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Making the diversity of CCI-related LEADER interventions comparable: A portfolio-to-case approach combining LLM-assisted coding and close reading

Wang Tongjing [a,*], André Torre [a], Maryline Filippi [b,a]

[a] Université Paris-Saclay, INRAE, AgroParisTech, SADAPT, 22 place de l'Agronomie, Palaiseau, 91123, France
[b] Bordeaux Sciences Agro, Université Paris-Saclay, INRAE, Gradignan, 33170, France

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ABSTRACT

The EU LEADER program supports diverse rural local initiatives, which suits Cultural and Creative Industries (CCIs) related activities with their varied forms and place-specific resources. Yet its flexibility also complicates systematic comparison and learning, as portfolio patterns can obscure differences in local organization and implementation, while individual cases can be difficult to situate within the wider range of interventions. This study therefore develops a portfolio-to-case approach combining large language model (LLM)-assisted coding with comparative close reading that support both perspective evidence. We coded 1528 project descriptions in the EU CAP Network Good Practice database across five dimensions, thematic field, challenge, action, actor, and territorial scale. Of the 403 LEADER-tagged projects, 135 were identified as CCI-related. The coded common project types then guided the structured comparison of 56 cases for close reading. In this database selected for dissemination, cultural activity mostly serves wider development purposes. Organizational capacity is central, and it takes a different form in each type: collectively led tourism projects coordinate providers and operate attractions, privately led tourism projects develop offers under enterprise management, heritage projects connect documentation and training with public activities, and social inclusion projects link cultural participation with continuing support. Projects draw on this capacity and can also strengthen it. Project descriptions, however, often omit the organizational work behind the results, and brief reporting on it would improve the database's value for comparison and learning. The approach provides a structured basis for comparing projects and identifying organizational arrangements and resources relevant to adaptation elsewhere.

1. Introduction

Rural regions differ sharply in economic structure, institutional capacity, and cultural resources, so standardized development models often travel poorly across territories (OECD, 2006, 2018; Torre and Wallet, 2016). Policy and research have therefore placed greater weight on local initiative and the mobilization of local assets (Burns and Kirkpatrick, 2008; Li et al., 2016). Within the European Union, LEADER (Liaison Entre Actions de Développement de l'Économie Rurale) is a main instrument for this approach. Implemented under the second pillar of the Common Agricultural Policy (CAP), LEADER supports bottom-up initiatives through Local Action Groups (LAGs), territorial partnerships among local stakeholders that develop local strategies and select projects in rural areas. Since the 2014-2020 programming period, the broader Community-Led Local Development (CLLD) approach has extended the LEADER model to other EU funds and area types (Kah et al., 2023). LEADER's place-based and participatory design gives local actors a central role in identifying territorial needs and flexibility in mobilizing local knowledge and resources (Bosworth et al., 2016; High and Nemes, 2007; Ray, 2000; Shucksmith, 2010).

Among activities mobilizing local resources, Cultural and Creative Industries (CCIs) stand out (Scott, 2000; Florida, 2005). They include activities centered on cultural values and creative expression, such as heritage preservation, artistic crafts, and performing arts (EP & Council, 2021). Rural CCI activity is particularly diverse, overlapping with tourism, local enterprise, community development (Bell and Jayne, 2010; Duxbury, 2021; Roberts and Townsend, 2016). These activities are associated with job creation (Kemeny et al., 2020), youth

* Corresponding author.
E-mail address: wang.tongjing@hotmail.com (W. Tongjing).

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engagement (Campbell, 2020), social inclusion (Duxbury and Campbell, 2011), regional resilience (Capello and Dellisanti, 2023), and community participation (Roberts and Townsend, 2016). The varied forms and local development purposes of CCI-related activities fit LEADER's broad and flexible scope of support.

Yet, this diversity also complicates assessment and learning. LEADER projects draw on tacit knowledge and locally embedded relationships (Bosworth et al., 2016; High and Nemes, 2007). An ecosystem perspective on CCIs similarly emphasizes the culture value arises from the relationships among cultural practitioners, organizations, and resources (de Bernard et al., 2022). Assessing project contributions therefore requires attention to organizational approaches that broad categories and numerical indicators capture only partially. At the program level, the European Court of Auditors (2022) found that LEADER's additional benefits had not been sufficiently demonstrated, and a more detailed framework emphasizing social capital, governance, and implementation results has since followed (EU CAP Network, 2024).

Research has approached these assessment challenges through both portfolio analysis (e.g. Biczkowski, 2020; Opria et al., 2021; Nieto Masot and Cárdenas Alonso, 2017a) and detailed case studies of local implementation (e.g., Dargan and Shucksmith, 2008; Esparcia, 2014; Bosworth et al., 2016). Portfolio analyses reveal common patterns but can provide limited project-specific context on organization and delivery. Case studies examine these arrangements in context, yet their findings can be difficult to relate to broader portfolio patterns.

The practical challenge is therefore to make the diversity of CCI-related LEADER projects comparable at scale while retaining the contextual detail that interpretation requires (Grimmer and Stewart, 2013), so that systematic comparison and learning is possible. This paper develops a portfolio-to-case approach that combines a large language model (LLM)-assisted coding with comparative close reading to analyze LEADER projects. We first use an LLM to code project, which provides a common basis for portfolio comparison and structured cases selection. We then conduct case reading on these selected cases, examining differences in development purposes, organizational arrangements, implementation, and considerations relevant to adaptation.

The EU CAP Network Good Practice database supports this empirical application by bringing together projects selected for dissemination and learning across territories (Good Practice Database, 2025). We applied this method to 1528 project descriptions from the database, including 403 tagged as LEADER, and identified 135 CCI-related LEADER projects for portfolio analysis. Each project description is coded across five dimensions: thematic field, main challenge, lead actor, main action, and territorial scale. The common project types guided the selection of 56 cases for comparative close reading on bottlenecks, interventions, outcomes, and adaptation lessons.

The article makes three contributions. Methodologically, it demonstrates a portfolio-to-case approach that makes heterogeneous project descriptions comparable at scale and supports structured case selection. Empirically, it identifies different forms of local organizational capacity across common project types and shows that projects draw on this capacity and may also strengthen it during implementation. It also identifies gaps in reporting on implementation difficulties, maintenance, and organizational strategies.

We proceed as follows. Section 2 reviews LEADER and its evaluation, rural cultural and creative initiatives, adoption conditions, and the methodological gap. Section 3 presents the data and coding protocol. Section 4 presents portfolio patterns and identifies the project types used for structured case selection. Section 5 uses the structured sample for comparative close reading. Section 6 discusses the findings, and Section 7 concludes.

2. Literature review

This section reviews four discussions that frame the study: LEADER as a community-led rural development instrument, rural cultural and creative initiatives, adaptation and cross-territorial learning, and the challenge of comparing project narratives at portfolio scale.

2.1. LEADER program for supporting bottom-up rural initiatives

The term ‘LEADER’ came from the French acronym for ‘Liaison Entre Actions de Développement de l’Économie Rurale’, meaning ‘Links between the rural economy and development actions’. The program has developed through three institutional phases. From 1991 to 2006, it operated as a separate Community Initiative supporting the development of rural areas through projects that respond to local needs (Kola-Bezka, 2020; Kull, 2014). In 2007, it was integrated into the Common Agricultural Policy as the LEADER Axis, financed under the Rural Development Programmes (Hoffmann and Hoffmann, 2018; Kull, 2014). From 2014, the EU generalized the LEADER method through Community-Led Local Development, allowing its use primarily through the EAFRD, but also under European Regional Development Fund, European Social Fund, and European Maritime and Fisheries Fund (Kah et al., 2023; Servillo and De Bruijn, 2018). It continues as a compulsory component of the CAP for 2023–2027.

LEADER organizes rural development through local participatory and territorial partnerships. Three features are especially relevant to this study (Johansson and Holmquist, 2024): place-based strategies, an orientation toward innovation and learning, and the central role of Local Action Groups (LAGs) that bring together public, private, and civil society actors for bottom-up decision-making. LAGs are the primary agents of development in their territories. They are responsible for designing the Local Development Strategy (LDS) and hold the decision-making power over project selection and funding.

Research interprets this model through networked innovation, as many studies show that tacit knowledge with external expert knowledge are essential for rural innovations (e.g. Dargan and Shucksmith, 2008; Esparcia, 2014; Torre et al., 2023). This model is also often theorized as neo-endogenous development, which emphasizes the role of local actors to mobilize territorial knowledge and resources while maintaining connections to external institutions (Ray, 2000; Bosworth et al., 2016). These perspectives place organizational capacity at the center of LEADER. Local actors must identify territorial resources, convene partners, interpret funding requirements, and translate local ideas into implementable projects (e.g., Dargan and Shucksmith, 2008; Esparcia, 2014).

National and regional studies identify recurring project themes, including tourism infrastructure, employment, local crafts and culture, and social inclusion, although their relative importance and beneficiary composition vary (Biczkowski, 2020; Opria et al., 2021). In Poland, LAGs have invested in heritage, tourism, and community integration (Biczkowski, 2020; Hoffmann and Hoffmann, 2018). In Romania, public initiatives outnumbered private ones during 2014–2020 (Opria et al., 2021), while private actors accounted for most LEADER investment in Andalusia during 2007–2015 (Cejudo-García et al., 2022). In the Czech Republic, some Local Development Strategies have converged around generic measures that weaken territorial targeting (Konečný et al., 2021). Studies of Extremadura find investment concentrated in more dynamic rural areas and among applicants with stronger financial and organizational resources (Nieto Masot and Cárdenas Alonso, 2017b, 2018). Implemented portfolios therefore reflect local priorities alongside uneven institutional and financial capacity.

2.2. LEADER evaluation

As LEADER moved from an experimental initiative to a mainstream CAP instrument, pressure increased for standardized administration and comparable evidence. The problem became especially visible in 2022, when the European Court of Auditors concluded that the available evidence was insufficient to establish whether LEADER's additional benefits justified its additional costs (European Court of Auditors, 2022).

EU policy and research have since broadened LEADER evaluation. A DG AGRI support study assessed the costs and additional benefits of LEADER during the 2014–2022 programming period (European Commission Directorate-General for Agriculture and Rural Development METISEEIG Agrosynergie & ECORYS, 2023). The Commission's subsequent evaluation examined its contribution to balanced territorial development (European Commission, 2024). Regulation (EU) 2022/1475 established common data requirements for monitoring and evaluation, including information on LAGs and their activities (European Commission, 2022). The 2024 guidelines provide an adaptable, nonbinding framework for assessing improved social capital, governance, and the results and impacts of strategy implementation (EU CAP Network, 2024). Recent studies have also developed complementary approaches, such as social-return analysis (Chatzichristos and Perimenis, 2022), network analysis (Barone et al., 2023), and quasi-experimental comparisons (Aubert et al., 2025). Each approach captures a particular dimension and remains tied to specific contexts or outcomes.

Greater formalization nevertheless increases administrative and procedural requirements (Dargan and Shucksmith, 2008), and raises costs in participation, networking, and animation, activities that help generate its added value (European Commission Directorate-General for Agriculture and Rural Development METISEEIG Agrosynergie & ECORYS, 2023). Administrative mainstreaming can constrain LAG autonomy (Navarro et al., 2016), while generic funding measures can weaken the territorial targeting of Local Development Strategies (Konečný et al., 2021).

LEADER therefore faces an inherent evaluation dilemma. Demonstrating its relational and context-dependent benefits requires translating them into common indicators and reports. This translation adds administrative work and places greater weight on readily codifiable information. Locally defined value remains difficult to capture (Bosworth et al., 2016), while longer-term structural change remains difficult to establish (Johansson and Holmquist, 2024).

At project level, this challenge is especially visible in dissemination. The EU CAP Network provides a Good Practice database that shares projects intended to support inspiration and learning (Good Practice Database, 2025). It also provides dedicated guides and recommendations for knowledge exchange, yet this guidance is voluntary and specific to transnational cooperation (EU CAP Network, 2025, p. 41). These project descriptions provide a basis for comparing project implementation, while their unstructured heterogeneous form limits the lessons available for adaptation. Our study focuses on this issue: it examines the information available in these projects for comparative research and learning across territories.

2.3. Rural CCI development

Rural areas differ from urban areas in many dimensions, which exceed a simple urban-rural divide (Torre and Wallet, 2016). Woods (2011) highlights that rurality is a distinctive social and economic formation with its own material conditions and development dynamics. Policy debate has increasingly emphasized place-based approaches that foreground local assets and bottom-up coordination (OECD, 2006, 2018).

Cultural and creative resources are among the most place-bound of the assets that rural places mobilize. Rooted in local heritage, skills, and everyday practice, they support diversification, identity, and participation in rural communities (Anwar McHenry, 2011; Duxbury and Campbell, 2011; Roberts and Townsend, 2016). Their policy weight, however, runs ahead of their definition.

At the general level, CCIs cover activities whose value rests on cultural expression and creative input. Classifications beyond this shared core diverge, combining cultural domains, creative occupations, and market activities in different ways (DCMS, 1998; EP & Council (European Parliament & Council of the European Union), 2021; Galloway and Dunlop, 2007; Throsby, 2008; OECD, 2022). For rural contexts, the definition is even less settled. Duxbury (2021) identified three dominant research storylines on rural CCI strategies: cultural vitality, which frames arts and heritage as a foundation for community development and local self-determination; the 'creative class' (Florida, 2002), which seeks to attract, train, and retain creative workers and entrepreneurs as 'residents-with-businesses' (Isserman et al., 2009; McGranahan et al., 2011; Richards and Wilson, 2007) through affordable space and quality-of-life amenities (Florida, 2002; McGranahan & Wojan, 2007; Duxbury, 2021); rural creative economies which emphasize connectivity as a central strategic focus, positing that branding, distribution channels, and urban–rural partnerships are structural conditions for the survival and growth of rural creative enterprises rather than optional add-ons (Bell and Jayne, 2010; Roberts and Townsend, 2016). These perspectives are not mutually exclusive. The ecosystem perspective on cultural and creative activity brings them together by holding that cultural value is produced through relationships among practitioners, organizations, and resources in a place, so vitality, enterprise, and the retention of creative workers rest on the same local interdependencies (de Bernard et al., 2022). Many strategies combine elements; for instance, McAuley and Fillis (2005) highlight "remote yet global" strategies that use symbolic identity and niche market positioning to support broader reach for peripheral commodities.

Therefore, rural CCIs operate in research and policy as an umbrella category that attracts diverse support (Bell and Jayne, 2010; Duxbury, 2021; Roberts and Townsend, 2016), which makes them well suited to rural development funding such as LEADER. This article follows the umbrella definition, and Section 3 uses it to identify CCI-related projects.

2.4. Adoption conditions across territories

Place-based initiatives rely on local adaptation, and EU and OECD policy also emphasizes the importance of learning across territories (OECD, 2025). However, in practice, adoption often becomes replication by appearance rather than adaptation to new institutional and territorial settings (Bulkeley, 2006; Stead, 2012).

Several frameworks help explain why adaptation fails. Absorptive capacity frameworks emphasize that uptake depends on prior knowledge and institutional thickness (Cohen and Levinthal, 1990; Zahra and George, 2002). Rural areas often face thin institutional settings, limited staffing, fewer intermediaries, and weak links to research systems (Amin and Thrift, 1995), which reduce the ability to recognize relevance, adapt external ideas, and sustain them beyond a single funding cycle. Proximity concepts add that mutual understanding, trust, and rule compatibility condition cooperation across territories (Boschma, 2005; Torre, 2008; Torre and Rallet, 2005). Resource characteristics add a further constraint. Chembessi et al. (2024) distinguish transferable resources, such as knowledge and inventions, which are free of local ties and can be reproduced elsewhere, from territorially anchored resources, such as culture and heritage, which are inseparable from their territory. Innovations built on anchored resources are therefore tailored to local conditions. In neo-endogenous terms, the channels through which practices circulate are themselves part of a territory's extra-local connections, and what those channels record about coordination and enabling conditions sets the limit of what other territories can learn from them (Ray, 2000; Bosworth et al., 2016).

These perspectives guide our close reading of reported lessons and our interpretation of organizational arrangements and resources relevant to adaptation.

2.5. Methodological gap

Evidence on LEADER and rural cultural and creative initiatives is recorded largely through narrative project descriptions. These narratives preserve intervention sequences, actor roles, and territorial

context, yet they are difficult to compare systematically across large portfolios. Analyzing them faces a general–detail dilemma (Grimmer and Stewart, 2013; Tongjing, 2025; Baker et al., 2008). On one hand, feature-based quantitative methods, including keyword dictionaries and machine-learning classifiers, can expand coverage, but they often strip away the relationships and intervention context that define rural development practices. On the other hand, close reading preserves contextual richness yet limits coverage and risks selective case choice (Baker and Levon, 2015).

Both strands are well developed in LEADER evaluation research. Quantitative studies classify implemented projects using descriptive statistics, funding-based categories, and GIS-based spatial analysis of official records and monitoring data (Biczkowski, 2020; Opria et al., 2021; Nieto Masot and Cárdenas Alonso, 2018; Hoffmann and Hoffmann, 2018). They map the structure of national portfolios. Qualitative studies code project scope and LAG strategy content in much more detail. They show how strategies set local priorities, how project content relates to stated goals, and where implementation drifts away from the area-based idea (Lošťák and Hudečková, 2010; Průša et al., 2022; Konečný et al., 2021).

However, few studies combine the two on the same projects. Applying a common coding scheme manually across a large collection of heterogeneous narratives requires substantial time. Therefore, portfolio statistics show the common themes of LEADER projects but not how these projects work: what challenge they start from, what they do about it, who leads, and how actors coordinate. Case studies show single projects in depth but not whether these cases recur across countries or remain local exceptions.

Recent natural language processing (NLP) applications to rural policy evaluation have moved in this direction, for instance by extracting public sentiment from social media to expand the evidence base (Domínguez et al., 2024). Large Language Models (LLMs) offer a more flexible alternative for coding heterogeneous narratives directly. Gilardi et al. (2023) find that LLM annotation can achieve high accuracy without extensive labeled data, and can even outperform crowd-workers on several text-annotation tasks.

These strengths do not remove validity risks. LLM outputs can vary with prompt wording, sampling parameters, and model updates. Beyond reliability issues, a more fundamental limit concerns the kinds of categories that automated coding can identify. LLMs perform well when labels can be specified through clear instructions tied to observable textual features. More complex analytical categories, such as bottleneck, adaptation condition, are rarely stated explicitly in project narratives. They must instead be inferred from implementation sequences and contextual cues.

In sum, rural heterogeneity motivates place-based approaches, and LEADER institutionalizes bottom-up support, yet evaluation often remains fragmented, and learning across territories is challenging. Rural CCI-related initiatives make this gap especially visible. Our design addresses this gap by combining LLM-assisted coding of reported project characteristics with comparative close reading of common project types.

3. Data and research design

This section introduces our portfolio-to-case approach. The workflow was implemented using the gpt-5-mini model via the OpenAI API. Appendix 1 reports the final prompts and category definitions.

3.1. Data source

We compiled a corpus of all projects listed in the EU CAP Network Good Practice database as of 17 November 2025 (Good Practice Database, 2025). The final dataset included 1528 projects. The database provides descriptions of CAP-supported rural development projects across EU member states. These projects are nominated by Member States and compiled by the CAP Implementation Contact Point as examples of successful rural development practice in diverse contexts.

3.2. LLM-assisted coding

For each project, we extracted the description of each project, including title, summary, and results. Each project description was coded into five dimensions: (1) primary and secondary thematic field, (2) main challenge addressed, (3) lead actor, (4) main action, and (5) territorial scale. The final prompt setting is attached in Appendix 1.

The five dimensions describe different aspects of a project. The thematic fields identify the sectors and socio-economic domains involved in project activity, including culture, tourism, agriculture, infrastructure, and social affairs. These field labels provide the basis for identifying CCI-related projects and describing their sectoral combinations.

We drew the definition of cultural and creative sectors from Article 2 (1) of Regulation (EU) 2021/818: tangible and intangible cultural heritage; archives, libraries, and museums; artistic crafts and visual arts; performing arts, music, and festivals; literature, books, and publishing; audiovisual, radio, and multimedia, including film, television, and video games; and architecture and design. We also include tourism within the broader analytical scope because rural CCIs often develop alongside visitor services, heritage promotion, and place-based experiences (Qu and Zollet, 2023; Duxbury et al., 2025), and in later Section 4 and 5 we discuss tourism counts within CCIs.

The main challenge addressed identifies the broad development issue motivating the project, such as tourism development, employment, or social inclusion. Specific difficulties, including fragmented provision, limited visibility, or social isolation, are examined during close reading. The main action identifies the intervention undertaken, distinguishing projects that address similar challenges through different activities, such as construction, training, or marketing.

The lead actor identifies the person or organization responsible for leading implementation. Territorial scale records the spatial reach of the intervention, distinguishing local, regional, and national activities.

For example, Travelling Farm Museum of Forgotten Skills used artistic installations, farm visits, workshops and a local food market to connect urban residents, farmers and artists, transmit practical knowledge and strengthen local food networks. *Led by Casco/Travelling Farm Museum*, it was coded in the thematic fields of culture and agriculture, with economy and jobs as its main challenge, cultural events and heritage promotion as its main action, local associations, NGOs and municipalities as its lead-actor category, and local as its territorial scale. This example illustrates how the five dimensions capture distinct aspects of a hybrid project rather than assigning it to a single sector.

Together, these dimensions support comparison of projects with similar purposes but different lead organizations and spatial reach.

3.3. LLM operation

The portfolio coding was deliberately kept simple. LEADER projects are highly heterogeneous, and a more granular common taxonomy would produce many single-case categories and weaken cross-project comparison. The quality of the descriptions also varies widely. Many narratives do not mention finer details, so adding dimensions would either multiply missing values or push the model to guess beyond what the text says. The classification therefore stays general, and a close reading stage returns to the full narratives to examine territorial needs, action sequences, actor relations, reported outcomes, and implementation constraints. This sequential division preserves a common comparison frame at portfolio level while retaining project-specific detail during qualitative interpretation (Grimmer and Stewart, 2013; Nelson, 2020).

The classification protocol was applied to all 1528 projects. This design has three purposes. A single frozen pipeline applied to everything is more consistent and auditable than one built for a subset. Calibration

samples drawn from the full database exposed the whole range of project content, which determined the closed category lists before they were frozen. And coding every entry allows the missing-value pattern in the analytical corpus to be checked against the database as a whole.

Calibration was essential because LLM decision processes are not directly observable, so iterative calibration was necessary to improve consistency and reduce unsupported labeling. Three challenges are relevant: hallucination (Huang et al., 2025), instability (Chen et al., 2024), and ambiguity.

Hallucination is a model problem, which refers to the error that labels introduce details that the text does not support (Ji et al., 2023). We reduced it through strict no-inference rules, clear instructions, and an explicit missing-value option.

We assessed instability by comparing the labels assigned to the same description across repeated runs. Consumer applications such as the ChatGPT web and mobile service may downgrade to a smaller model when servers are busy (Chen et al., 2024). We used Python scripts to access gpt-5-mini through the OpenAI API, with the model explicitly specified in each request. Requests that cannot be served return an error rather than an answer from a different model (OpenAI, 2026). Each project was processed five times, with majority voting and manual review used to assess label consistency.

Ambiguity is a data problem. Many project descriptions are vague or incomplete. A careful manual coder would face the same difficulty (Krippendorff, 2018). We addressed it by allowing missing values instead of forcing a label and by treating disagreement as a signal: projects with split votes went to manual review. Disagreement of this kind reflects the limits of the source descriptions rather than a failure of the coding (Plank, 2022).

A further risk is systematic bias, where the model consistently favors certain categories. We addressed it through manual review during iterative prompt calibration.

The calibration protocol had four steps.

Step 1: Corpus-level scoping

We first used open-ended prompts to extract concise descriptors from each narrative. We pooled descriptors for each dimension and asked the model to group them into candidate themes. We then reviewed and consolidated themes into fixed category lists with brief decision rules. Later coding prompts used these fixed options.

Step 2: Initial calibration

To diagnose drivers of error, we processed a random sample of 20 projects across 20 runs and checked outputs against the original texts. Two issues emerged: vague boundaries and genuine hybridity. We tightened definitions and allowed missing values. We also introduced a secondary field variable when the narrative explicitly indicated more than one substantive domain.

Step 3: Extended calibration

With the refined schema in place, we conducted a second calibration on a sample of 200 projects. This step had two aims: (1) to confirm that the fixed categories covered the diversity of projects in the corpus and (2) to determine the number of repeated runs selected on the basis of observed stability.

We evaluated stability by comparing consensus labels under 3, 5, and 10 independent runs on the same sample. We found that consensus labels changed rarely between five and ten runs, and the share of split-vote cases decreased only marginally. We therefore selected five runs as the protocol providing the best balance between stability and computational cost.

To handle variation across these runs, we applied a majority-vote consensus rule:

High agreement (5/0 or 4/1): The majority label was assigned automatically.

Split agreement (3/2): The project was flagged as unstable and triggered two additional runs. If a clear majority emerged across seven runs, we assigned that label; otherwise, the case was flagged for manual review.

We set an operational target of approximately 10% flagged cases in the calibration sample. This threshold kept manual verification feasible while preserving conservative no-inference rules. Prompt wording was refined iteratively until the calibration sample met this stability target.

Step 4: Full-dataset coding and manual checking

We then processed the full dataset and manually reviewed all cases that did not reach clear consensus after the additional runs, as well as all records with missing values. Remaining missing values were concentrated in dimensions that depend on explicit organizational or spatial information in the project narratives, particularly lead actor (33 cases), territorial scale (37 cases), and the secondary thematic field (65 cases).

Manual inspection shows that most of these missing values reflected genuine gaps in the source descriptions rather than classification errors. Insufficient information still left some assignments unresolved.

3.4. Comparative analysis of common project types

Drawing on the use of categorical dimensions to construct descriptive typologies (Collier et al., 2012), we group common configurations into project types around a common development challenge and related actions to guide case selection. The close reading covered 56 projects: 32 tourism route and experience projects, splitting into 26 collectively led and six privately led cases, 15 culture and heritage projects, and nine social inclusion projects.

Each case was examined using a common template covering initial development challenges, interventions, organizational roles and coordination arrangements, delivery difficulties, reported results, continuation, and adaptation lessons. We distinguished reported outputs and outcomes from forecasts and targets, and recorded continuation as explicitly reported, implied, or unreported. Reported lessons were considered separately from our interpretations of organizational arrangements and resources relevant to adaptation. One author conducted the initial analysis, the other authors checked the organizational fields, and differences were resolved through discussion. The full workflow diagram is presented in Fig. 1.

4. Portfolio patterns in CCI-related LEADER projects

This section presents the LLM-classified portfolio results in three steps. Section 4.1 presents the overall description and topic coverage, Section 4.2 examines pairwise frequencies across coded dimensions, Section 4.3 moves to common project types. Three main project types are then selected to guide case selection for comparative close reading in Section 5.

4.1. Overall description

We used LLM to code all 1528 projects, of which 403 were tagged as LEADER, and 135 were identified as CCI-related. The 135 projects cover 26 countries, including 128 single-country and seven multi-country projects. Estonia represents the largest single-country group, with nine projects (6.7% of the corpus). Start dates are reported for 127 projects: 19 projects (15.0%) began in 2007–2013, 83 (65.4%) in 2014–2020, and 25 (19.7%) in 2021–2023. Total project budgets are reported for 122 projects with a range from €2500 to €4,380,024.

The EU CAP Network database assigns its own topic tags to each project. Fig. 2 presents the results. Its breadth indicates that CCI-related projects do not map onto a single policy objective. The most frequently

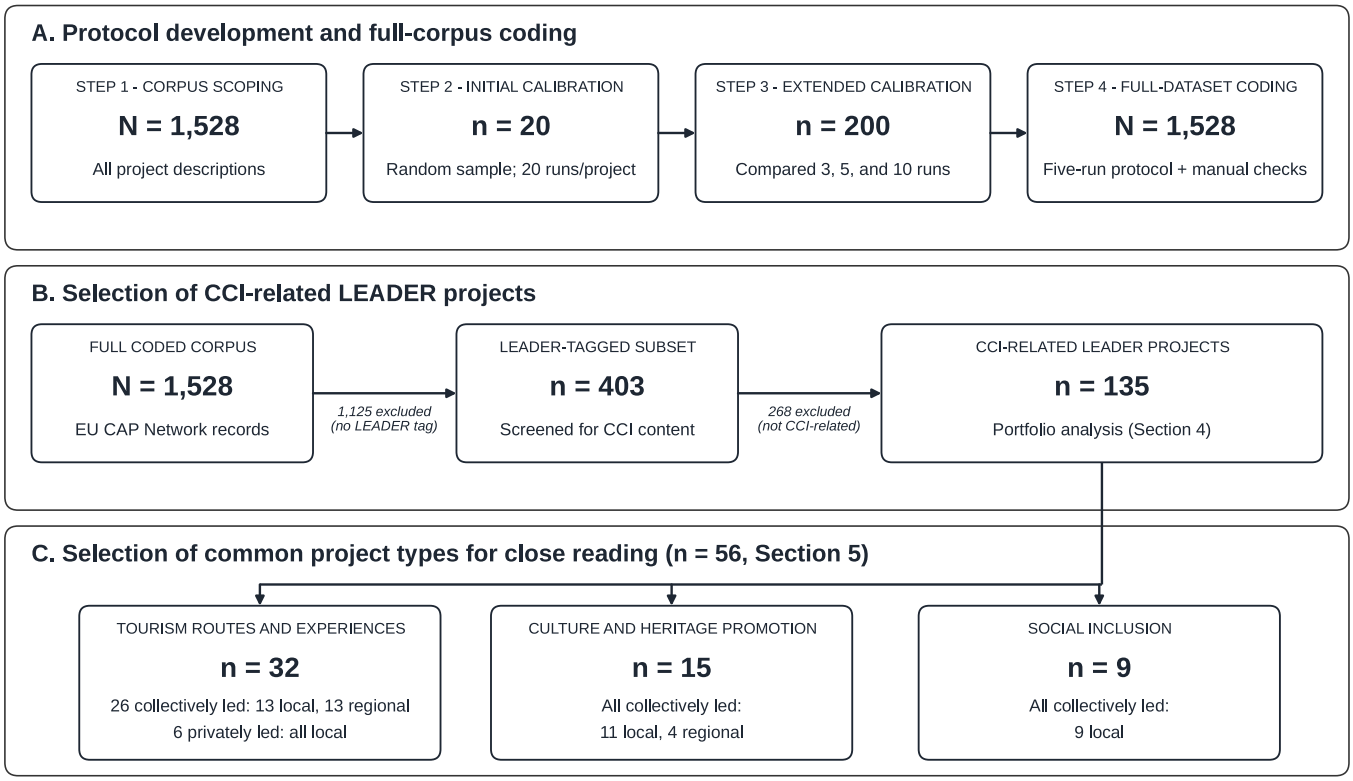


Fig. 1. Workflow of LLM-assisted portfolio-to-case project analysis approach.

associated topics are Tourism (94 mentions), Rural Development (67), Jobs, Growth and Equality in Rural Areas (49), Social Inclusion (35), and Environment (32). Together, these five topics account for just over half of all topic mentions. Tourism is the most common entry point and often co-occurs with rural development, employment, and social objectives. Overall, the topic distribution suggests that CCIs in this portfolio more often combine cultural activity with broader rural development goals rather than pursuing culture for its own sake.

4.2. General pair patterns

Fig. 3 presents the most frequent pair combinations. Each cell reports the number of projects in a given pair category. Primary and secondary thematic fields are treated as a single assignment.

The field-challenge pairs (Panel A) show that projects within the same thematic field address different development challenges. Among the 70 projects coded in the Culture field, 23 (33%) identify culture and heritage as their main challenge. The remaining 47 (67%) address other challenges, including tourism (19), economy and jobs (12), and social inclusion (12). Among the 96 projects coded in the Tourism field, 18 address economy and jobs and 10 address culture and heritage. These results suggest that a reading of these projects as cultural promotion would miss two thirds of them. Hoffmann and Hoffmann (2018) similarly describe LEADER cooperation projects that combine local customs and products with tourism routes, illustrating how cultural resources serve wider development purposes.

The challenge–action pairs (Panel B) reveal which intervention types are used for which challenges. Among the 49 projects addressing tourism challenges, 34 (69%) emphasize actions on visitor experiences, routes, and promotion, but also 6 projects rely on construction, and 5 on marketing. The 29 projects addressing 'Economy & jobs' challenges use a broader mix of actions, including branding (6 projects), construction (6 projects), and production (6 projects), while three develop tourism products, routes and experiences. This mix of interventions also appears in Extremadura, where LEADER and PRODER supported trail improvements, interpretation centers, and promotional activities alongside tourism accommodation (Nieto Masot and Cárdenas Alonso, 2017a).

The challenge–actor pairwise relationships (Panel C) show that collective actors lead the large majority of projects. 'Local associations, NGOs & municipalities' lead 106 of the 135 projects (79%), whereas 'Individuals & SMEs' lead 22 (16%). Tourism and economy and jobs account for 19 of 22 privately led projects (86%), compared with 56 of 106 projects led by associations, NGOs, and municipalities (53%). The latter group appears across all challenge categories.

The action–actor and action–territory pairs (Panel D and E) further distinguish their activities. Production, processing, and new products account for seven of 22 privately led projects (32%), compared with one of 106 projects led by associations, NGOs, and municipalities (1%). The action–territory pairs (Panel E) show differences in spatial reach. Branding and marketing predominantly operate at regional or national scales (12 of 14 projects, 86%). Tourism products, routes, and experiences and training activities more often operate locally, accounting for 23 of 40 and seven of 12 projects, respectively (58% in both groups).

Taken together, these results suggests that CCI-related LEADER projects serve diverse local development practices rather than as a discrete sectoral portfolio. Instead, LEADER functions as a flexible toolkit in which local associations combine CCI activities with tourism, economic, cultural, and social objectives depending on local needs.

4.3. Complete project configurations

Pairwise counts make broad structural patterns visible, yet they can also suggest combinations that rarely appear within a single project. The next step, therefore, moves from pairs to complete configurations. We define a project configuration by concatenating each project's four labels: challenge, action, actor, and territorial scale, which together describe the general dimensions of an intervention. The thematic field is left out because it defines the corpus and does not distinguish configurations. Counting identical project configurations identifies the project

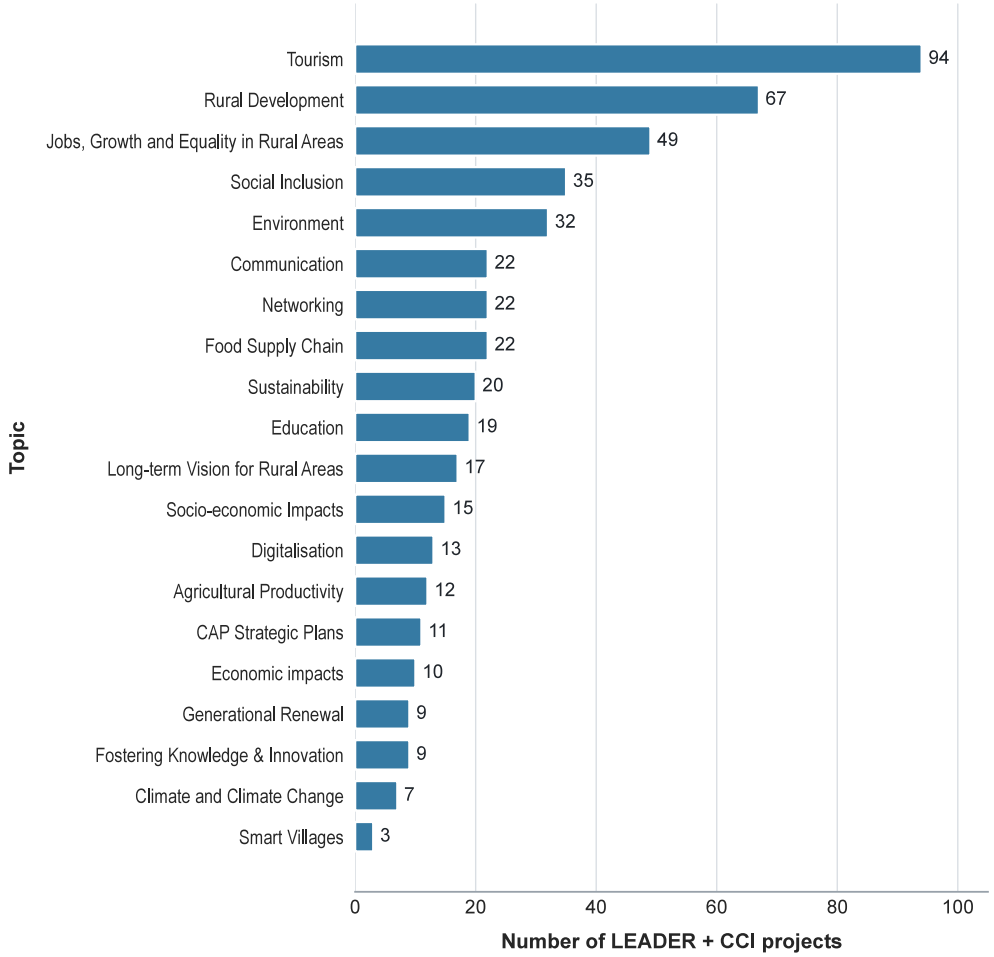


Fig. 2. Topic distribution of CCI projects within LEADER projects.

profiles that actually occur in the portfolio and clarifies whether LEADER interventions concentrate around a limited set of archetypes or remain diverse.

Fig. 4 presents the three most common complete project configurations. Each row represents one full configuration across challenge, action, actor, and territorial scale. Colors indicate challenge categories and n reports the number of projects within each category.

The selected tourism-route group comprises 26 collectively led projects, equally divided between local and regional scales, and six individually led projects operating locally. Three configurations combine a tourism challenge with tourism route and experience actions. These comprise collective leadership at the local scale (13 projects), at the regional scale (13), and individual or SME leadership at the local scale (six).

These tourism configurations therefore suggest differences in project focus by lead actor. The individuals and SMEs-led project types center on local-level product creation, while the LAGs, associations, or municipalities-led projects in both local and regional routes are more concerned with shared service, such as branding, heritage promotion and route-building. Their use of routes, heritage sites and cultural events for place promotion is consistent with previous research (Leonidou et al., 2018; Vuignier, 2017).

Outside tourism, dominant combinations remain more locally anchored. The culture-and-heritage group includes 15 projects, of which 11 operate locally and four regionally. The social-inclusion group is entirely local, comprising five projects centered on community activities and four on training and education.

The shift from topics to pairs to full project configurations highlights a tension between portfolio-level regularities and project-level diversity. Pairwise frequencies show clear tendencies such as collective leadership, tourism as an entry point, and local anchoring. These tendencies still combine in different ways across projects, which indicates that no single archetype represents CCI-related LEADER practice. Section 5 turns to the narratives within the three dominant project types.

5. Comparative project analysis of dominant project types

Section 5 examines three main project types identified in Section 4: (1) tourism route and experience, (2) culture and heritage promotion, and (3) social inclusion through community activities and training. The analysis focuses on the challenges addressed, interventions, reported results, and considerations for adaptation.

5.1. Tourism route and experience project type

The tourism route and experience projects include 26 collectively led projects, split between local (13) and regional (13) scales, and six privately led projects, all operating locally. This pattern is consistent with integrated rural tourism research identifying business networks and intermediary management as mechanisms for combining dispersed resources into a territorial offer (Petrou et al., 2007; Panyik et al., 2011).

Collectively led projects often seek to connect existing attractions into a shared tourism offer. Weak coordination or limited visibility, such as fragmented hiking and cycling networks, and underused heritage sites, is reported in 21 of the 26 cases. Common interventions involve developing shared services, such as mapping assets, convening

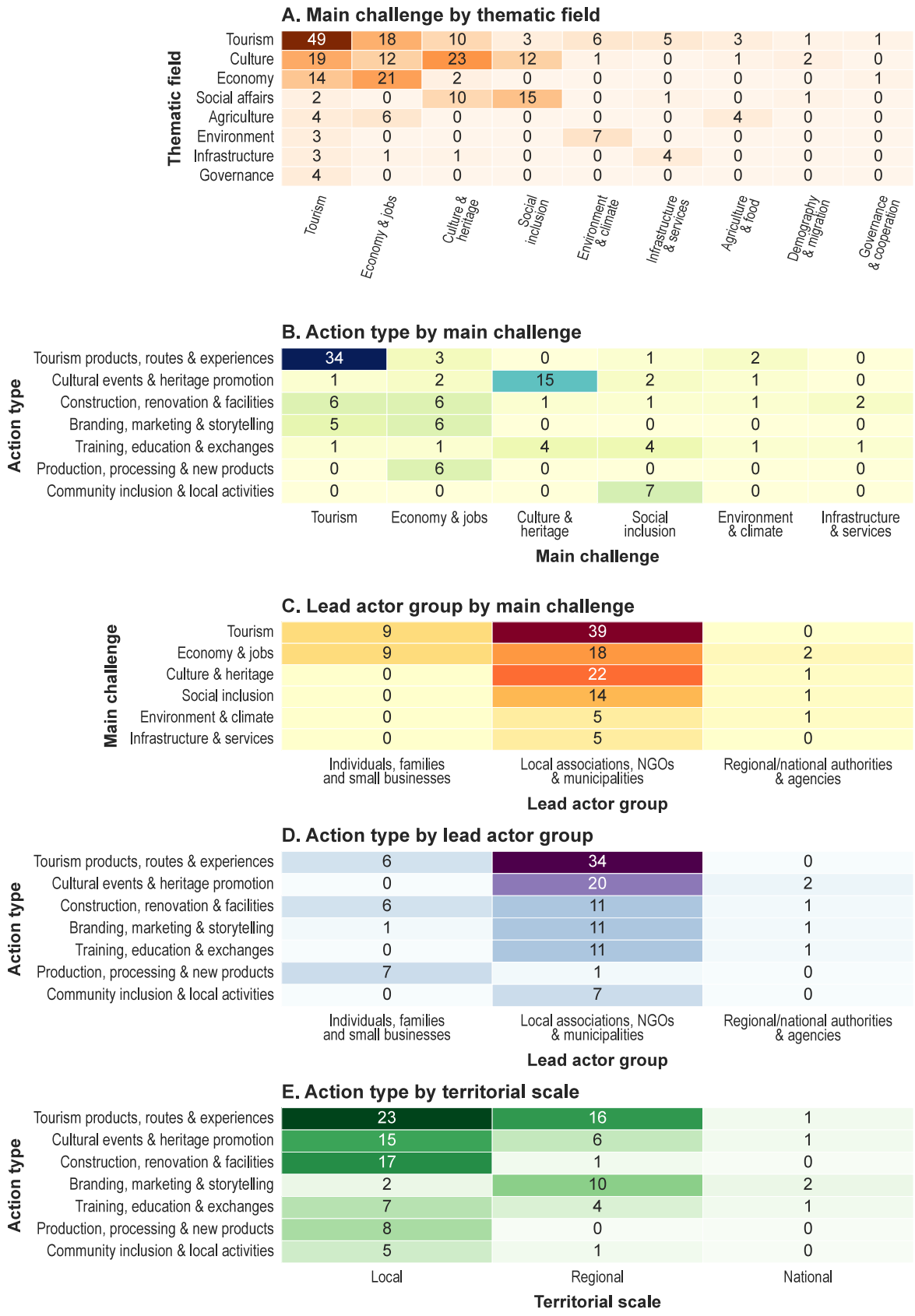


Fig. 3. Pairwise relationships within LEADER CCI projects.

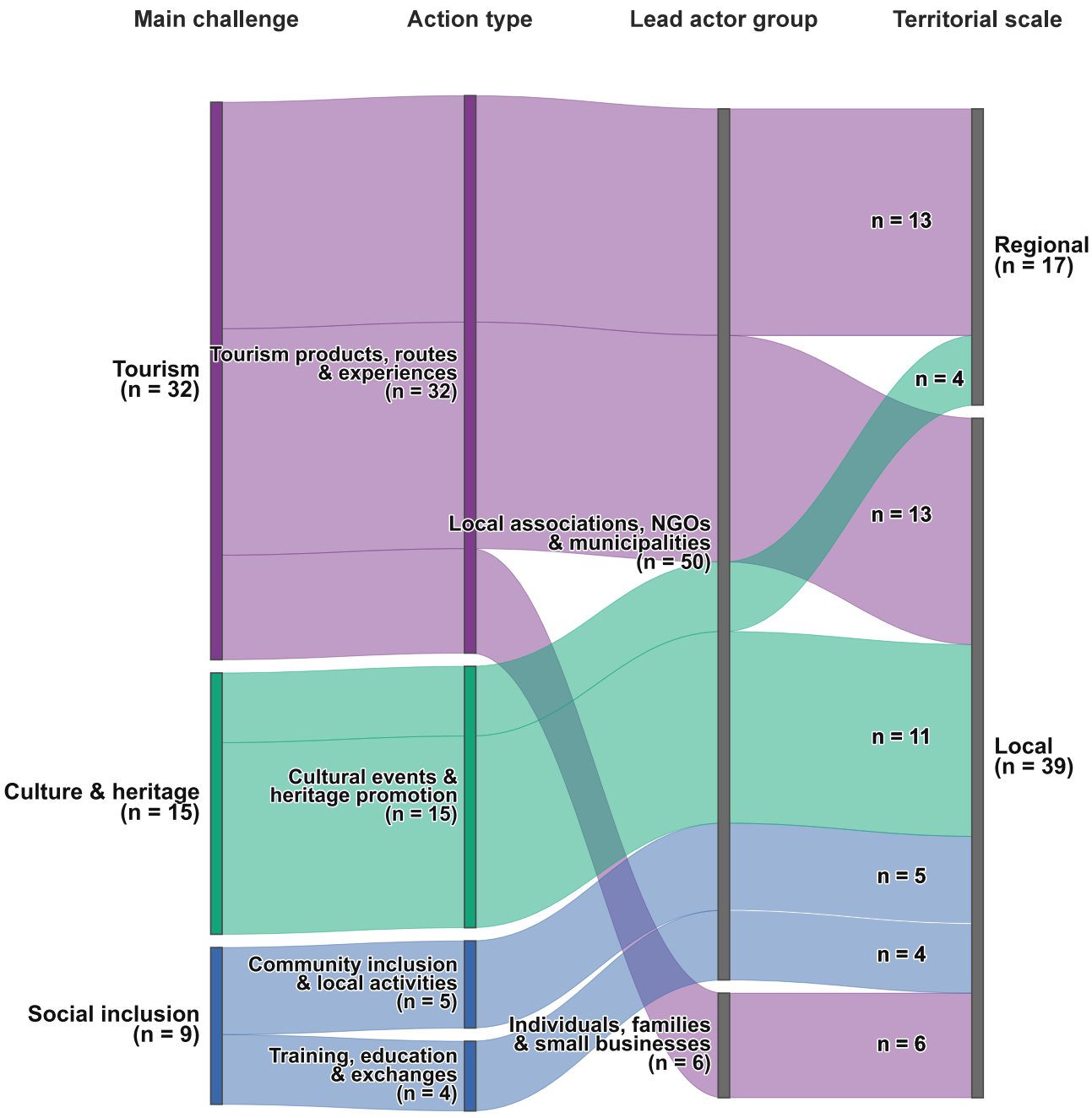


Fig. 4. – The common project types.

operators, agreeing on signage and quality standards, and adding digital tools, such as apps or QR codes to support navigation. These coordination work appears in all 13 regional and seven of the 13 local accounts. Guttland.Guttland Trails, 2025 is a clear example, which connected two LEADER areas through an umbrella brand, joint promotion, a co-funded coordinator, and a certification system for trail quality, waymarking, and sustainability.

Collective projects also run tourism attractions directly. For instance, the *Brown Coal Mining Thematic Village* transformed industrial heritage into an eco-museum, reconstructed mining features, a nature trail, and a pottery house. The association became a tourism operator and employed ten temporary workers to maintain the attractions (Brown Coal Mining Thematic Village, 2015).

The private-led tourism projects, by contrast, mainly concern building an individual business by creating marketable facilities or services. The Upside-Down House in Smārde created a visitor attraction and supporting facilities that generated three full-time jobs (Upside-Down House in Smārde, 2023). The Home of Buckwheat combined a farm-based venue with workshops, tastings, and product sales, creating one job and expecting higher tourism and farm turnover (Home of Buckwheat in Latvia, 2025). Both projects involve local partners, but ownership, management, and expected returns remain centered on the enterprise. Direct management therefore appears under both private and collective leadership, while the coordinating role is found almost only in collectively led projects.

Fourteen of the 26 collectively led tourism-route projects are explicit about culture. In these cases, cultural assets are incorporated into visitor offers and local economic strategies, creating continuing curatorial, promotional and maintenance tasks. Besides the Brown Coal project, *Art as a Leverage of Local Development in a Mountain Area* converted landscape-inspired artwork into events and an ongoing annual cultural program involving a growing number of venues (Art as a leverage of

local development in a mountain area, 2018). Similar arrangements are described in Poland, where LAG-supported thematic trails and eco-museums bring local attractions into joint tourism offers, sometimes across neighboring LAG areas (Bednarek-Szczepańska, 2017). In these cases, culture is a tool for attracting business, and sustaining it is as important as developing it.

Regarding results, 23 collective projects report quantified outcomes, and eight provide use or participation figures, while all six private-led projects report achieved employment. Seven collective projects explicitly identify a post-grant operating or maintenance arrangement, eight imply or plan continuation, while eleven provides no information on continuation.

Regarding potential project adoption, three conditions are particularly relevant: (1) a coordinator with convening capacity across municipalities, (2) a sufficient base of operators that can provide services along the route, and (3) resources for shared tools such as branding, signage, and mapping that make the network legible and manageable. The finished attractions is place-specific, while the coordination approaches offer examples for other project teams.

5.2. Culture and heritage project type

The 15 culture and heritage projects are all collectively led. 11 operate locally and four regionally. The common challenges include poorly documented heritage (8), limited access (5), and underused assets (4). We interpret these difficulties as signs of limited capacity to document and sustain local cultural resources, which aligns with research showing that rural heritage value depends on the continuing organizational work through which volunteers document, digitize and make local histories accessible (Beel et al., 2017).

These projects follow similar intervention approaches. They typically begin with behind-the-scenes capacity building. Actors extend heritage inventories, museums train volunteers to catalog objects, or residents contribute oral histories. They then translate these resources into more visible activities, such as festivals, guided tours, or thematic exhibitions. *Bâti-Botte is a clear example*, the LAG extended a built-heritage inventory to 14 additional villages and used it to support heritage classes, workshops, field visits, and a booklet (Bâti-Botte, 2018). Regional projects connect several organizations and develop shared capacity across sites. In Western Estonia, small-museum managers and volunteers received training in museum pedagogy, event organization, photography, and exhibition design. Participants also formed a regional support network and jointly produced a book documenting local folk costumes (Promoting the cultural heritage, 2024). These activities are similar to studies in Poland and Castilla y León, which also report LEADER support for local traditions, heritage conservation, cultural infrastructure, and tourist attractiveness (Hoffmann and Hoffmann, 2018; Miranda Escolar and Moyano-Pesquera, 2020).

Training, cooperation, and shared documentation develop the skills and working arrangements local organizations use to manage heritage. We therefore interpret capacity building as a central contribution of these collectively-led projects, alongside their inventories, publications, and public activities. The cases suggest that projects draw on local organizational capacity and can also strengthen it during implementation.

Delivery depended on financial and human resources that were difficult to secure. Five projects mention financial difficulties and two depend on unpaid work. Thirteen projects report tangible outputs, eight give participation figures, and four report achieved visitor or employment figures. Social and organizational contributions are described mainly qualitatively, and information on longer-term use is limited.

For project adoption, the heritage content is place-specific, while documentation procedures and training approaches offer examples for other project teams. Reported lessons emphasize community involvement and local leadership (nine projects), specialist expertise (five), and continued funding (four). These lessons suggest that adaptation requires attention to the organization hosting the work, access to specialist support, and the people and resources available to sustain participation.

5.3. Social inclusion project type

In the social inclusion projects, cultural activities become a flexible tool addressing challenges related to local vulnerability, such as social isolation among older residents, limited opportunities for rural youth, and barriers faced by unemployed adults.

Eight projects create or strengthen an organizational arrangement connecting participants, activities and local services. Specific actions include co-design activities with older residents to test new forms of social support, using media, storytelling, or local journalism to help young people develop skills and connect with local institutions, and transforming unused buildings into multi-purpose hubs that host cultural events while offering training, work experience, or supportive routines. These arrangements connect creative participation with diverse community services.

In this project type, cultural and creative activities often function as low-threshold entry points for sustained local involvement. Culture serves as a practical means to improve local amenities and service delivery rather than an end in itself. This mechanism is visible in Making rural youth visible (2018), where storytelling and publication were linked to preventive youth work, and in *Truagh Spirit's Wise and Well Social Club* (LEADER helps design and deliver services, 2025), where theatre visits and intergenerational cultural activities were combined with meals, digital training, information sessions, and access to public services for older residents. Similar support was documented in Northumberland, where LEADER funded youth facilities and training and projects for older and disabled residents, although later funding rules restricted this work (Shucksmith et al., 2021).

Regarding the outcome evidence, all nine report at least one numerical measure of output, reach, use or employment, but the evidence does not generally evaluate changes over time. Eight projects also report wider social or territorial effects qualitatively. Six state a continuation arrangement, two imply continuation, and one does not report it.

These cases also suggest successful adoption would depend on how cultural activities are connected with continuing local support. A similar mechanism is identified by Steiner et al. (2023), whose evaluation of a Scottish rural social enterprise shows how a community organization can act as a boundary spanner between participants, health professionals and local services. The element relevant for adaptation elsewhere is therefore the organizational capacity to connect cultural activity with continuing support, more than the cultural activity itself.

5.4. Cross-type comparison

Table 1 summarizes the 56 close-reading cases across four comparison groups within three project types, comparing their bottlenecks, interventions, outcomes, and adaptation lessons.

The comparison identifies different organizational functions across the groups. Collectively led tourism projects coordinate providers and assets into shared visitor offers; privately led tourism projects organize investment and operations within an enterprise; heritage projects connect documentation with stewardship and public use; and social inclusion projects link cultural activities with continuing support. Within collectively-led tourism, shared brands, standards, provider networks, or coordinators appear in all 13 regional descriptions and seven of the 13 local descriptions, indicating more consistent documentation of these arrangements at the regional scale.

Reporting also differs across groups. All six privately led tourism descriptions report employment. Collective tourism and heritage descriptions report completed activities more frequently than use or participation figures. All nine social inclusion descriptions provide numerical measures of delivery or reach; six explicitly report post-grant continuation and two imply it, against 11 of the 26 collectively led

Table 1
Comparison of four common project types.

Project type	Bottleneck	Intervention	Reported outcomes	Adaptation lessons	Examples
Tourism routes and experiences, collectively led (n = 26; 13 local, 13 regional)	Fragmented assets and limited visibility: Twenty-one identify these challenges. Ten report delivery difficulties involving partners, funding rules, permits, or technical work.	Organizing a shared visitor offer: Twenty-three develop routes or products. Shared brands, standards, provider networks, or coordinators appear in 20 projects: all 13 regional cases and seven of 13 local cases.	Delivery and participation: Twenty-three report outputs and eight report use or participation figures. Five include forecasts or targets. Post-grant continuation is unreported in 11.	Shared responsibility: Stakeholder involvement (16), local adaptation (11), shared standards or brands (7), and continued funding (6) are emphasized.	Guttland.Trails: coordination and certification; Onion Route: membership-funded provider network; Brabantse Kouters: shared planner and QR access points.
Tourism routes and experiences, privately led (n = 6; all local)	Establishing or expanding a visitor business: Enterprises develop offers from their land, buildings, crops, skills, or traditions. Three report construction, cost, or supplier difficulties.	Developing an enterprise-operated offer: All six create or expand a venue, attraction, or service under enterprise ownership and management. Quinta da Moscadinha also reports agreements with local growers.	Employment reported, wider benefits mainly qualitative: All six report employment; two provide visitor or stay figures. Two include forecasts. Broader benefits remain largely unquantified.	Owner skills and local relationships: Provider or supplier links (2), planning (2), and specialist skills (2) are emphasized. Two projects state no lessons. Shared provider standards are not identified as lessons.	Quinta da Moscadinha: cider, hospitality, and grower agreements; Swan Hotel's Cowshed: farming and dining; Mid Ireland Adventure: outdoor activities, one full-time job and one seasonal position.
Culture and heritage promotion (n = 15; collectively led; 11 local, 4 regional)	Limited documentation and public access: Challenges concern documentation (8), access (5), or underused assets (4). Delivery difficulties include finance (5) and dependence on unpaid work (2).	Recording heritage for public use: Participatory documentation or co-creation (10), new organizational arrangements (10), and training (7) connect local knowledge with public activities and resources.	Heritage made accessible: Thirteen report outputs, eight participation figures, and four achieved visitor or employment figures. Wider effects remain mainly qualitative, without longer-term evidence.	Local involvement and specialist support: Community involvement and local leadership (9), specialist expertise (5), and continued funding (4) are emphasized. Shared standards appear in one project.	Bâti-Botte: inventory linked to school activities; Catalan dry-stone project: citizen cataloging app and shared inventory; Western Estonia: museum training and support network.
Social inclusion through community activities and training (n = 9; collectively led; all local)	Limited access and voice: Eight identify a group lacking access or voice. Three report difficulties involving institutional agreement, grant-management capacity, or administrative demands on volunteers.	Connecting activities with continuing support: Eight link cultural activities with an existing service, enterprise, or organization supporting participation, learning, or access to local services.	Participation counted, wider effects mainly qualitative: All nine report numerical measures of delivery or reach, and two report employment. Effects on confidence, voice, and belonging remain largely unquantified.	Staff and community involvement: Trained staff (5), community involvement (5), and partner involvement (5) are emphasized. Continued funding appears in one project. Shared standards are not identified as lessons.	Boyndie: training within visitor and trading activities; Making rural youth visible: storytelling linked to youth work; Truagh Spirit: community consultation and planning informing subsequent recurring services.

tourism descriptions that give no information on continuation.

6. Discussion

Through an LLM-assisted portfolio-to-case approach, this study identified and compared 135 CCI-related LEADER projects in the EU CAP Network Good Practice database. Several insights come from the quantitative comparison of portfolio patterns with individual case studies.

First, at the portfolio level, projects involving culture frequently address broader development challenges. Projects commonly connect cultural resources with tourism, employment, social inclusion, or local services, while culture alone projects are rare. Therefore, a focus on pure cultural promotion would overlook the broader contribution of rural CCIs. This pattern is consistent with research on rural creative economies embedded in community development, local enterprise and resilience (Bell and Jayne, 2010; Duxbury, 2021; Roberts and Townsend, 2016) and with LEADER's integrated place-based logic (OECD, 2006; Torre and Wallet, 2016). Although applied here is a relatively small database, this study illustrates the potential of LLM-assisted coding to quantify these overlaps in larger project collections.

Second, the portfolio analysis suggests the main challenges addressed vary by lead actor. Collective actors lead most projects addressing culture and social inclusion challenges, and no privately led project identifies either as its main challenge. The close reading shows collective associations perform diverse functions, often providing shared resources and services, such as coordinating resources and activities across several organizations. Association-led tourism projects, for example, develop shared brands, route standards, and joint marketing tools serving several operators, while private enterprises focus more directly on developing individual businesses. However, the prominence of collective actors may partly reflect project selection for a database intended to disseminate good practices, as studies of LEADER in Andalusia report a large private-sector share (Cejudo-García et al., 2022).

Third, the close reading specifies organizational capacity as a type-specific rather than generic contribution. Collectively led tourism projects coordinate and operate attractions, while privately led tourism projects run business, heritage projects document and train, and social inclusion projects connect. This complements LEADER research on networking and the combination of local and expert knowledge (Dargan and Shucksmith, 2008; Esparcia, 2014) by bringing rural tourism (Petrou et al., 2007; Panyik et al., 2011), volunteer-based heritage production (Beel et al., 2017), and boundary-spanning rural social enterprise (Steiner et al., 2023) into one comparison across selected project descriptions.

Fourth, adapting a CCI-related LEADER practice depends on local needs and organizational capacity, alongside the availability of similar cultural resources. Also, the organizational capacity can be strengthened by LEADER as well. The projects show the formation of coordination roles, skills, planning routines and relationships between organizations during implementation. In neo-endogenous terms, this capacity develops through connections between locally embedded actors and knowledge and external finance, expertise and institutions (Ray, 2006; Bosworth et al., 2016). Such support matters because these organizations form part of the institutional capacity (Amin and Thrift, 1995; Barca et al., 2012; Iammarino et al., 2019). Supporting a LEADER project is therefore also an investment in that capacity, and whether the organization came out stronger is as relevant a question as whether the project succeeded.

Fifth, the comparison also identifies gaps in the information available for learning in this database. Project descriptions report activities and participation more consistently than the responsibilities and resources supporting continuation. For example, 11 of the 26 collectively led tourism descriptions provide no information on post-grant

continuation. Organizational work can remain implicit when it supports more visible activities, leaving its contribution less apparent. Within a collection selected for dissemination, these gaps limit the basis for examining the organizational arrangements behind implementation and continued activity.

Admittedly, organizational knowledge is partly tacit, and detailed reporting can add administrative work (European Commission DG AGRI (Directorate-General for Agriculture and Rural Development), 2025) while capturing project value only partially (High and Nemes, 2007). Learning may still require close reading and contact with project teams. Our portfolio-to-case approach suggests a strategy by giving brief descriptions of implementation difficulties and responses, written in contributors' own words within existing fields. This could limit additional reporting work while allowing LLM-assisted coding to help locate relevant projects for closer examination.

Together, these findings show the value of the portfolio-to-case approach for connecting common coding categories with the examination of differences within them. LLM-assisted coding classifies heterogeneous projects into specific types without training a separate classifier on labeled project examples. The resulting codes support comparative close reading, which gives more details on shared functions across projects with different activities, as well as differences in organization within similar project types. While detailed understanding still depends on examining individual projects, the method provides a systematic basis for identifying general patterns, organizing comparison studies, and locating specific cases.

7. Conclusion

LEADER supports a wide range of community-led rural development projects, yet this diversity makes their activities and implementation difficult to examine systematically at a portfolio scale. To address this gap, this paper proposes a portfolio-to-case approach for comparative analysis. We applied LLM-assisted coding to all 1528 project descriptions in the EU CAP Network Good Practice database. Among the 403 LEADER-tagged projects, 135 were identified as CCI-related. We conducted portfolio analysis of the 135 projects and comparative close reading of 56 selected cases. This design provides a systematic way to analyze a heterogeneous collection by identifying common project patterns, while retaining access to individual case studies.

The results show that in this Good Practice Database, CCI-related LEADER projects function primarily as instruments for addressing practical local challenges and organizing collective action. Their implementation depends on local organizational capacity, and project support may also strengthen local institutional capacity. We recommend adding brief descriptions of implementation difficulties, responses, and post-grant arrangements to project descriptions. These descriptions can remain concise, helping readers compare projects and identify relevant experience for detailed case studies. The empirical results illustrate the method's potential to support comparison and learning across heterogeneous LEADER projects at scale.

Several limitations apply. The analysis depends on the content and quality of project narratives. Rhetorical and vague descriptions may limit inferences about actor responsibilities and implementation arrangements. Missing information on lead actors and territorial scale may reflect reporting gaps. The projects in the EU CAP Network Good Practice were selected for promotion, and the findings therefore describe this collection rather than the wider population of LEADER projects. Collective and visible initiatives may be overrepresented, while failure, conflict, and weak implementation may receive less attention. Outputs may also vary between runs or after model updates, limiting exact reproducibility. LLM model-assisted coding remains sensitive to prompt design and may miss contextual nuances. Hallucinations although limited, may still introduce details unsupported by the project descriptions and lead to incorrect interpretations (Prescott et al., 2024). We checked the coding during sampling and subsequent close reading, although we did not assess coding accuracy against an independent human-coded benchmark. The study supports comparative synthesis across projects, yet it does not estimate causal impacts or long-run outcomes. Finally, close reading focused on selected common configurations, leaving less common arrangements less fully explored.

Future research can limit these constraints by linking project types to outcome indicators and follow-up evaluations, testing mechanisms through mixed-method designs that include interviews or fieldwork, and comparing project configuration stability across Member States and program periods. Comparative work across funding instruments also deserves attention. Cohesion policy tools, including Smart Specialisation Strategies, also support local development, but they do so through an institution-led prioritization structure. Comparing the priorities between institution-led and community-led instruments can clarify gaps for more comprehensive policy mix support on rural development.

CRediT authorship contribution statement

Wang Tongjing: Writing – original draft, Visualization, Methodology, Data curation, Conceptualization, Formal analysis, Writing – review & editing. **André Torre:** Writing – review & editing, Validation, Supervision, Project administration, Funding acquisition, Formal analysis, Conceptualization. **Maryline Filippi:** Writing – review & editing, Validation, Supervision, Formal analysis, Conceptualization.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work, the authors used Open AI's gpt-5-mini model through the API for the LLM-assisted project classification described in Section 3. ChatGPT and Claude were also used for Python coding assistance in data visualization, and for language editing. After using these tools, the authors reviewed and edited all content as needed and take full responsibility for the content of the published article.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: All three authors WANG TONGJING, ANDRE TORRE and MARYLINE FILIPPI reports financial support was provided by Horizon Europe with Grant agreement ID: 101061747.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jrurstud.2026.104467.

Data availability

Data will be made available on request.

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