparation and variance analysis
New / innovative business models	Competencies required to rethink traditional business practices and adopting innovative strategies and smart business models to address evolving market needs, capitalise on emerging trends by leveraging creativity, technology, collaboration, and partnerships (e.g. private-public partnership)	▪ Know how to develop innovative business plans ▪ Know how to develop new business models e.g. private-public partnership, social enterprises, local carbon markets, business models that prioritise resource efficiency (e.g. payment for ecosystem services), or reuse or recycling to create a closed-loop system (c.f. to circular economy business models)
Business strategy, planning, positioning and performance	Competencies encompass the knowledge, skills, abilities, attitudes, and behaviours that needed to effectively conduct market research to understand and analyse needs and market dynamics, develop market entry	▪ Business environment analysis ▪ Business risk management ▪ Setting goals with SMART (Specific, Measurable, Achievable, Relevant, Time-bound) objectives ▪ Developing branding and positioning strategies

	strategies, identify target markets, and establish competitive positioning; develop, implement, and manage strategic plans, position businesses for success within rural environments, and assess and improve performance outcomes.	▪ Conducting market profiling ▪ Analysing product performance

Section 7. Other Characteristics

7.1 Rural development approach

When talking about types of rural development, academics and practitioners usually use labels such as (neo)endogenous vs (neo)exogenous development that aim to capture differences regarding how development is approached and initiatives are developed. The questionnaire includes here a list of the main development characteristics used in such definitions. Within each pair, please select the one that better applies to your solution. There is also a text box if you would like to further expand on what you have selected. You are asked to state whether the solution you are adding is:

- Driven by national programmes or by local plans/strategies
- Driven by local actors (e.g. individuals, organisations or businesses) or by actors that are not local.
- Driven by a partnership or network of actors, or driven by a unique identifiable actor.
- Focused exclusively on the rural spaces or connecting with urban areas.

7.2 Adaptability and replicability to other contexts

Adaptability and replicability refer to the possibility of applying the same solution implemented in one locality to a different territorial context with the aim of achieving the same objective(s). Replication is based on the common understanding that territories benefit from the exchange of information, experiences, ideas and solutions. Replicability is not intended as an exact copy of the product/solution/etc. in other contexts but should be understood as its adaptation to a different environment.

(see https://ruggedised.eu/fileadmin/repository/Publications/D7.7_-_Lessons_learned_on_replication_for_wide_uptake.pdf)

The questionnaire asks the following questions about adaptability and replicability to other contexts:

- Does it provide information on the methodology and the implementation?
- Are tools, patents and publications open source or accessible?
- Does it provide the contact details of the person/institution implementing the solution?
- Is it inspired by another initiative/project developed previously in the same place or somewhere else?
- Has it inspired other communities/places to adapt it and do something similar?
- Has the solution gained the attention of the regional/national media/press (e.g. been visited/interviewed by national TV) or participated in regional/national/international showcases or exhibitions (e.g. national tourism expo)?

7.3 Enabling conditions

In any solution, there are a number of conditions and factors that offer resources or opportunities for the solution to emerge and develop. These contextual factors cover a broad range of socio-economic conditions, from the availability and accessibility of resources, institutional and regulatory frameworks, social relationships and intangible resources such as culture, values and trust. Some of them can be place specific (e.g. specific to the rural community) or be broader (e.g. regional or national circumstances).

The question includes a list of the factors and conditions that have been identified as relevant when analysing processes of innovation in rural areas (e.g. in SIMRA and in RURITAGE). Of the list, please

select the ones that enabled or facilitated the development of the solution and provide details. If you consider there was another factor that was important in making the initiative possible, please then select “Other” and describe in detail them using the box.

- Availability of funding resources (public or private).
- Existing public incentives to provide this type of solution (e.g. subsidies, grants, tax savings, priority access to policy programmes, policy requirements) or private incentives (e.g. interest rates, savings, increase life span of assets, reduction in energy costs or other costs).
- Market demand for the solution (from the general public/individual users or from businesses or public sector).
- Structural economic changes (e.g. wider economic reforms like the roll-out of austerity programmes or in an opposite sense, the extension of the welfare state services).
- Good level of civic engagement or civic culture (e.g. high level of participation in local associations or community initiatives or volunteering).
- General awareness about the challenges addressed by the solution (that the challenges addressed by the solution are widely known in the society/community, for example, that they are talked about frequently in the news or local news).
- Social memory of past situations or previous experiences on which the solution is built (e.g. that the community faced in the past a similar challenge or developed a solution with similar characteristics).
- Existence of a culture of voluntary working (e.g. the members of the community are used of volunteering their time and/or resources to develop community tasks).
- Good leadership (e.g. existence of a clear leader or leading team that provides the financial, political, social and technical coordination and support for the development of the solution).
- Good level of trust in the organisation leading the solution (the community widely accepts the leadership role of the key organisation/team/individual, believes in their capacities and resources to develop the solution, and generally value positively the decisions that it makes).
- Community is open to taking risks and developing new projects (the local community has a risk-taking culture and/or a tradition of entrepreneurship).
- Availability of knowledge transfer and networking opportunities (e.g. proximity to or existence of close relations with higher education institutions or research centres).
- Existence of built and landscape resources that are considered as assets (e.g. historical, artistic or natural heritage, protected areas).
- Political stability (e.g. existing of an uncontested democratic regime with regular democratic elections, absence of war).
- Local political support (the relevant local authorities (e.g. local Council) publicly support the solution by providing leadership, resources (financial capital/human capital/built capital), or promotes and further advances the development of the solution).
- Public support (the community widely stands by and vouches for the solution).
- Existence or achievement of an institutional framework or recognition (e.g. official declarations like heritage sites, national parks, protected designation of origin).
- Good governance model (the governance and management setup of the solution is efficient and facilitates collaboration and participation).

- Good fit with local development strategies (the solution fits well within long-term plans or visions at community/local/regional level that are already existing or that are developed along the solution).
- Other

7.4 Barriers

In any solution, there are a number of conditions and factors that can be an obstacle to the start or development of the solution or even prevent it altogether. These contextual factors cover a broad range of socio-economic conditions, from the lack of adequate resources to the inadequacy of institutional and regulatory frameworks, and weak social networks or leadership. Some of them can be place specific (e.g. specific to the rural community) or be broader (e.g. regional or national circumstances).
The question includes a list of the factors and conditions that have been identified as relevant when analysing processes of innovation in rural areas (e.g. in SIMRA and in RURITAGE). Of the list, please select the ones that hindered or prevented the development of the solution and provide details. If you think there were other factors that were a barrier to the development of the initiative, then please select "Other" and describe them using the box.

- Lack of funding to start the solution (lack of financial capital to kick-off the solution and support the implementation at the beginning)
- Lack of funding to maintain or upgrade the solution (lack of enough financial capital to keep the solution going or for developing it further after the initial stage has run its course).
- Rigid financing schemes (e.g. grants that cover only specific types of costs that are not adequate for rural organisations or that have excessive checks or reporting requirements).
- General feelings of negativity, pessimism or lack of self-confidence in the community (there is a general feeling that it is not worthy to try to do anything).
- Previous unsuccessful experiences with similar topics or solutions.
- Lack of social capital or social infrastructure (e.g. lack of volunteers, lack of community platforms).
- Close-mindedness, conservatism or marginalisation of alternative thinking (the community is adverse to taking risks or doing new things).
- Lack of local engagement (the members of the community are in generally passive and do not participate in local initiatives).
- Lack of competencies in the community (e.g. e.g. lack of knowledge or skills regarding digital, technical, social, governance or financial aspects) that are required for the development of the solution among the members of the community). When answering to this question, please consider all the competencies you have considered as necessary in section 6.
- Community illiteracy on the topic (the community is not aware of the societal challenge that the solution addresses and/or the type of innovations that are the basis for its implementation).
- Institutional fragility (there are existing contradictions or even conflicts among multiple dimensions of an institution or institutions that should be aligned or cooperating for the solution to progress).

- Insufficient or inadequate governance structure (the governance or management set-up of the solution does not appropriately involve the stakeholders that are key for the successful development of the solution).
- Lack of (or limited) appropriate regulatory framework (the rules and guidelines that should shape the development of the solution are limited, outdated, or do not take into consideration circumstances that are relevant for the development of the solution).
- Too many bureaucratic rules and administrative burdens (e.g. red tape, excessive administrative requirements for the size of the solution).
- Infrastructural obstacles (e.g. lack of connection to electricity or water supply)
- Other

7.5 Key resources and capitals needed

Capitals needed are the assets or resources that must be in place (or that must be accessible) for the implementation of solutions. When defining the necessary capitals, we include cultural (including intangible heritage), natural, built (including built cultural heritage), social (including political), human and financial.

The questionnaire asks: what are the capitals needed to develop and implement the solution? Possible responses are as follows:

- **Cultural:** Cultural capital reflects the way people "know the world" and how they act within it, as well as their traditions and language. Cultural capital influences how creativity, innovation, and influence emerge and are nurtured, e.g.
    - local traditions
    - local languages
    - musical and art skills
    - artisanal and craft skills
    - other
- **Natural:** Natural capital refers to those assets that abide in a location, including weather, geographic isolation, natural resources, amenities, and natural beauty, e.g.
    - Public green areas
    - Private green areas
    - Agricultural land
    - Woods and forest
    - Wetlands
    - Water and shores
    - Flora and fauna
    - Costal and beach
    - Other
- **Built:** Built capital refers to housing, transportation infrastructure, telecommunications infrastructure and hardware, utilities, heritage buildings and infrastructure, e.g.
    - Transport infrastructures
    - Digital infrastructures
    - Software and hardware

    - Public buildings
    - Private buildings
    - Heritage and historical buildings
    - Religious buildings
    - Other
- **Social:** Social capital reflects the connections among people and organisations or the social "glue" to make things, positive or negative, happen. Bonding social capital refers to those close ties that build cohesion within a community. Bridging social capital refers to associations between organisations and communities. Governance and political capital are included here as the ability of people to find their own voice and to engage in actions that contribute to the well-being and development of their community, e.g.
    - Formal and informal associations and networks
    - Cooperatives
    - Volunteers' networks
    - Social enterprises
    - Other
- **Human:** Human capital is understood to include the skills and abilities of people to develop and enhance their resources and to access outside resources and bodies of knowledge to increase their understanding, identify promising practices, and to access data for community-building.
- **Financial:** Financial capital refers to the financial resources available to invest in community capacity-building, to underwrite the development of businesses, to support civic and social entrepreneurship, and to accumulate wealth for future community development, e.g.
    - Private investments
    - EU Public Funding
    - National Public Funding
    - Regional/Local Funding
    - Crowdfunding
    - Other

(Main source/sources: built on RURITAGE Practices Repository (D1.1))

7.6 Funding

The questionnaire asks how the solution was funded along with details of the funding programme and approximate funding value. Possible funding sources are as follows:

- EU funding (e.g. LEADER, EAFRD fund, LIFE programme, Social Fund, Interreg)
- National funding
- Regional/local funding
- Crowdfunding
- Private investment
- Donations
- Other

7.7 Policies and Programmes

EU policies and programmes are of potential relevance to the rural-community lead solutions. The questionnaire asks if the solutions have been directly benefitted or hindered by a particular policy. If the response is affirmative, please provide details of the impact and identify the group of policies that impacted the solution and the authority/regulator who with the solution interacted more, if known.

7.7.1. Has the solution been benefited or hindered by EU policies and programmes?

- No
- Yes, the EU policies benefited the solution
- Yes, the EU policies hindered the solution
- Don't know

7.7.2. There are several groupings of EU policies below. For each of the groups, could you please consider if any of the policies have had an impact on the solution (e.g. access to funding, creating opportunities or challenges). If so, please detail and select who is the authority/regulator you are/were more commonly directly involved with.

Policy	Authority/Regulator	Please detail
EU Regional and Rural Development Policies (Long term vision for EU's rural areas, European Agricultural Fund for Rural Development (EAFRD), LEADER Programme, EU Structural Funds (ERDF, ESF))	○ Local Authority ○ Regional authority (where applicable) ○ National ministry or agency ○ European Commission / EU Agency ○ There was no relation with the regulatory, implementing or delivery body for this policy.	
EU Common Agricultural Policy (Common Agricultural Policy, Farm to Fork Strategy)	○ Local Authority ○ Regional authority (where applicable) ○ National ministry or agency ○ European Commission / EU Agency ○ There was no relation with the regulatory, implementing or delivery body for this policy.	
EU Environmental Policy (EU Green Deal Strategy, Fit for 55 package (reducing emission by at least 55% by 2030), Renewable Energy Directive, EU	○ Local Authority ○ Regional authority (where applicable) ○ National ministry or agency	

Biodiversity Strategy got 2030, The Nature 2000 network, Water Framework Directive, EU Nature Restoration Law)	○ European Commission / EU Agency ○ There was no relation with the regulatory, implementing or delivery body for this policy.	
EU Maritime policy (Marine Strategy Framework Directive, Blue Growth)	○ Local Authority ○ Regional authority (where applicable) ○ National ministry or agency ○ European Commission / EU Agency ○ There was no relation with the regulatory, implementing or delivery body for this policy.	
EU Transport Policy (Sustainable and Smart Mobile Strategy, Trans-European Transport Network)	○ Local Authority ○ Regional authority (where applicable) ○ National ministry or agency ○ European Commission / EU Agency ○ There was no relation with the regulatory, implementing or delivery body for this policy.	
EU Culture Policy (New European Agenda for Culture, Creative Europe 2021-2-27, Framework for Action on Cultural Heritage, Work Plan for Culture)	○ Local Authority ○ Regional authority (where applicable) ○ National ministry or agency ○ European Commission / EU Agency ○ There was no relation with the regulatory, implementing or delivery body for this policy.	
EU Health Policy (Global Health Strategy Better health for all in a changing world, EU4Health Programme)	○ Local Authority ○ Regional authority (where applicable) ○ National ministry or agency	

	○ European Commission / EU Agency ○ There was no relation with the regulatory, implementing or delivery body for this policy.	
EU Internal Market / EU Industrial policies (European Initiative on Artificial Intelligence/AI Package, European Agenda for Tourism 2030, EU State Aid, EU Procurement Directives)	○ Local Authority ○ Regional authority (where applicable) ○ National ministry or agency ○ European Commission / EU Agency ○ There was no relation with the regulatory, implementing or delivery body for this policy.	

8 Anything else you would like to share

There is a space in the questionnaire if there is anything else you want to add about the solution that was not covered by the previous questions.

Frequently Asked Questions

The Frequently Asked Question is a living document in the SharePoint. Please consult the latest version in this link.
We aim to update it regularly including new questions and solutions. Please do not hesitate to get in contact with us if you have a question that is not covered in the FAQ yet and we will include it.

Alphabetical Index

Annex II: Conceptual Framework Matrix

RDDs		CROSS CUTTING PRIORITIES				INNOVATIONS				CHARACTERISTICS				IMPACTS				MUST HAVE				
RDDs	RDDs sub-categories	Climate change adaptation	Climate change mitigation	Biodiversity	Social jusitce and inclusion _if YES assign stakeholder groups and groups at risk of exclusion	Digital and technological innovation _Assign TRL	Technical innovation	Social, organizational and governance innovation	Financial and business model innovation	Adaptability ansd replicability to oher contexts	Key resources and needed capitals *(including Competencies under Human capital; Digital and technological, Technical, Social, Organizational, Governance, financial and business model)*	Geographies and territorial context	Challenges	Stronger Rural Areas	Connected Rural Areas	Resilient rural areas	Prosperous rural areas	Challenges	Code	Title	Location	Description
		YES/NO + CHECK LIST				YES/NO + CHECK LIST								Connected to Rural Empowerment Indicators (WP5)								
Sustainable Multimodal mobility	Asset sharing																					
	Ride sharing																					
	Flexible transport service																					
	Active travel (walking, cycling)																					
	Multimodal combinations																					
	Travel planning																					
Energy transition and climate neutrality	Energy production, distribution and supply change																					
	Energy prosumership																					
	Greening for Mitigation of carbon emission																					
	Carbon markets																					
	Load balancing																					
	Energy consumption and efficiency																					
Sustainable agrifood systems and ecosystem management	Agroecosystem management																					
	Ecosystem management																					
	Automation and IT for production																					
	Food supply, distribution and food waste reduction																					
	Sustainable diets and nutrition																					
	Quality check of raw and processed food																					
Nature based and cultural tourism	Branding and destination management (DMO + DMC)																					
	Destination development																					
	Destination monitoring																					
	Monitoring and management of the carrying capacity																					
Culture and cultural innovation	Tangible cultural heritage management and conservation																					
	Valuing intangible cultural heritage																					
	Short term and long term cultural events initiative																					
	Use and reuse of space (public, private, open space and buildings)																					
	Audience development activities and service diversification in cultural institutions																					
Local services, health and well-being	Connected devices for care and wellbeing services																					
	E-governance																					
	Digital nomadism and remote working																					
	Employment and employability initiatives																					
	Education																					
	Public health and One-health approach																					
	Bottom up initiatives for care																					
	Waste Management																					