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## Chapter 18

# Italian Rural Gentrification and Agricultural Mosaics: A Bayesian and Kruskal-Wallis Meta-Analysis Amid EU CAP Reform 2023-27

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## 1. Introduction

Rural Gentrification (RG), while a prominent feature of contemporary debates on land use and community development in Italy's agricultural sector, is not a phenomenon of only modern times. Historically, the countryside has experienced similar transformative forces during the era of *vedutismo* (De Seta C. et al., 1980), when picturesque ruins and the rampant pillaging of marbles from churches and other infrastructures exemplified early forms of Rural Gentrification. These elements were often cannibalized and reintegrated into structures serving agrarian needs—such as animal shelters, storage facilities, or refuges—highlighting a cyclic pattern of resource utilization and socio-economic transformation in rural landscapes (Di Mauro L., 2001).



Fundamentals from the past from *Vedutismo* marking a innate sense of rural exploration: **Figure 1.** "Barn cistern" (Torlonia, Parco Archeologico Appia Antica, RM, Lazio). July 2016. CC BY-SA 4.0. Author: Giuppy85. Wikimedia Commons. **Fig. 2.** "Querini Stampalia Art Gallery – Roman Countryside with Ruins and Pond – Marco Ricci" (Valpadana, BO, Emilia Romagna). 1720s. CC BY-SA 4.0 DEED. Author: Didier Descouens. Wikimedia commons. **Fig. 3.** "Laborare est Orare" (1862). Author: John Rogers Herbert. Public Domain.

Nowadays, these landscapes form a complex "*Multiscale Complex Agricultural Mosaic*" (MCAM) that underpins the national economy, supports biodiversity, and upholds a rich cultural heritage. Nonetheless, this intricate mosaic faces pressing challenges due to silent environmental degradation influenced by the nuanced dynamics of Rural Gentrification (RG): this phenomenon is characterized by seasonal human presence, which varies greatly and is often omitted from mainstream discussions.

The stakes are raised by the need to balance agricultural productivity with environmental sustainability amidst the evolving "*Common Agricultural Policy*" (CAP) reforms initiated in 2023: these reforms introduce new zoning laws and regulations that may irreversibly dictate the developmental trajectory of these regions.

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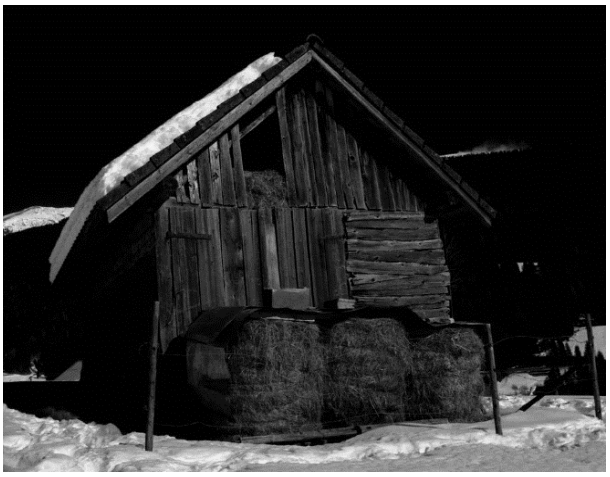
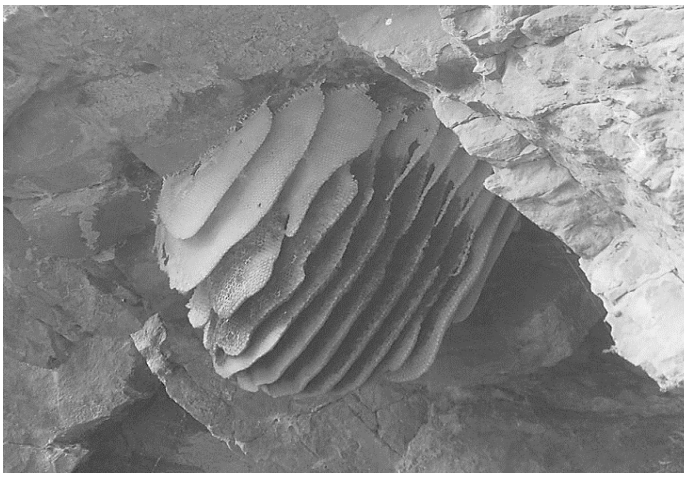



Rustic charms from the lost past: the essence of temporary praxis from traditional practices and rural narratives: **Fig. 4.** "Fienile – Hay-loft" (Padola, BL, Veneto). March 2009. CC BY-NC-ND 2.0 DEED. Author: lo.re.n.zo. Flickr. **Fig. 5.** "Apis mellifera sicula honeycomb" (Fiume Milicia, Casteldaccia, PA, Sicily). May 2018. CC BY-SA 4.0. Author: Fabio Lo Valvo. (Wiki).

This chapter delves into a computational and textual study aimed at dissecting these complex challenges. It employs an extensive array of grey literature, including governmental publications and internal policy documents not distributed via commercial publishing routes: these documents provide invaluable insights into niche topics of Rural Gentrification that have not yet been thoroughly explored in peer-reviewed academic literature albeit discontinuous across the many regions.

Our methodological framework begins with an initial literature review, structured around binary questions to guide the narrative effectively; specifically, this approach is enriched by the *Term Frequency-Inverse Document Frequency* (TF-IDF) method to highlight key terms and themes pivotal to understanding Rural Gentrification. Further linguistic analyses explore semantic classes such as antonyms, homophones, and hypernyms across various disciplinary fields, enhancing the contextual comprehension of relevant terms. Quantitative analyses utilize statistical tools like the *Shapiro* and *Anderson* indices to evaluate data consistency, while *Principal Component Analysis* and *Cosine Similarity* measures help identify patterns and establish 26 typologies of Rural Gentrification across the Italian peninsula.


Historic fortress amidst the Italian Alps as landmarks of Rural Gentrification: **Fig. 6.** "Fénis Castle" (AO, Valle d'Aosta). July 2023. CC BY-SA 4.0 DEED. Public Domain. Author: Hagai Agmon-Snir. Wikimedia commons. **Fig. 7.** "Rifugio Preuss" (Refuge at 2243m near Vaiolet, Val di Fassa, TN, Umbria). March 2017. CC BY-SA 2.0 DEED. Author: Strocchi. Flickr.

The findings from this study not only enrich our understanding of the dynamics within Rural Gentrification but also offer critical insights for both academic and policy-making spheres. By scrutinizing the strengths and limitations of the RG framework, this research proposes strategies to enhance its effectiveness and promote sustainable management of rural landscapes; additionally, it also emphasizes the need for regulated land use policies within public administrations to mitigate the impacts of gentrification and foster sustainable rural development.

Extending beyond Italy's agricultural sectors, the scope of this research also aims to provide a replicable model for harmonizing environmental sustainability with rural socio-economic transformations in other contexts; this mission is dedicated to establishing a point of reference that fosters a sensitivity open to integrating mixed-use structures that accommodate both agricultural production and reception.

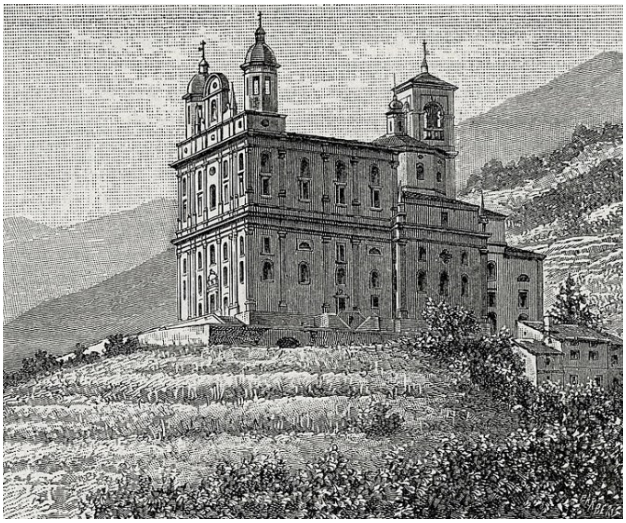
## 1.1. Literature exploration from the review process

To address the intricate dynamics between Rural Gentrification (RG) actors and environmental degradation within Italy's agricultural framework effectively, a rapid meta-review of grey literature is identified as a particularly efficient, albeit limited, approach; this method stands out because, unlike traditional Systematic Literature Reviews (SLR) that require extensive searches through academic journals - often impeded by paywalls and publication delays - grey literature is readily accessible and can be compiled and synthesized much more swiftly; this type of literature frequently tackles policy-relevant questions and is deeply rooted in real-world applications, thus enhancing the relevance of its findings for policy advice and decision-making.

Historically, the Department of Training and Internationalization has concentrated on interpreting the Italian landscape through the prism of Architectural legislation, as detailed in a 2023 grey literature manuscript. The recent Committee Meeting underscored the need to incorporate a grey literature protocol into Meta-reviews to identify unaddressed areas in the field effectively.

The mission of this initiative is to enable architects and researchers to pinpoint topics not sufficiently explored in academic literature and to suggest new avenues for investigation: by leveraging grey literature, researchers, and more likely professionals, can access a pool of resources that are both affordable and accessible, thereby overcoming financial limitations; simultaneously, this approach not only speeds up the review process but also broadens the scope and applicability of the research findings: it aims to deliver focused and precise impacts on scholarly discourse and practical policy implementation, thereby facilitating the development of sustainable and effective strategies for Architects operating in rural areas and mountainous communities along the Italian peninsula and in foreigner national contexts.

A set of questions introduced the scope definition: "*What capabilities should a farmer, architect, agricultural entrepreneur, and urban planner in the public sector possess to ensure that their decisions for rural preservation are visionary and forward-thinking*? " ; "*What are the main strategies involved in improving agricultural resilience and promoting the greening of land use*? " ; "*Why are collaborative efforts with universities, research institutes, government bodies, and private stakeholders essential for research, and how do they contribute to the development of sustainable and effective policies that support the long-term economic and environmental sustainability of rural and mountainous communities*? ".



Exemplifying morphological cohesion, Trevisio from past and today: **Fig. 8.** "Tresivio: Sanctuary of the Holy House" (xilography by Giuseppe Barberis)" (SO, Lombardia). 1896. Public Domain. Author: Strafforello Gustavo, La patria, geografia dell'Italia. Provincie di Como e Sondrio Canton Ticino e valli dei Grigioni. Torino Unione Tipografico-Editrice. Wikimedia commons. **Fig. 9.** "Sanctuary of the Holy House" (Tresivio, Valtellina, SO, Lombardia). April 2022. CC BY-SA 4.0 DEED. Author: Helvio ricina. Wikimedia commons.

## 1.2. Data extraction from the conceptualized patterns

The structure, by counting each keyword respectively structured in the following table, has noted important

variations or patterns, with the implementation of the TF-IDF (*Term Frequency-Inverse Document Frequency*) technique used for data extraction in natural language processing and information retrieval. It is a numerical representation of the importance of a term within a document or a collection of documents and measured the frequency of RG terms implied within the unique website and 57 manuscript documents. It assigns a higher weight to terms that appear more frequently, as they are likely to be more important in representing the content of the document.

Respectively, the IDF (*Inverse Document Frequency*) measured the rarity of a term across a collection of documents assigning a higher weight to terms that are less common across the collection, as they are considered more informative or distinctive in this collection.

A combination of open-source data and a user-friendly website to conduct a comprehensive analysis of diverse information sources, have blended both 1) quantitative and 2) qualitative research methods: the 1) quantitative analysis covers various data types, including discrete, continuous, ordinal, and nominal categories; the 2) qualitative aspects explore narrative and contextual dimensions of the subjects at hand. The research adopts an intricate analytical framework that encompasses ex post facto analysis, cross-sectional studies, and quantitative textual modeling, using socio-economic, biological, abstract, census-based and morphological data to explore a broad spectrum of issues.

The principal areas of focus are enhancing agricultural resilience, advancing land use greening, developing business transfer mechanisms, and promoting the circular bioeconomy, alongside urban impacts on coastal and peri-urban environments.

The investigation extends to gentrification processes, market fluctuations, forestry concerns, landscape architecture, rural community settlements, energy poverty, agricultural gentrification, and the preservation of cultural heritage.

Empirical data is sourced through case studies and surveys implemented across various Italian regions and other European locales: the project benefits significantly from the collaborative input of universities, research institutes, governmental entities, and private sector participants, which is vital for amassing a broad and insightful dataset; this collaborative effort is dedicated to crafting sustainable and effective strategies that enhance the economic viability and environmental sustainability of rural and mountainous areas over the long term.

Market fluctuations: visual impact of the tourism industry, past and present: **Fig. 10.** "TN Moena Val di Fassa m. 1000 panorama" (Lavis, TN, Trentino Alto Adige). 1954. Public Domain. Author: Collezione cartoline Albertomos. Wikimedia commons. **Fig. 11.** "Vigo di Fassa" (TN, Trentino Alto Adige). July 2012. CC BY-SA 3.0 DEED. Author: Bbruno. Wikimedia commons.

## 1.3. Risk of bias assessment priorly emerged

Risk of bias assessment in a Meta-Analysis is a systematic evaluation of the methodological quality and potential sources of bias in the included studies: it involves assessing various aspects of study design, conduct, and reporting to determine the overall risk of bias in the collected data.

This assessment aims to ensure the reliability and validity of the findings by considering factors that could potentially affect the accuracy and generalizability of the results; common domains assessed for bias include randomization, allocation concealment, blinding, selective reporting, and funding sources: by identifying and addressing potential biases, the risk of drawing misleading conclusions from the meta-analysis is minimized, and the overall quality of the evidence is enhanced.

Keywords were chosen and limitedly picked up in the reference section, to give robustness as for 1305/2013 policy-making specificity in the context of word TF-IDF (*Term Frequency-Inverse Document Frequency*) involving the process of retrieving relevant information from a collection of documents or texts. TF-IDF is a numerical representation that measures the importance of a word in a document relative to a corpus of documents within such semantic classes.

## 2. Methodology

The entire research project was conducted in accordance with the mission of the Department of Training and Internationalization, adhering to para-legal and ethical guidelines established by the Ministry of Justice; this mission aims to promote research excellence and foster global collaboration to tackle critical issues and contribute to sustainable urban development. In line with these objectives, our study utilized a variety of materials and methods to ensure a rigorous and comprehensive analysis of rural gentrification (RG) development; this computational initiative began in 2023 with the seminal work of authors Capobianco, Lorenzo and Polverino, Salvatore.

1. **PRISMA Protocol**: The researchers followed the PRISMA (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses*) Protocol to ensure a systematic and transparent approach to their analysis.

2. **For quantitative Semantics**, the importance of different perceptions on rural gentrification (RG) development has relied on information retrieval priorly to the dimensionality assessment. The equation *Term Frequency* (TF) was fundamental to calculate the frequency of a term "$t$" in a document "$d$" relative to the total number of terms in the document. The basic measure of how often a term occurs in a document was computed, in relation with the document's length (Eq. 1); its alternative logarithmic form has, precisely, (Eq. 1.1) the impact of very high term frequencies in order to mitigate frequently dominating terms in a document. Its inverse measurement, the *Inverse Document Frequency* (IDF) (Eq. 1.2a), whereby *N* stands for the total number of documents *D*, while $df_t$ is the number of documents that contain the term *t*; its weighting formula $\boldsymbol{w_{t,d}}$ (Eq. 1.2b) was also obtained by multiplying the term frequency (TF) of a term in a document by the inverse document frequency (IDF) of the term across a set of textual files. TF-IDF combination (Eq. 1.3) has generated an initial document clustering.

$$\textbf{TF}\ (t, d) = \left( \frac{Number\ of\ times\ term\ t\ appears\ in\ document\ d}{Total\ number\ of\ terms\ in\ document\ d} \right) \quad [Eq.\ 1]$$

$$\textbf{TF}\ (t, d) = \log_{10}(count\ (t,\ d) + 1) \quad [Eq.\ 1.1]$$

(Mogotsi, I.C. et al., 2010) & (R. Stephen, 2004)

$$\textbf{idf}_t = \log_{10}\left(\frac{N}{df_t}\right); \boldsymbol{w_{t,d}} = tf_{t,d} \times idf_t \quad [Eq.\ 1.2a, 1.2b]$$

$$\textbf{TF-IDF}\ (t, d, D) = \boldsymbol{TF}\ (t, d) \times \boldsymbol{IDF}\ (t, D) \quad [Eq.\ 1.3]$$

(Wu, Ho Chung et al., 2008)

Migrating to the awareness of textual dependencies between multiple variables, covariance matrix **C** (Eq 2.1) was implemented to measure each pair of elements across different variables in the data, here represented by $X_C$, and $X_C^T$ its transpose. $W$ represents a weighting matrix applied to the data matrix $X_C$ in the formula of Weighted Covariance Matrix (Eq. 2.). The *Principal Components* (**PC**) (Eq. 2.3) was of fundamental importance to compute the eigenvalues and eigenvectors of the context of its *Analysis* (**PCA**).

$$\mathbf{C} = \left( \frac{1}{n-1} \right) X_C^T\ X_C \quad [Eq.\ 2.1]$$

$$\mathbf{C_S} = \left( \frac{1}{n-1} \right) (W \circ {X_C}^T)\ (W \circ X_C) \quad [Eq.\ 2.2]$$

(Hair, Joseph & Black et al., 2010)

$$\mathbf{PC} = eigen\ (C) \quad [Eq.\ 2.3]$$

The spread of number in these data sets, was measured from a variance-based ($\boldsymbol{\sigma^2}$) statistically relevant from every other number in the set (Eq. 3); the denominator of the scaling factor, $n - 1$, was used instead of $n$ (the number of data points) to correct for bias in the estimation of the population variance from a sample (this condition is known as the Bessel's correction consenting a wider degree of freedom when the sample mean $\bar{\boldsymbol{X}}$ is used as an estimator for the population mean). The normalized of the total has allowed the research to continue. A coefficient also occurred by this normalization was generated by Bayes' Theorem Formula, albeit its role was not preferred as predominant in the study.

$$\boldsymbol{\sigma^2} = \left( \frac{1}{n-1} \right) \sum_{i=1}^{n} (\boldsymbol{X_i} - \bar{\boldsymbol{X}})^2 \quad [Eq.\ 3.1]$$

(Hochkirchen, Thomas, 2010)

$$\mathbf{p\ (\theta \mid x)} = \frac{p(\theta \mid x)\ p\ (\theta)}{p(x)} \quad [Eq.\ 3.2]$$

The likelihood of observing such a difference if the null hypothesis (that the population might be equal) was provided via the t-test (Eq. 4), has rendered significant differences in the comparison of means of two independent samples, $s_1^2$, $s_2^2$ and their corresponding sample sizes $\mathbf{n_1}$,$\mathbf{n_2}$. The square root expression combined the variances of the two groups, adjusting by their respective samples, providing a measure of variability or spread of the scores.

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \quad \text{[Eq. 4]}$$

(Fox, Eric P. 1998)

A refinement for the one-way analysis of such ranks, was applied via *Kruskal Wallis* (Eq. 5), in order to determine if any statistically significant differences between the medians of two or more independent groups, was, in last instance, differing from a normal distribution of the data (making it a preferred way to the one-way ANOVA when those assumptions are not met).

$$H = \frac{12}{N\,(N+1)} \sum_{i=1}^{g} \frac{R_i^2}{n_i} - 3(N+1) \quad \text{[Eq. 5]}$$

(Kruskal, W. & W. Allen Wallis, 1952)

3. In terms of **Qualitative Semantics**: analogously to quantitative semantics, different perceptions on RG development were also explored through qualitative semantics divided into five groups: **Antonyms** (dissimilar and conflicting), **Homophones** (sound-alike albeit with dissimilar conception), **Homonyms** (spelled identically with disparate meanings), **Hyponyms** (specific words with a narrower meaning) and **Hypernyms** (if the category is general referring to specific keyword); this proven terminology was generated successfully with an original dichotomy, caption mark based, ready to be implemented for: i) "**Active Citizenship**"; ii) "**Landscape Architecture**"; iii) "**Life Cycle Assessment**"; iv) "**Rural Biodiversity**"; v) "**Rural Community Empowerment**" and vi) "**Rural Gentrification**".

4. Five semantic classes groups were enriched by a narrower set of **keywords**. This approach involved identifying relevant keywords fundamental to conduct the meta-analysis identity of this applied research. Their declination was based on uppercase letters: **rural areas** for Antonyms, i.e. depopulation, neglection, **rural** for Homonyms, i.e. gentrification, resettlement, **small town** for Hypernyms, i.e. revival, **rural areas** for Hyponyms, (the larger group) i.e. migration, dwellers, debate, inclusion, exclusion, heritage, neo-endogenous, **general** for Hypernyms, i.e. displacement, discontinuity, growth, empowerment.

5. **Anderson-Darling** test (Eq. 6) was preferred to *Kolmogorov-Smirnov*, given its statistical credibility to assess whether a sample of data comes from a specified probability distribution: important tails of distribution of keywords, specifically *n* sample size, or the number of observations in the data set, were computed, following *i*-th ordered data point, i.e. in ascending order ($Y_i$), particularly sensitive to deviations from specified areas of grouping and visually scattered along $F$ , the cumulative distribution function (CDF).

$$\mathbf{A^2} = -n - \frac{1}{n} \sum_{i=1}^{n} (2i-1)\,[\log\left(F\,(Y_i)\right) + \log\,(1 - F\,(Y_{n+1-i}))] \quad \text{[Eq. 6]}$$

(Anderson–Darling Test, 2008)

6. **Cosine similarity** (Eq. 7.1) and its components (Eq. 7.2) grouping provided a quantitative measure to evaluate the relatedness and similarity of the keywords within each group, mathematically used to measure the cosine of the angle between two non-zero vectors in an inner product space, this metric facilitated the final evaluation of similarity between two documents by calculating the cosine of the angle between their TF-IDF vectors, thus indicating how similar the document contents are.

$$\textbf{Cosine Similarity (A, B )} = \frac{A \cdot B}{\|A\|\|B\|} \quad \text{[Eq. 7.1]}$$

$$\mathbf{A} \cdot \mathbf{B} = \sum_{i=1}^{n} A_i B_i \; ; \; \|A\| = \sqrt{\sum_{i=1}^{n} A_i^2} \quad \text{[Eq. 7.2]}$$

(Ian H. Witten et al., 2011)

## 2.1. Direction to identify our agricultural research

The research on Rural Gentrification (RG) has been meticulously designed to explore the varied and multifaceted impacts that encompass economic, social, and cultural dimensions of Italian rural areas: this comprehensive

investigation begins by questioning whether the questionnaires were oriented to capture broad perspectives, specifically focusing on the touted benefits such as renovation and revitalization, alongside the economic boosts and cultural conservation efforts that advocates often highlight.

Simultaneously, it critically examines the potential negative outcomes underscored by detractors, such as increased social and economic inequalities and the displacement of lower-income populations.

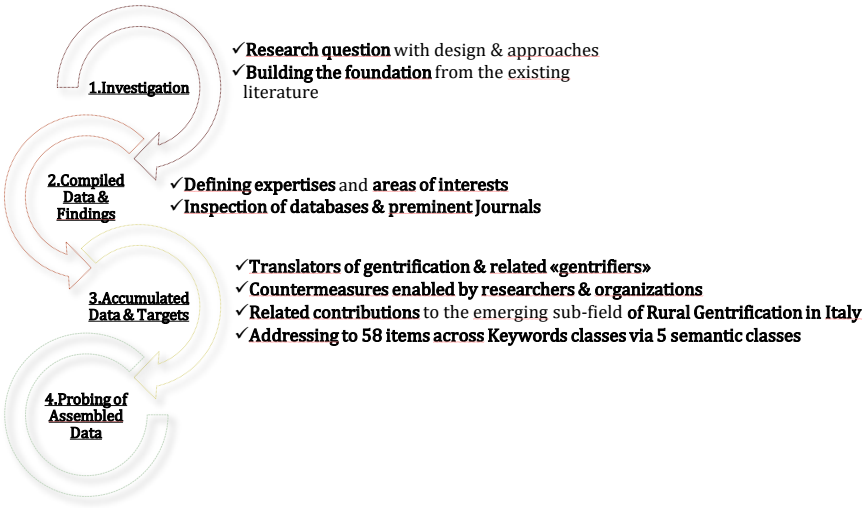
Our findings reveal that while Rural Gentrification can indeed stimulate property values, enhance local economies, and enrich cultural heritage, it also risks intensifying social disparities and eroding the fabric of local communities.

In response to these challenges, the survey further probes into the strategies developed to mitigate such adverse effects, asking what countermeasures, such as legislative reforms and community development programs, have been implemented to balance economic growth with social equity and environmental sustainability.

Additionally, the research delves into the positive outcomes of Rural Gentrification, inquiring about its contributions to community development, cultural enrichment, and local empowerment, perceived or real.

This aspect of the study highlights the potential for gentrification to act as a catalyst for positive change when managed thoughtfully and inclusively.

Lastly, in addressing the specific context of Italy, our survey clarifies into the expertise of the translators involved in the research process: this question is crucial to ensure that the subtleties of Rural Gentrification's impact are accurately captured and interpreted, reflecting the unique cultural and social dynamics at play.




**Graph 1.** Research Methodology Overview: the preliminary framework served as a base upon which computational evaluation has been expanded.

| Inquiry | Collected Data | Objectives | Results |
|---|---|---|---|
| 1. Main drivers and factors | Demographic information, economic data, historical trends | To identify and analyze the main drivers and factors contributing to rural gentrification in the studied area | 1-2. Research design and approaches and authorship: the study employed a mixed-methods research design by authors, combining qualitative and quantitative methods to gather comprehensive data on rural gentrification<br><br>3. Subject of examination: The research focused on analyzing the drivers and factors contributing to rural gentrification in the studied area. Various socio-economic, demographic, and policy-related factors were investigated<br><br>4. Study location: The research was conducted in a specific rural area or region, chosen based on its relevance and significance in terms of rural gentrification processes<br><br>5. Translators of gentrification and its gentrifiers: the study involved engaging with various stakeholders, including local residents, policymakers, community leaders, and developers, to understand their perspectives on rural gentrification. Translators, who had expertise in the field of rural gentrification and relevant cultural knowledge, played a crucial role in facilitating communication and ensuring accurate translation and interpretation of data<br><br>6. Countermeasure: The research explored the countermeasures or strategies that have been developed to address the potential negative impacts of rural gentrification. These may include initiatives aimed at preserving affordable housing, promoting community participation, or implementing sustainable development practices<br><br>7. Contribution for Rural Gentrification studies: The research findings contribute to the existing body of knowledge on rural gentrification by providing insights into the specific context studied. The results offer valuable information and recommendations for policymakers, researchers, and practitioners involved in rural development and planning, aiding in the formulation of effective strategies and policies to mitigate the negative effects of gentrification and promote sustainable rural communities |
| 2. Affordability of housing | Property assessments, changes in affordability over time and other housing market indicators | To examine the impact of the phenomenon on the affordability of housing and living costs for local residents | |
| 3. Social and economic consequences | Changes in population demographics, income levels, employment opportunities, and social cohesion indicators | To investigate the social and economic consequences on the existing community | |
| 4. Local cultural heritage | Documenting cultural sites, traditions, festivals, and other community initiatives | To assess the effects on the preservation and promotion of local cultural heritage | |
| 5. Strategies and policies | Sorting government documents, policy reports, and interviews with relevant stakeholders | To evaluate the strategies and policies implemented to manage and mitigate the negative effects | |
| 6. Job creation and income distribution | Arranging employment data, business development initiatives, and income inequality indicators | To explore the influence on the local economy, including job creation and income distribution | |
| 7. Perceptions of local residents | Conducting surveys, interviews, or focus group perceptions | To understand the attitudes and perceptions of local residents and its effects on their community | |
| 8. Access to essential services | Service provision data, mapping resources, and conducting community assessments | To examine the implications on the access to essential services, such as healthcare and education | |
| 9. Environment and natural resources impact | Land use, biodiversity, water resources, and ecological systems | To investigate the impact on the environment and natural resources in the area | |
| 10. Potential strategies for achieving a balance | Data on potential strategies for achieving a balance between economic development and the preservation of rural identity and social cohesion | To propose potential strategies for achieving a balance between economic development and the preservation of rural identity and social cohesion | |
| 11. Questionnaires designed with a top-down orientation to shape the understanding | To design with a top-down approach to shape the understanding of this phenomenon | To examine the design and orientation of questionnaires used in the research process to shape the understanding | |
| 12. Countermeasures or strategies have been developed to address the potential negative | To address the potential negative impacts: policy initiatives, community-led projects, and best practice examples | To assess the countermeasures or strategies developed to address the potential negative impacts and their effectiveness | |
| 13. Contributions emerged | To benchmark a community development, cultural enrichment, or local empowerment: success stories, community initiatives and innovative approaches | To identify and analyse the contributions or positive outcomes that have emerged in terms of community development, cultural enrichment, or local empowerment | |
| 14. The translators involved in the research | Data on the translators, involved in the research process, their expertise ensuring accurate translation and interpretation of data: qualifications, language skills and cultural knowledge | To investigate the role and expertise of translators involved in the research process, exclusively in the specific Italian scenario, to ensure accurate translation and interpretation of data | |

**Table 1.** Key Survey questions and findings: multilayered summary of the primary review.

Resilience and local heritage: two examples for rural communities: **Fig. 12.** "Wine-growing holding in the Chianti region" – La Madonna, Barone Ricasoli company (Gaiole, Chianti, Toscana)". November 2012. CC BY-SA 4.0 DEED. Author: Adbar. Wikimedia commons. **Fig. 13.** "Guardia Sanframondi" (BN, Campania). November 2016. CC BY 2.0 DEED. Author: Gianfranco Vitolo. flickr.com

## 2.2. Statistical synopsis for MCMA: rigorous literature review and PRISMA

The selection of statistical synopsis and lecture played a crucial role in research methodology, enabling researchers to effectively analyse and interpret their data: in this context, the following questions arose: "*What search platform was employed to gather relevant information*? "

Defining the search strategy is essential to ensure a comprehensive and targeted approach. Additionally, the appraisal process, **(Tab. 2, below)**, was crucial for evaluating the quality and relevance of the selected sources.

By carefully selecting and assessing statistical synopses and lectures, researchers can enhance the validity and reliability of our findings, ultimately contributing to the overall rigor and credibility of future research.

| | ***Steps*** | ***Outcomes*** | ***Methods*** |
|---|---|---|---|
| ***PRISMA*** | ***Protocol Search***<br>The research employed the PRISMA Protocol Search to systematically identify and analyse relevant literature on Rural Gentrification. This approach ensured a comprehensive and transparent review of existing studies, enabling to gain a thorough understanding of the topic | ***Study of scope***<br>The PRISMA Protocol Search yielded a comprehensive collection of research articles, reports, and other relevant sources related to Rural Gentrification. This enabled the researchers to synthesize and analyse the available information, identify trends and patterns, and draw meaningful conclusions about the phenomenon in rural areas | The PRISMA Protocol Search was conducted using a predefined search strategy tailored to the specific context of Rural Gentrification. The researchers identified relevant keywords and search terms related to RG and applied them to search platforms or databases. The search results were then screened based on inclusion and exclusion criteria to select studies that were most relevant to the research objectives. This rigorous method ensured the selection of high-quality sources for the study of RG |
| | ***Search platform***<br>The researchers utilized online databases, such as Scopus or MDPI, to search for relevant literature on Italian Rural Gentrification | ***Define the search strategy***<br>The researchers developed a comprehensive search strategy that included relevant keywords, Boolean operators, and filters to ensure the retrieval of pertinent articles on Rural Gentrification | ***Appraisal***<br>The researchers employed a systematic approach to evaluate the quality and relevance of the identified articles. This involved assessing factors such as study design, methodology, sample size, and data analysis techniques to ensure the inclusion of high-quality research |

The appraisal process considered only the targeted ecosystem and specific variables, resulting in the selection of 33 relevant studies from various publishers. These selected studies from reputable sources contribute to the study's aim of exploring Rural Gentrification in the Italian context and provide valuable insights into the subject matter in particular:

I) 14 articles from *Scienze Del Territorio* ISSN 2284-242X, *Rivista di Studi Territorialisti* and

II) 9 articles from Italian Journal of Forest and Mountain Environments Firenze University Press ISSN 2036-3494;

III) included, specifically across mountainous areas of Italy: rural education (Bartolini R. et al., 2021), immigration census (Bergamasco G. et al., 2021), farmers difficulties (Bertolino A., 2021), centralism (Bolognesi M. et al., 2021), demographic haemorrhage towards coastal and peri-urban settlements (Caridi G. et al., 2021), alpine municipalities (Cattaneo C., 2020) and minorities (Curzel V., 2021), historical (Decandia L., 2020) and urbanistic (De Matteis G. et al., 2021) narratives, alpine anthropology (Dunoyer C., 2021), agricultural gentrification (Ebbreo C., 2021) (Ferlaino F., 2021), touristic integration (Lella L. et al., 2021), ethnographic dissemination (Pazzagli R., 2021), alpine federalism (Salsa A., 2021), the program *"Manifesto of Camaldoli"* (Società Dei Territorialisti/E, 2021) and a holistic approach incorporating ecological principles and practices into agricultural systems in mountainous regions (Zollet S., 2021);

IV) forestry normative*"Testo Unico in materia di Foreste e Filiere Forestali"* (Cantiani P. et al., 2022) and its Landscape Architecture liaison (Corona P. et al., 2022), its hydrogeological risk assessment and

reforestation pattern (Iovino F et al., 2020, 2019), following stages of reforestation (Marandola D. et al., 2012), economic resilience (Marone E., 2023), D.lgs 34/2018, (Marucci A. et al., 2022), wildlife impact (Sorbetti F. et al., 2020) and Forest policy for management decision-making (Stefani A., 2021), and its economic valuation in landscape architecture planning (Stefani A., 2023).

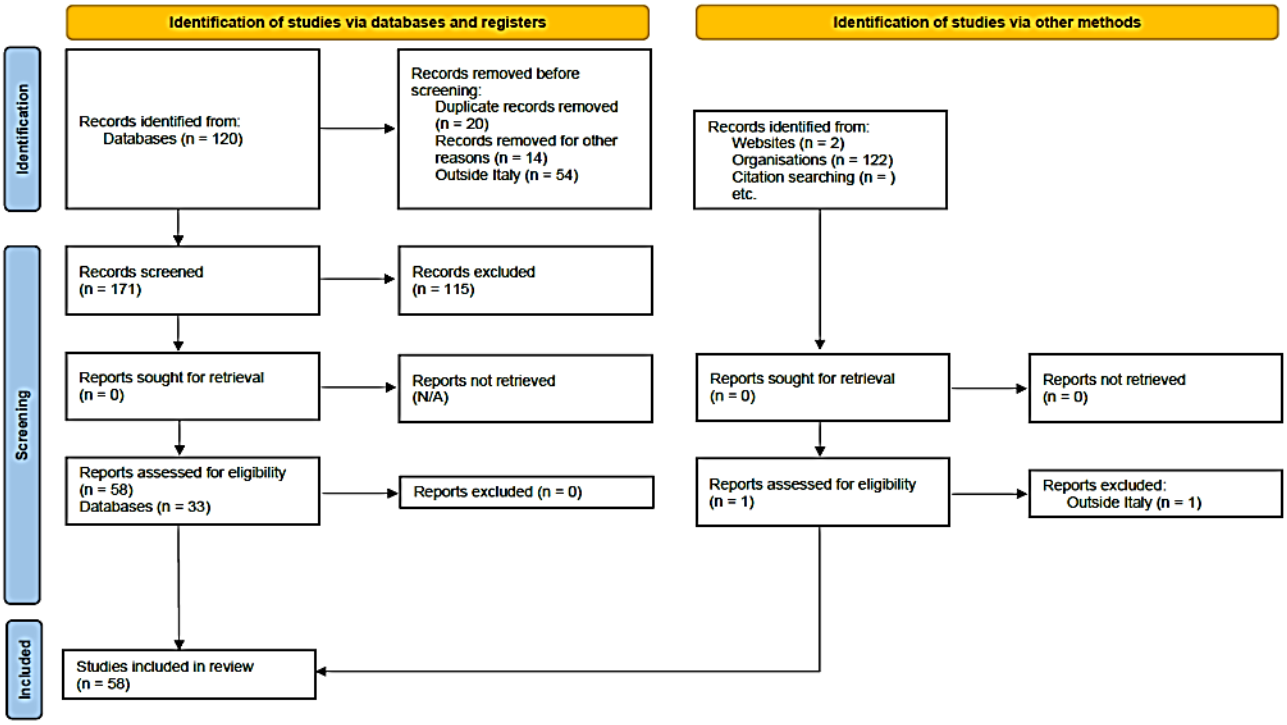



**Fig. 14.** PRISMA Protocol adaptation for RG. The research followed the PRISMA Protocol Search to identify relevant literature on rural gentrification. The search was conducted using a specific search platform, and a comprehensive search strategy was defined to ensure the inclusion of relevant studies. A total of 120 database records were initially identified. Duplicate records have been removed, resulting in the exclusion of 20 records.
Additionally, 14 records were removed for other reasons, such as irrelevance yielding implausible estimates of negative effect size.
Among the remaining records, 54 were excluded as they were not focused on Rural Gentrification in Italy.

## 3. Results: semantics variables and measurement of the interrogations for an initial regression analysis

In this stage, the assessment was binary, **(Tab. 3)**, involving a dichotomous evaluation, assigning a value of 1 for "YES" and value of 0 for "No": the first whereby a noticeable increase in agricultural productivity or recognition was achieved, the latter, regarded the exclusion of certain parameters; both evaluations served to build the initial regression of the model.

No paper in the current literature ever cited "*Severe Disadvantage*" (ACNs), so this parameter could not be classified.

| | | Variable | Interrogation and Measurement |
|---|---|---|---|
| (V1) | | European status of the land | Does the land rely exclusively within the European context? 1 = Yes; 0 = No |
| | (-a) | South-European status | Does the land rely within the European context? 1 = Yes; 0 = No |
| | (-b) | Italian status | Does the land rely exclusively within the Italian context? 1 = Yes; 0 = No |
| (V2) | | Rural scenario | Does the land rely within rural a municipality(ies) or is it fine-tuned? 1 = Yes; 0 = No |
| | (-a) | Disadvantaged rural appreciation | Is the rural context recognized by the disadvantaged status? 1 = Yes; 0 = No |
| | (-b) | RG 1305/2013 credit | Is the rural context recognized by the RG1305/2013 status? 1 = Yes; 0 = No |
| | (-c) | Severe Disadvantage (ACNs) | Does the disadvantage structurally imply a deep concern? 1 = Yes; 0 = No |
| (V3) | | Rural Gentrification (RG) | Does the current literature cover the RG concept for this exact context? 1 = Yes; 0 = No |
| | (-a) | Gentrified Rural context | Are the agricultural practices executed within a gentrified context? 1 = Yes; 0 = No |
| | (-b) | Active Economy | Is the income per-capita important within the rural municipality? 1 = Yes; 0 = No |
| | (-c/1) | Conscious Citizenship | Is the citizenship aware of territorial problems? 1 = Yes; 0 = No |
| | (-c/2-a) | Active Citizenship | Is the citizenship overall active in the participative model? 1 = Yes; 0 = No |
| | (-c/2-b) | RG1305 Active Citizenship | Is the citizenship active due to RG1305/2013? 1 = Yes; 0 = No |
| | (-c/2-c) | Agricultural Active Citizenship | Is the citizenship active due to agricultural difficulties? 1 = Yes; 0 = No |
| | (-c/2-d) | Active Citizenship for Nature | Is the citizenship active due to natural preservation? 1 = Yes; 0 = No |
| | (-c/2-e) | Active Citizenship for LCA | Has the citizenship requested/implemented the LCA protocol? 1 = Yes; 0 = No |
| | (-d) | Land Fragmentation | Has the parcellation disintegration taken place? 1 = Yes; 0 = No |
| (V4) | (I) | Top-down coverage | Are the rural mosaics covered by any top-down acknowledgement? 1 = Yes; 0 = No |
| | (-a) | Mountainous cover | Is the rural context overlapping with mountainous communities? 1 = Yes; 0 = No |
| | (-b) | Hill coverage | Are the agricultural parcels relying within an appreciable hilly fabric? 1 = Yes; 0 = No |
| | (-b/1) | European coverage | Is the governance recognition by the European level? 1 = Yes; 0 = No |
| | (-b/2) | National coverage | Is the governance recognition by the Italian government? 1 = Yes; 0 = No |
| | (-b/3) | Regional coverage | Is the governance recognition by the regional government? 1 = Yes; 0 = No |
| | (-b/4) | Interregional coverage | Is the governance recognition by any interregional association? 1 = Yes; 0 = No |
| | (-b/5) | Provincial coverage | Is the governance recognition by the provincial government? 1 = Yes; 0 = No |
| | (-b/6) | Local coverage | Is the governance recognition by the local administration? 1 = Yes; 0 = No |
| | (II) | Bottom-up coverage | Is the governance recognition at the local scale? 1 = Yes; 0 = No |
| | (III) | LA coverage | Are the rural mosaics covered by any top-down LA acknowledgement? 1 = Yes; 0 = No |
| | (IV) | Governance limitations | Are the governance models perceived as a structural obstruction? 1 = Yes; 0 = No |
| MCDA-LCIA | (I) | LCA agreement in the ED | Is the LCA suitable/implemented at the environmental scale? 1 = Yes; 0 = No |
| | (-a) | LCA exposure | Is the LCA suitable/implemented at the social scale? 1 = Yes; 0 = No |
| | (-a/1) | POL.OBJ.A2.b/I definition | Are the exogenous values potentially suitable for a top-down monitoring? 1 = Yes; 0 = No |
| | (-a/2) | POL.OBJ.A2.b/II definition | Are the endogenous values potentially suitable for a bottom-up self-evaluation? 1 = Yes; 0 = No |
| | (-b/1) | STR.PI.C2.a.I coverage | Are the limits biotic? 1 = Yes; 0 = No |
| | (-b/2) | STR.PI.C2.a.I coverage | Are the limits abiotic? 1 = Yes; 0 = No |
| | (II) | E-LCA agreement within the MS | Is the E-LCA contemplated at the mountainous scale? 1 = Yes; 0 = No |
| | (III) | LCSA Empowerment | Is the LCSA contemplated in the research-frame? 1 = Yes; 0 = No |
| | (IV) | S-LCA agreement within the MS | Is the S-LCA contemplated at the mountainous scale? 1 = Yes; 0 = No |

**Tab. 3**. Quantitative Semantics. Different perceptions on RG development.

Regarding the coefficient of determination (R^2) values, **(Tab. 4**), v1-b had the highest value (0.35014), followed by v1-a, South-European status, (0.14632), V3, Rural Gentrification, (0.10886), and V3-a, Gentrified Rural Context, (0.079365). The results that represent the least ideal values are: V4-I, Top-down coverage, and V4-IV, Governance limitations, (0.02191), followed by V4-I-b/2, National coverage, (0.016631), V4-I-b/3, Regional

coverage, (0.014379), V4-I-a, Mountainous cover, (0.013207), and V4-I-b/6, Local coverage, (0.010519). The remaining values presented low or negligible weight.

Regarding the "Optimum" which represents the point at which variables are optimized for the best performance, V3-c/2-a, Active Citizenship, had the highest value (5.9424), followed by V4-II, Bottom-up coverage, (5.6637), V4-III, Landscape Architecture coverage, (5.6366), and V3-c/2-d, Active Citizenship for Nature, (5.5846).

As for the measure of tolerance, which represents the acceptable deviation, V4-I-b/1, European coverage, showed the highest value (2.4186). The maximum value, on the other hand, is represented by V4-IV, Governance limitations, (43.833).

These results are evident as illustrated in the following graphs: i) **(Fig. 15)** highest relationships of Abundance test among variables characterize V1-a and V4-I-b assessments; ii) **(Fig. 16)** Shannon H Diversity Index across binary test subjects of research on the x-axis and the diversity index values on the y-axis, illustrating the variations in diversity among the subjects visualized within three main clusters: a) geographic context; b-c) dynamics of RG (b) and related factors and (c) examining coverage and governance dynamics in rural mosaics; d) assessing LCA implementation and coverage; iii) **(Fig. 17)** Mantel test, that visualizes the matrices of these dissimilarities, and how to interpret an alternative spatial correlation of the shaped structure; iv) the interquartile range, **(Fig. 18)**, which is a measure of statistical dispersion similarly.

| | V1-a | V1-b | V2 | V2-a | V2-b | V2-c | V3 | V3-a | V3-b | V3-c/1 | V3-c/2-a | V3-c/2-b | V3-c/2-c | V3-c/2-d |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prime | 0,79565 | 1 | 1 | 1 | 1 | 1 | -0,63576 | -0,13447 | 0,17661 | -0,66972 | 5,9424 | 1 | -0,36958 | 5,5846 |
| Acceptance | 0,87391 | 0,01 | 0,01 | 0,01 | 0,01 | 1 | -0,82817 | -0,09425 | 1,3879 | 1,7476 | -6,3305 | 0,01 | 1,5068 | -5,2809 |
| Utmost | 1,009 | 1 | 1 | 1 | 1 | 0 | 0,89511 | 1,8448 | 0,67209 | 0,71746 | 0,51786 | 1 | 0,68702 | 0,58307 |
| R-squared | 0,14632 | 0,35014 | -0,72619 | -3,5181 | -17,279 | N/A | 0,10886 | 0,079365 | 0,002123 | 0,00887 | 0,00049 | -26,446 | 0,00887 | 0,000911 |

| | V3-c/2-e | V3-d | V4-I | V4-I-a | V4-I-b | V4-I-b/1 | V4-I-b/2 | V4-I-b/3 | V4-I-b/4 | V4-I-b/5 | V4-I-b/6 | V4-II | V4-III | V4-IV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prime | 1 | 1 | 0,90853 | 0,62213 | 1 | 0,22788 | 2,2112 | 2,4246 | 1 | 1 | 1,5602 | 5,6637 | 5,6366 | -13,216 |
| Acceptance | 0,01 | 0,01 | 0,77808 | 0,70137 | 0,01 | 2,4186 | 1,6645 | 1,8095 | 0,01 | 0,01 | 1,4207 | -6,1663 | -3,4827 | -4,5676 |
| Utmost | 1 | 1 | 0,65908 | 0,98802 | 1 | 0,66963 | 0,80555 | 0,81799 | 1 | 1 | 0,6092 | 0,50824 | 1,235 | 43,833 |
| R-squared | -17,279 | -2,1621 | 0,02191 | 0,013207 | -0,72619 | 0,000195 | 0,016631 | 0,014379 | -6,7983 | -1,0216 | 0,010519 | 0,00049 | 0,006061 | 0,02191 |

| | MCDA-LCIA-I | MCDA-LCIA-I-a | MCDA-LCIA-I-a/ | MCDA-LCIA-I-a/2 | MCDA-LCIA-I-b/ | MCDA-LCIA-I-b/2 | MCDA-LCIA-II | MCDA-LCIA-III | MCDA-LCIA-IV |
|---|---|---|---|---|---|---|---|---|---|
| Prime | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Acceptance | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 |
| Utmost | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| R-squared | -12,694 | -17,279 | -12,694 | -12,694 | -12,694 | -17,279 | -17,279 | -26,446 | -26,446 |

**Table 4**. Quantitative considerations.

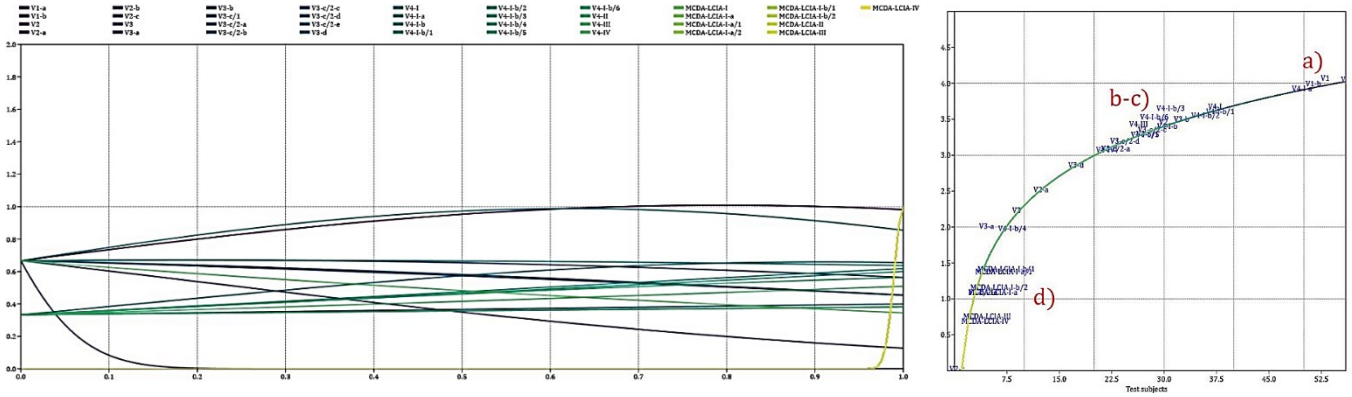



**Fig. 15.** Variables relationships in the research case study: abundance on the Y-axis. **Fig. 16.** Shannon H Diversity Index across Test Subjects.

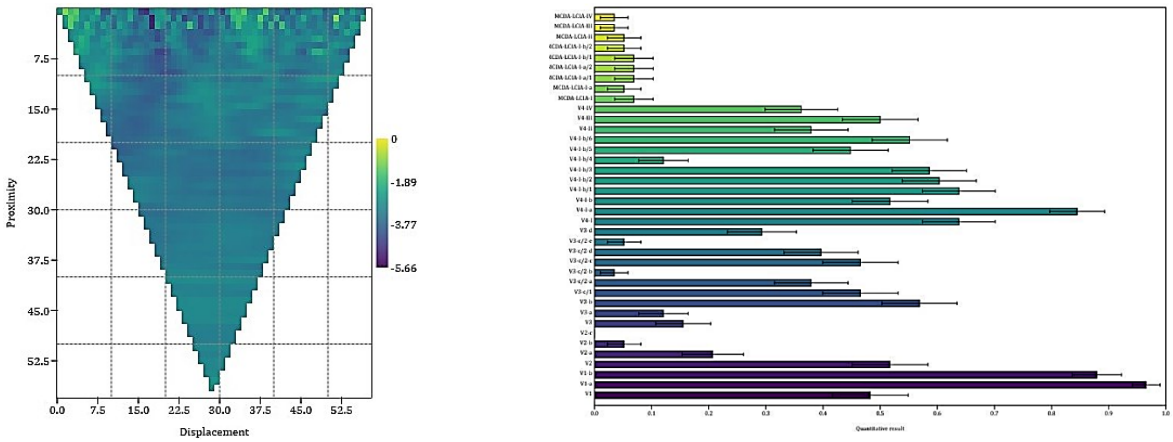



**Fig 17.** Spatial correlation among Variables of the evaluation structure. **Fig. 18.** Interquartile range.

## 3.1. Literary perspectives on rural transformation and its displacement

Conducting an initial systematic review of the relevant literature has been an essential step in this Meta-Analysis section: in this stage, our focus was on identifying qualitative and quantitative approaches and the types of data they considered, such as ordinal, nominal, discrete, or continuous so that the study's scope included an evaluation of the research location, specifically whether the studies conducted fine-tuned evaluations and how the authors intended to summarize the involvement of gentrifiers.

Various countermeasures were also accounted in the papers, contributing to rural studies from theoretical, bureaucratic, or practical perspectives. Certain papers highlighted the financial instruments derived from European funding plans, demonstrating their applicability to the local scenario.

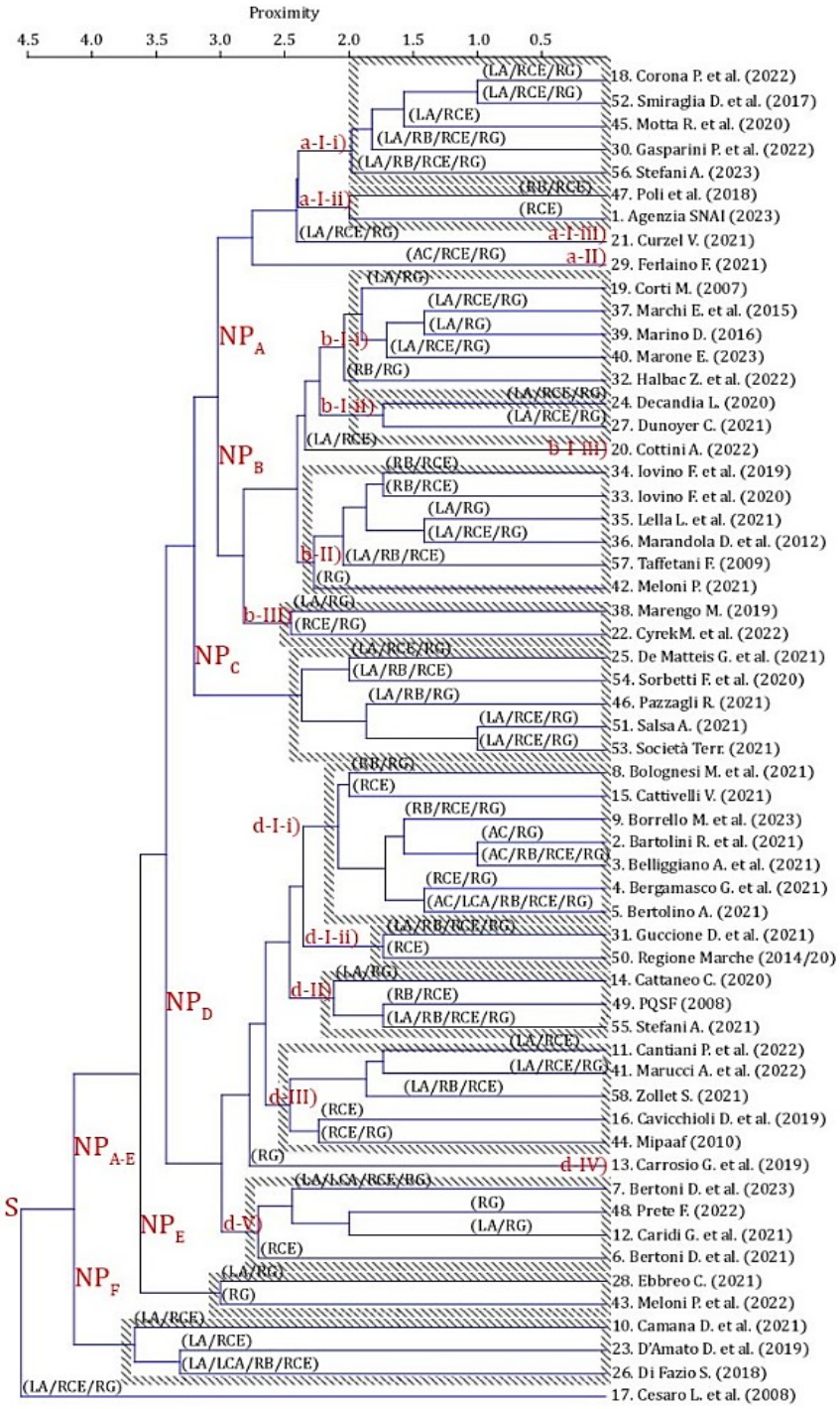



**Fig. 19.** Hierarchical tree on the current Italian RG literature: Architecture Tree of the associations based on keywords.

It's important to note that biases may arise during the initial phase of the review process: for example, limitations may exist in understanding the extent of certain projects, from the European to the local level; additionally, it cannot be assumed or expected that all combinations of terms will be found in the research, such as searching for an interregional framework that could be extended to Southern Italy.

Conscious Citizenship and Active Citizenship resulted in zero selected papers, even though inclusive citizenship was emphasized: this was because the parameter of non-rurality did not encompass this type of citizenship.

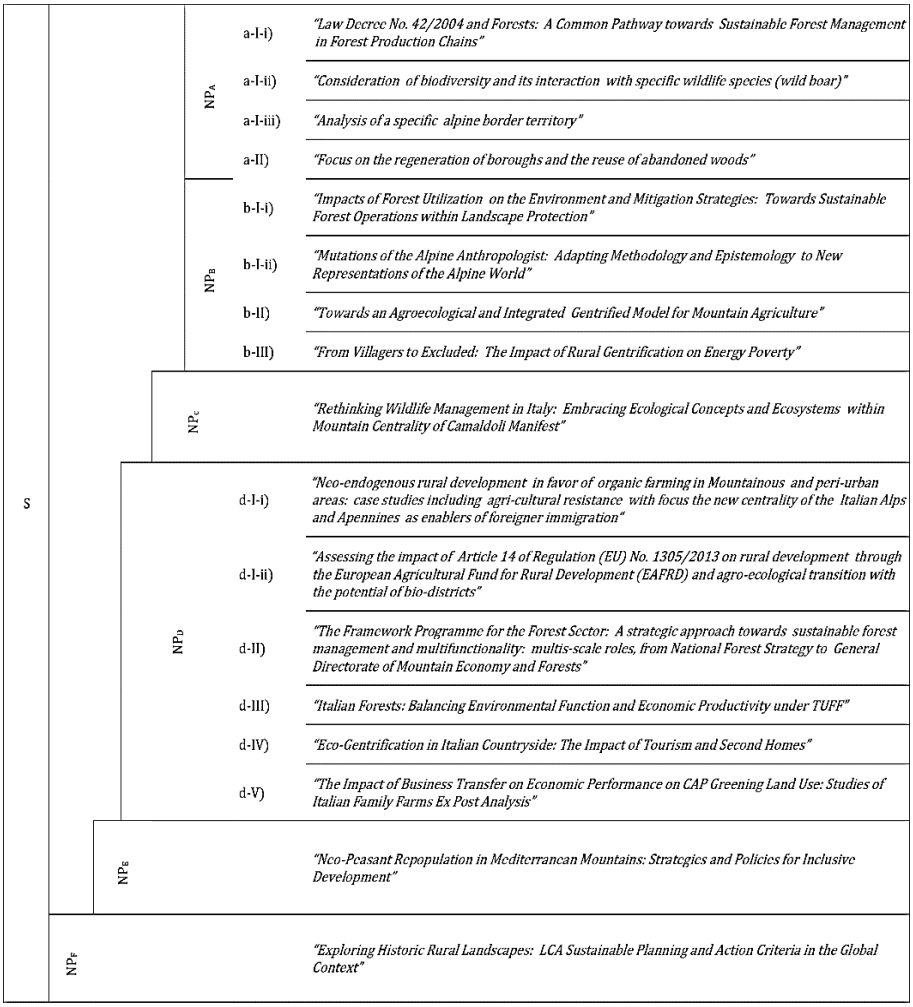
RG and its rural context consistently appeared together in the results.

Top-down coverage was interpreted as an organizational aspect, including universities and research institutions, rather than strictly governmental: papers exclusively related to RG were considered for the radar plot drivers' keywords.

In qualitative studies, the value of the top-down approach was considered null as rigid protocols were not followed while on the other hand, bottom-up coverage was understood in a broader sense, although not explicitly mentioned, suggesting that authors were not specifically directed to use this term regarding inclusivity, i.e. it should be noted that mountains and hills do not always overlap as areas of interest.

The discussion focused on biotic aspects, with limited attention to abiotic aspects, which are "big global problems that require global answers that are more difficult to formulate and agree upon". Regional policies, for example, may include areas designated as SNAI (*Sites of Community Importance for the Alpine and Apennine Habitats*) and internal areas.

Landscape Architecture (LA) coverage includes references individually related to protection and cultural heritage while the concept of Agricultural Active Citizenship refers as well to the willingness to support distinct incentives, i.e., *Payments for Ecosystem Services* (PES) which is of particular interest to the new PAC 2023-2027 scope definition.




**Tab. 5.** Parsing Sentence Structures: given titles of the obtained Semantic Complexity Tree. Six tree diagrams visualize the hierarchical relationships in the rural studies, all corresponding to the main node, "S", Sentence, by the manuscript *"The Multifunctional Role of Forests: Policies Methods and Case Studies. EFI Proceedings"* (Cesaro L. et al., 2008) which embeds the maximum range of keywords researched for such reviewing process. The main

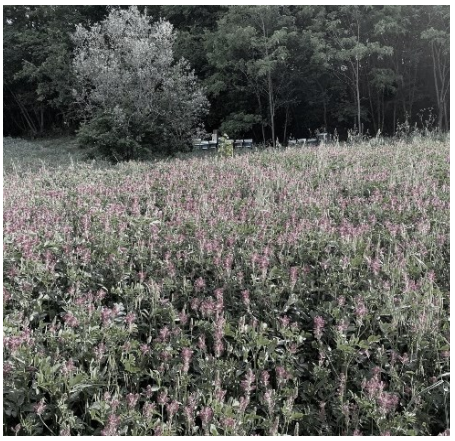
components are mutually dependent and composing independently meaningful entity to the selected criteria and named one by one enhancing consistency to the primary scope of the research, to assess Rural Gentrification viewpoints in the Italian scenario. $NPF_A$ and $NPF_b$ , "Noun Phrase function", intended as pronoun, by which the complement objects vary, interest two groups in Forestry and Landscape Heritage, that are equally meaningful to the "*Camaldoli Manifest*", $NPF_C$. They are positioned at a superior branch, with $NPF_D$, as applied frameworks, in the active citizenship process, not just limited to Agri-Cultural Resistance bottom-up summer project, in Mountainous and Peri-Urban Areas, but extended to EU Rural Development top-down entrepreneurial plans, that covered north Italy flat territories and permanently conduct Multifunctional Organic Farming in Bio-Districts.

Our study arrives to delve into the eco-gentrification of the Italian countryside, exploring the nuanced impacts of tourism and the proliferation of second homes: these developments introduce neo-endogenous features to rural areas, yet they only partially integrate with the foundational policies of the European Union, specifically the underrepresented Article 14 (EU) No. 1305/2013 as discussed in "*Estimating the CAP Greening Effect by Machine Learning Techniques: A Big Data Ex Post Analysis*" (Bertoni D. et al., 2021). This particular aspect of the European Agricultural Fund for Rural Development (EAFRD) highlights gaps between policy objectives and their local applications, demonstrating the complex dynamics at play in rural development. Rural Gentrification, although essential to the inner areas, has received limited attention, being cited in only a handful of scholarly articles, reflecting its marginal presence in discussions dominated by broader European policies: our meta-analysis aims to fill this gap by providing a thorough examination of Rural Gentrification's discourse, supported by a methodologically robust approach.

MCMA forest patchwork of silvopastoral and autumnal hues: **Fig. 20.** "The Forest in Autumn" (Rieti, Lazio) September 2019. CC BY-SA 4.0 DEED. Author: DarioMar19. Wikimedia commons. **Fig. 21.** "Italian Country House" (SI, Toscana). December 2024. CC BY-SA 2.0 DEED. Author: Gianni del Bufalo. Flickr.

The study specifically focuses on rural scenarios within Italy, aligning economic variables with regional development needs. This includes a diverse range of topics: from rural education strategies bolstered by a *bottom-up* approach advocated by ANCI (*Associazione Nazionale Comuni Italiani*) (Bartolini R. et al., 2021), to the integration of circular bioeconomy principles in Salerno province (Borrello M. et al., 2023).

Additionally, the eco-gentrification of second homes is analyzed for its effects on rural landscapes (Carrosio G. et al., 2019), alongside peri-urban dynamics (Cattivelli V., 2021), and forestry coverage (Cesaro L. et al., 2008), embracing a review' attitude towards regional-scale neo-endogenous participatory policymaking (NUTS2) (Belliggiano A. et al., 2021) and the challenges facing the social fabric of inner mountainous rural centers (Bolognesi M. et al., 2021), emphasizing the need for updated policy frameworks that encompass emerging rural features.



Integrated Rural Management: Silvopastoralism and modern Beekeeping of « *Apis Mellifera Ligustica* » at that time adopted by the Order of Benedictines in Monte Verna: **Fig. 22-23.** *"Hedysarium coronarium*" and beekeeping (Gruppo Paesaggio). (Piana di Monte Verna, CE, Campania). Author: S. Polverino. All rights reserved. **Fig. 24.**

"Benedictine walls ". (Villa Santa Croce, Piana di Monte Verna, CE, Campania). 2022. Author: L. Catrame. Creative Commons Attribution – Non commercial (Google guidelines).

This comprehensive approach not only reflects on the current academic landscape, as outlined by "*The Multifunctional Role of Forests: Policies Methods and Case Studies. EFI Proceedings*" (Cesaro L. et al., 2008), but also suggests a forward-looking strategy encapsulated in the new delivery model of the "*Rete Rurale Nazionale*" (Guccione D. et al., 2021). By examining these diverse elements, our study provides a detailed exploration of the variables influencing Rural Gentrification in Italy, offering nuanced insights into the interplay between rural dynamics and economic factors. This holistic view not only aids in understanding the specific conditions of rural Italy but also serves as a model for addressing Rural Gentrification in similar contexts worldwide.

Another important consideration involves all papers on Rural Gentrification that contain keywords related to both the rural and interregional contexts: by examining these papers, can valuable insights into the complex dynamics of gentrification not only covers rural areas as are intended by the common audience as bucolic landscapes, but also across different productive regional districts.

This approach allows for a comprehensive analysis of the interplay between Rural Gentrification and regional development, providing a more holistic understanding of the phenomenon: at the current moment, RG does not appear to interest explicitly, the interregional context that emerged to be closely associated in the current research with almost all variables used in *Multi-Criteria Decision Analysis* (MCDA).

This observation highlights the significance of considering the interregional dimension when applying MCDA techniques, so that the author was addressed initially, to capture the spatial and regional nuances that influence decision-making processes and to describe the qualitative and quantitative data. This integration enhances the robustness and accuracy of the MCDA results, enabling a more comprehensive evaluation of various criteria and their impacts across different regions. In the context of *Life Cycle Assessment* (LCA), the explicit findings may not always explicitly address certain aspects. However, one significant finding that emerges is the recognition of the resilience and self-determination exhibited by communities.



Cultivating independence: rituals of Self-Sufficiency from the past and its gentrifiers: **Fig. 25.** "Iblei beekeeping with Sicilian bees in the Fascieddi" (PA, Sicilia). September 2008. CC BY-SA 3.0. Author: Arturogenduso. Wikimedia commons. **Fig. 26.** "Madonie, Sulla coronaria" (Area naturale protetta, PA, Sicilia). June 2019. CC BY-NC.ND 2.0 DEED. Author: carlisle617. Flickr. **Fig. 27.** "Mario feeding the wild boars" (Anghiari, AR, Toscana). March 2006. CC BY 2.0 DEED. Author: Monica Arellano-Ongpin. Flickr.

This resilience is identified as a crucial response to financial crises and consumerism (Bertolino M., 2021). Notably, the local communities have developed effective techniques for recycling lavender components, which have become part of the local heritage and represent "tangible and intangible" best practices: this acknowledgment underscores the importance of valuing and preserving these community-driven initiatives, as they contribute to sustainable practices and promote the preservation of cultural and environmental resources.

The absence of explicit inclusion of *Life Cycle Assessment* (LCA) and its isolation from the themes of recycling biological materials and rural dry and oily fractions, as well as the restoration of rustic buildings and their conversion into productive rural social housing in accordance with special urban planning regulations in mountainous and/or disadvantaged municipalities, or those subject to other regional autonomy peculiarities, has emerged as a significant gap.

This gap is evident to the extent that two papers, namely "*The Impact of Business Transfer on Economic Performance on CAP Greening Land Use: Studies of Italian Family Farms Ex Post Analysis*" (Camana D. et al., 2021) and "*Neo-endogenous rural development*" in favor of organic farming in Mountainous and peri-urban areas: case studies including agri-cultural resistance with focus the new centrality of the Italian Alps and Apennines as enablers of foreigner immigration (D'Amato D. et al., 2019), were either computed separately or partially assimilated (Bertoni D. et al., 2021; Bertolino A., 2021).

The remaining literature does not closely regard Rural Gentrification but interacts and relate to different domains, (**Tab. 6**), because it is typically associated with urban areas and housing necessities and market dynamics, not necessarily implicating cultural heritage: the analysis accounts much information regarding forestry, that in Italy is still perceived as a specific rural management, for which the conservation, and utilization of its resources and ecosystems is still unknown or poorly assessed by local administrations; it involves practices such as tree planting, timber harvesting, forest conservation, and the sustainable use of forest products.

Forestry encompasses a range of activities, including forest management, biodiversity conservation, carbon sequestration, watershed protection, and the production of timber and non-timber forest products. It is primarily associated with rural or natural areas where forests are prevalent. The models attributed to rural settlements, can be translated, however, as efforts of specialized gentrified settlements: "*nuovi montanari*" (Bergamasco G. et al., 2021) constitute the new frontiers of the Italian inland settlers, whose technical professionalism contribute to moderate but significant economical features for the territory, likewise the gentrification by foreigner immigrants (Marengo M., 2019) that faces off energy consumption criteria from their respective homelands (Cyrek M. et al., 2022).

| | Author (year) | Research design and approaches | Subject of examination | Study location | Translators of gentrification & its gentrifiers | Countermeasure | Contribution for Rural Gentrification studies |
|---|---|---|---|---|---|---|---|
| 1. | Agenzia per la Coesione Territoriale. Strategia Naziona Aree Interne, SNAI. (2023)* | Quantitative Discrete data | Internal areas populations (RCE) | All municipalities, Italy. | Agenzia per la coesione territoriale & PPP | >591 Millions euro, SIE funds et al. | 60% Italian coverage 52% Municipalities 22% Italian population |
| 2. | Bartolini R. et al. (2021) | Quantitative Continuous data | School groups (AC-RG) | Mountain areas, smaller islands & inland areas by low population density; Italy. | INDIRE, Movimento delle Piccole scuole, ANCI & pupils | Survey to Programma Operativo Nazionale plurifondo | 157 Questionnaires Accordi di Programma Quadro & SNAI |
| 3. | Belliggiano A. et al. (2021) | Quantitative Discrete data | Policymaking at a local and regional scale (AC/RB/RCR/RG) | Varese Ligure(VL) & Castel Del Giudice (CG); Italy. | University of Molise, CREA-PB & VL-CG citizenships | NUTS2 survey by IsoBio (Mipaaf) | PCA for endogenous qualification to EAFRD, LEADER, LIFE & CAP et private stakeholders |
| 4. | Bergamasco G. et al. (2021) | Qualitative Ordinal & Quantitative Continuous data | Immigration statistics (RCE/RG) | All municipalities, Italy. | EURAC, University of Turin & "nuovi montanari" | Survey by MATILDE & networkForAlps | Foreign immigration in the Alps GIS survey |
| 5. | Bertolino M. A. (2021) | Qualitative Ordinal data | Agri-Cultural Resistance and Local Development (AC/LCA/RB/RCE/RG) | Susa Valley, Italy. | CREPA & farmers, Forestry office | Survey by M.A.S.K.A. | Lavender and rye cycle manufactural process |
| 6. | Bertoni D. et al. (2021) | Quantitative ex post Ordinal data | Land Use greening -based (RCE) | Lombardy Region, Italy. | University of Milan & farmers | GIS and statistical assessment | FADN-based Land Use GIS comparative study |
| 7. | Bertoni D. et al. (2023) | Quantitative Cross-sectional Discrete data | Business transfer (LA/LCA/RCE/RG) | 11,000 farms, Italy. | INRAE, University of Milan & family agri-business | Farm lifecycle by GREThA | 2008–2014 FSM succession changes & economic performance of family firms |
| 8. | Bolognesi M. & Corrado F. (2021) | Qualitative Nominal data | Centralism of the Italian Montainous Community (RR/RG) | Mountainous Communities, Italy. | Universities & PPP | PPP by Società dei Territorialisti e delle Territorialiste ONLUS | Dissertation of current state-of-art for Mountainous Communities |
| 9. | Borrello M. et al. (2023) | Qualitative Ordinal & Quantitative Continuous data | Circular Bioeconomy and the Forest-Wood Sector (RR/RCE/IRG) | 17 firms within the Campania Forest registry, Italy. | UNINA & Entrepreneurs/stakeholders | CRF by PRIN DRASTIC-MIUR-Call 2017 | Urban areas (8.5%), Intensive agriculture areas (9.9%), Intermediate rural areas (28.2%), Rural areas with general development problems (53.4%) SWOT Circular biocconomical analysis |
| 10. | Camana D. et al. (2021) | Quantitative modelling, economic data | Life Cycle Thinking & Green Deal (LCA/RCE) | WEEE treatment Facilities, Energy & Agri-entrepreneurs, Italy. | Associazione Rete Italiana LCA & PPP | EU Research & Innovation funding programs for decarbonization GHG emissions | 1999/31/CE & D.Lgs. 36/2003 dissemination |
| 11. | Cantiani P. et al. (2022) | Qualitative Ordinal data | TUFP Challenges (LCA/RCE) | All municipalities with Forestry coverage, Italy. | CREA & PA | Awareness of TUFF legislation for the pertinent application of the new Forestry Heritage code of Italy | Dissertation on Landscape Architecture protection protocols and Forestry (Testo Unico Forestale) |
| 12. | Caridi G. et al. (2021) | Qualitative Nominal data | Coastal and inner peri-urbanism (LA/RG) | Southern Ionian Calabria, Italy. | University of Reggio Calabria & N/A | N/A | Historical abstract |
| 13. | Carrosio G. et al. (2019) | Qualitative Ordinal & Quantitative Continuous data | Gentrification based on ecology (RG) | All municipalities, Italy. | University of Trieste & N/A | N/A | Eco-gentrification' exploitation |
| 14. | Cattaneo M. C. (2020) | Qualitative Nominal data | Qualitative Nominal performance of economical factors (LA/RG) | Alpine municipalities, Italy. | CRANEC, Milan & CCIAA Sondrio, TN, BZ et al and start-ups. | ALPS Benchmarking NUTS3 | Applying "Statuto Comunitario per la Valtellina" |
| 15. | Cattivelli V. (2021) | Qualitative Nominal data & Quantitative Discrete data | Planning peri-urban areas at regional level (RCE) | Lombardy, Emilia Romagna, Italy. | Eurac research & PA | Multi-Level policy for a more accurate delimitation of the territory | Dissertation on Law No. 20/2000 pioneering definition of « peri-urban agricultural areas » |
| 16. | Cavicchioli D. et al. (2019) | Quantitative Formal Epidemiological data | Market analysis & labour migration (RCE) | PO consortium (603 farms), Italy. | University of Milan & Agri-Entrepreneurs | Price cost regression analysis supported by AOP UNOLOMBARDIA (data) | LMSC & OCT Meta Analysis |
| 17. | Cesaro L. et al. (2008) | Qualitative Ordinal & Quantitative Continuous data | Forestry measures within the context of RD (LA/RCE/RG) | Rural areas recognized by RDP, Italy. | INEA, EOMF & PPP | Afforestation analysis for surfaces EAFRD eligible | Dissemination on EU Forestry Strategy |
| 18. | Corona P. et al. (2022) | Qualitative Ordinal data | Landscape Architecture & Masaf TUFF (LA/RCE/RG) | Forestry landscapes, Italy. | CREA & PPP | Towards TUFF policies | Dissemination on Legislative decrees No. 42/2004 & 34/2018 |
| 19. | Corti M. (2007) | Qualitative Ordinal data | Rural Space as a Contested Space (LA/RG) | All municipalities with Forestry coverage, Italy. | Terre Nostre & PPP | Awareness of Bibliographic sources regarding authentic rural practices for a "campagne italiane" framework | Dissemination on : Agroindustrialism, Productivism, Hedonistic Urban Neoruralism, and Peasant Neoruralism |
| 20. | Cottini A. (2022) | Quantitative Discrete data | Architectural Heritage (LA-RCE) | Eremo delle Carceri, Assisi, PG; Italy. | European Project F-ATLAS & Ordine Francescano | JPI Cultural Heritage, Horizon 2020 | Ergonomics of human-system interaction - Part 210: Human-centred design for interactive system |
| 21. | Curzel V. (2021) | Qualitative Nominal data | Minorities in Alpine settlements (LA/RCE/RG) | Ex-caserma, Alto Adige, Italy. | N/A & PA | Architecture Heritage appreciation | Co-working regeneration & Cultural Heritage |
| 22. | Cyrek M. et al. (2022) | Qualitative Ordinal & Quantitative Continuous data | Energy poverty in rural settlements (RCE/RG) | European Countries and Italy. | University of Rzeszów & PA | Energy Awareness due to Rural Gentrification : gentrifiers and rural settlements | Projection of Eurostat data among urban agglomerations in the rural landscape with a set of model estimation techniques |
| 23. | D'Amato D. et al. (2019) | Qualitative Ordinal & Quantitative Continuous data | Circular Bioeconomy (LCA/RCE) | European Countries and Italy. | Helsinki University & PPP | LCA review | Representation of LCA impact categories and their relations to CICES ecosystem services |
| 24. | Decandia L. (2020) | Qualitative Nominal data | Historical dissertation (LA/RCE/RG) | Various Neolitical sites. | University of Sassari & PPP | Genealogy of Mountainous Communities | Dissemination on an inclusive model of urbanism |
| 25. | De Matteis G. et al. (2021) | Qualitative Nominal data | Urbanistic dissertation (LA/RCR/RG) | Mountainous Communities, Italy. | Universities of Turin, Florence & | New co-existing of human settlements | Dissemination on autonomous governance by "Manifesto di Camaldoli" |
| 26. | Di Fazio S. et al. (2018) | Qualitative Nominal & Quantitative Continuous data | Historic Rural Landscapes & LCA (LA/LCA/RB/RCR) | All municipalities, Italy. | University of Reggio Calabria & PPP | Landscape wheel and crossed schemes | ICOMOS/IFLA Action Criteria |
| 27. | Dunoyer C. (2021) | Qualitative Nominal data | Alpine Anthropology (LA/RCE/RG) | Alpine municipalities, Europe & Italy. | CEPP & PPP | N/A | Dissemination on Alps as Heritage site |
| 28. | Ebbreo C. (2021) | Qualitative Ordinal data | Agricultural Gentrification (LA/RG) | Mediterranean Mountainous municipalities, Italy. | University of Calabria & PPP | N/A | Dissemination on new farmers in Mountainous Communities |
| 29. | Feriaino F. (2021) | Qualitative Ordinal data | Agricultural Gentrification (AC/RCE/RG) | Inland Areas National Strategy, Italy. | IRES & PPP | N/A | Disadvantaged Mountainous Communities |
| 30. | Gasparini P. et al. (2022) | Qualitative Ordinal & Quantitative Continuous data | Italian National Forest Inventory (LA/RB/RCE/RG) | All municipalities with Forestry coverage, Italy. | CREA, Arma dei Carabinieri (Forestali) & PA | Top-down Strong quantitative research for a defined protocol in the history of organisational structure of the Italian National Forest Inventory | Top-down Field Assessment, Survey Protocols, Data Collection, Inventory Categories, Forest Types and Forest Subtypes, Heritage, Constraints & Land Cover |
| 31. | Guccione D. et al. (2021) | Qualitative Ordinal & Quantitative Continuous data | Agro-ecology approach within Biodistricts (LA/RB/RCE/RG) | European IN.N.E.R. & 51 bio-districts, Italy. | CREA & PPP | Focus group SWOT analysis | Bottom-up participative model on current state-of-art of Agro-ecology |
| 32. | Halbac C. Z. et al. (2022) | Qualitative Ordinal & Quantitative Continuous data | Soil Degradation in a Landscape Ecology Perspective (RB/RG) | All municipalities, Italy. | Universities of Timisoara, Basilicata, Macerata, Tuscia & | Subscription to United Nations Convention to Combat Desertification | Environmentally Sensitive Area Index (ESAI) et al. (1960/90/2010) |
| 33. | Iovino F. et al. (2020) | Qualitative Ordinal & Quantitative Continuous data | Forest Management and Prevention of Hydrogeological Institution (RB/RCE) | Campania Region, Italy. | University of Calabria,CESBIM & PPP | Improvement of forest management for coppicing economy in compliance with the landscape code and biodiversity | Corine Land Cover in correlation to Carta dei Sistemi di Terre e dei Sottosistemi Pedologici |
| 34. | Iovino F. et al. (2019) | Qualitative Ordinal & Quantitative Continuous data | Coastal reforestation improvement and conservation (RB/RCE) | Calabria Region, Italy. | University of Calabria, Azienda CVC, Carabinieri Forestali & PPP | Dendro-auxometric improvement practices according to a common non-fragmentary program | Forestry dendrometry study with regard of GIS bioclimatic zones (wind) |
| 35. | Lella L. et al. (2021) | Qualitative Ordinal & Quantitative Discrete data | Inland Mountain, integrated Mountain and Tourist Districts (LA/RG) | Piemonte Region, Italy. | IRES, CNR & PA | Unitary GIS planning on demographic, settlement, natural, productive, infrastructure and services, cultural, natural capital | Projection of results of "Rapporto Le montagne del Piemonte" (3 territorial macro-areas) |
| 36. | Marandola D. et al. (2012) | Qualitative Ordinal & Quantitative Continuous data | Afforestation and creation of woodland (LA/RCE/RG) | Piemonte Region, Italy. | INEA, Federforeste & PPP (AReB) | Empowerment of Forest Stakeholders' Associations during the 2000-2006 RDP against abandonment and negligence | Limitations of Corine Land Cover tree crops and promotion of a "fragmented forest ownership" association (ROKU University) |
| 37. | Marchi E. et al. (2015) | Qualitative Nominal data | Forestry and soil ecology dissertation (LA/RCE/RG) | All municipalities, Italy. | GESAAF, DISPAA University of Florence & PPP | Sustainable soil science-based protocols | Dissertation on various authors experts in the silviculture theme |
| 38. | Marengo M. (2019) | Qualitative Nominal data | Contemporary Rural Gentrification (LA/RG) | Marginal Mountain Areas, Parco nazionale delle Foreste Casentinesi (Tuscany, Emilia Romagna), Italy. | University of Genova & PA | Empowerment of public services in Marginal Mountainous Communities | Exploitation of complex dynamics of marginal areas with new demographic immigrants |
| 39. | Marino D. (2016) | Qualitative Ordinal & Quantitative Continuous data | Market Research agri-food (LA/RG) | All municipalities, Italy. | Università del Molise & PPP | Advance of an urbane agriculture vs homogenization and standardization | Map of sustainability indicators (AFN) |
| 40. | Marone E. (2023) | Qualitative Nominal data | Economy sustainability of management options (LA/RCE/RG) | All municipalities, Italy. | University of Florence & PPP | State-Regions Conference and the landscape authorization application by the Region, together with Superintendency | Dissertation on Landscape Architecture protection protocols and Forestry (Testo Unico Forestale) |
| 41. | Marucci A. et al. (2022) | Qualitative Nominal & Quantitative Continuous data | Agroforestry D.lgs 34/2018 estimation following SE-criteria (LA/RCE/RG) | Molise Region, Italy. | Università del Molise & PPP | Embracing a unified GIS Corine Land Cover III level | Qualitative matrices of potential supply of ecosystem services linked to land cover |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 42. | Meloni P. (2021) | Qualitative Nominal data | Rural Gentrification (RG) | Southern Tuscany, Italy. | University of Perugia & N/A | Awareness of Bibliographic sources regarding Rural Gentrification in the new urbanization of the rural landscape | Exploitation of the Social Sciences and Humanities in a Rural Gentrification experimentation: *Chiantishire* |
| 43. | Meloni P. et al. (2022) | Qualitative Nominal data | Social implications for a slower urbanism (RG) | All municipalities, Italy. | Universities of Perugia and Siena & N/A | Emerging need of a quality Rural Gentrification | Exploitation on Neoruralismo provided by various authors in Arts and Architecture |
| 44. | Ministero Politiche Agricole e Forestali (2010)* | Quantitative modelling, economic data | Disadvantaged municipalities 1305/2013 in Atlante nazionale del Territorio rurale (RCE/RG) | All municipalities, Italy. | Mipaaf & PPP | Fine-tuning improvement of 1305/2013 areas (Art.32) | Biophysical criterion, fine-tuning approach, thresholds of disadvantaged municipalities |
| 45. | Motta R. et al. (2020) | Qualitative Nominal data | Forest Landscape and Protection of Cultural Heritage (LA/RCE) | All municipalities, Italy. | Universities of Turin, Viterbo, Florence, Milano (Statale), Molise, Padova, Alberitalia, Compagnia delle Foreste, CREA & Superintendency | Not agreement with the policy-ruler Superintendency regarding silvicultural management for forest areas under articles 134 & 136 CLt: dialogue to solve European Landscape Convention | Dissertation on European Landscape Convention (ELC) |
| 46. | Pazzagli R. (2021) | Qualitative Nominal data | Population dissemination (LA/RB/RG) | Molise Region, Italy. | University of Molise & SNAI | Public services in inland, marginal, and mountainous areas | Dissertation on demography within the Mountainous Landscape |
| 47. | Poli P. et al. (2018) | Qualitative Nominal data | Invasive Species Agreement for Sus Scrofa within the International Union for Conservation of Nature (IUCN) (RB/RCE) | Elba, Castelfalfi, Monte Pisano & all municipalities, Italy. | University of Pisa, European Commission & PPP | More effective hunting control for a quality landscape | Dissertation on Veterinary and Crop Safety |
| 48. | Prete F. (2022) | Qualitative Nominal data | Italian legal framework of agricultural land succession and of land acquisition by legal Persons (RG) | All municipalities, Italy. | University of Campania, Agricultural Ministry & Private Stakeholders | N/A | Dissertation on The Italian Civil Code & Family Pact : Italian Legal Framework of Agricultural Land Succession and Acquisition by Legal Persons |
| 49. | Programma Quadro per il settore forestale (2008)* | Quantitative modelling, economic data | Framework program for the forest sector (RB/RCE) | All municipalities, Italy. | Mipaaf, MATTM, Regions and Trento-Bolzano, INEA-CREA, ISMEA, EU & PPP | Inea as part of the activities of the Rural Network National, Action 3.2.2 " Information on the contents and results of rural development policies" | Inventory categories Forest categories, SWOT and National Priority Goals |
| 50. | Regione Marche (2014/2020)* | Quantitative modelling, economic data | Cost-benefit analysis, programme cycle model and nudge politics (RCE) | Agri-Entrepreneurs, ATS, GP (PEI), PA & PMI, Italy. | Regione Marche & beneficiaries | RG 1305/2013 FEASR | Financial Plan – Submeasures: (I) Training, (II) Information & (III) Exchanges |
| 51. | Salsa A. (2021) | Qualitative Ordinal data | History of Alpine federalism (LA/RCE/RG) | Alpine municipalities, Italy. | Trentino School of Management & PA | Proposing a local self-government orientation in favour of the Alpine municipalities, following historical evidences trespassing neoliberal policies | Dissertation on anthropological re-visionism of agroforestry practices (fragmentation of forest areas) for a unified vision of self-government |
| 52. | Smiraglia D. et al. (2017) | Qualitative Ordinal & Quantitative Continuous data | Landscape Metrics (LA/RCE/RG) | Alpine municipalities, Italy. | ISPRA, University of Rome, CREA-AA-FL & PA | Emerging relationship with United Nations sustainability | Application of FRAGSTATS metrics & ESAI framework |
| 53. | Società Dei Territorialisti/E (2021) | Qualitative Nominal data | Manifesto di Camaldoli (LA/RCE/RG) | Mountainous Communities, Italy. | Società Dei Territorialisti/E & PA | Emerging evidence of a community of self-government for the mountains | Dissertation on historical evidence provided by Camaldoli Conference |
| 54. | Sorbetti F. et al. (2020) | Qualitative Nominal & Quantitative Discrete data | Wild Ungulate and Forest (LA/RB/RCE) | All municipalities with Forestry coverage, Italy. | University of Florence & PPP | Emerging necessity of implementing tailored policies in specified tree-crops | Qualitative results of the interaction: ungulates and agroforestry crop production in Tuscany |
| 55. | Stefani A. (2021) | Qualitative Nominal data | Mountain Economy and Forests (LA/RU/RLE/RG) | All municipalities with Forestry and Mountainous coverage, Italy. | Direzione generale dell'Economia montana e delle forest (MiPAAF) & PPP | Emerging necessity of implementing new policies : « The new National Forest Strategy » (Nuova Strategia Forestale) | Public Policy Dissertation by Topic: 1999/105/CE, D.lgs. 3 04/2018, n.34 (TUFF), "Carta forestale nazionale" (For Italy) et al. |
| 56. | Stefani A. (2023) | Qualitative Nominal data | Landscape Architecture (Heritage) and Forest production chains (LA/RB/RCE/RG) | All municipalities with Forestry and Mountainous coverage, Pine forests (Pineta del Tombolo, Castiglione della Pescaia, Grosseto Tuscany), Italy. | Direzione generale dell'Economia montana e delle forest (MiPAAF) & PPP | Emerging necessity of implementing a horizontal multiscalar governance model beyond the legislative contradictions for the common good | Public Policy Dissertation by Topic: ex art. 136 42/04 & TUFF in compliance with the art.136, 142, 149 and the opinions of the Council of State |
| 57. | Taffetani F. (2009) | Qualitative Ordinal & Quantitative Continuous data | Residual sylviculture and biodiversity conservation (LA/RB/RCE) | Capitanata, Selva di Castelfidardo nella Valle del Musone, Marche, Boschi della Riserva Naturale di Onferno, Italy. | University of Marche & PPP | Necessity of an updated biodiversity inventory beyond PA structural limits | Three forestry case studies regarding: Land Cover, qualitative bioclimatic and biodiversity data |
| 58. | Zollet S. (2021) | Qualitative Nominal data | Territorial Agro-ecological and Integrated Model for Mountain Agriculture (LA/RB/RCE) | Valbelluna, Veneto, Italy. | University of Hiroshima & PPP | To elevate the Mountainous Communities As privileged laboratories | Dissertation on Agro-ecological and integrated pathway for mountain agriculture |

**Table 6.** Evaluated papers for this study on Rural Gentrification for the Italian rural landscape.

## 3.2. Navigating dichotomies : literary reflections on divisions

Proper execution of the *Systematic Literature Review* (SLR) process has been crucial, requiring careful planning before starting the review work. On the other hand, Meta-Analysis uses statistical techniques to combine data from multiple related studies, generating more precise estimates on the topic of study: a key advantage of Meta-Analysis lies not only in its ability to aggregate data but also in its capacity to quantify variation and consistency across studies, offering even more robust coherence that can be more conclusive than those derived from any single study, and therefore drawing conclusions based on the synthesized evidence.

The study explores the five semantics of terminology and the dichotomy within various concepts, across an unexplored pattern in Rural Gentrification: as a novel aspect of the Meta-Analysis, the following paragraph **(Tab. 7)** elucidates to propose a numerical *Principal Component Analysis* (PCA) wide range of semantic and linguistic categories, priorly plotted to match their dimensional similarity in order to conceptualize an initial spatial dimensionality **(Fig. 28)**: the highest eigenvalue regarded axis 1 with a variance estimated at 75,176%.

| | Axis 1 | Axis 2 | Axis 3 | Axis 4 |
|---|---|---|---|---|
| 1 | -0,0316281 | -0,123586 | 0,0089155 | 0,00117634 |
| 2 | -0,101904 | -0,0122675 | -0,0280296 | -0,000768628 |
| 3 | 0,0208931 | 0,004876 | 0,0274053 | -0,0019621 |
| 4 | 0,0352677 | 0,0779474 | 0,0109729 | 0,00156421 |
| 5 | 0,0969164 | 0,0432936 | -0,0170272 | 6,84862E-06 |
| 6 | -0,0580811 | 0,011806 | 0,0020096 | 6,2916E-05 |
| 7 | 0,208253 | -0,0423312 | -0,00720555 | -0,000225589 |
| 8 | 0,0354546 | -0,00720679 | -0,00122673 | -3,8406E-05 |
| 9 | -0,0813314 | 0,0165321 | 0,00281406 | 8,81017E-05 |
| 10 | -0,0904818 | 0,0183921 | 0,00313067 | 9,80138E-05 |

| Axis | Eigenvalue | % of total | Cumulative |
|---|---|---|---|
| 1 | 0,00825893 | 75,176 | 75,176 |
| 2 | 0,00251421 | 22,885 | 98,061 |
| 3 | 0,000212162 | 1,9312 | 99,993 |
| 4 | 8,23064E-07 | 0,0074918 | 100 |

**Tab. 7.** PCA data points.

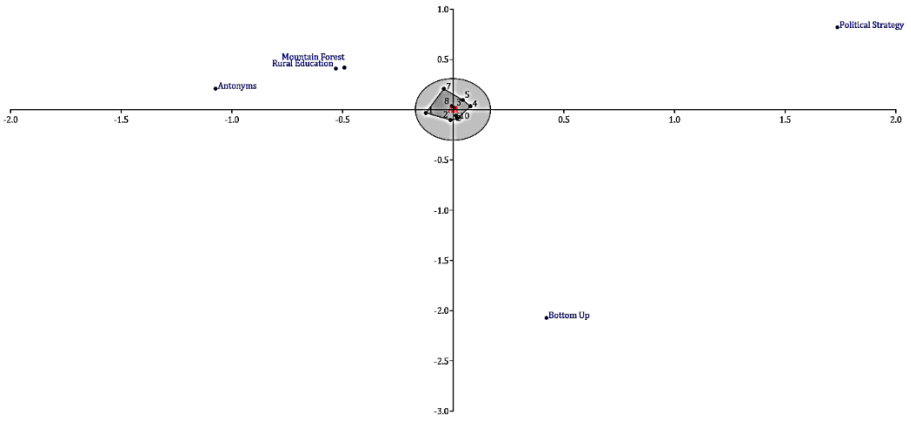
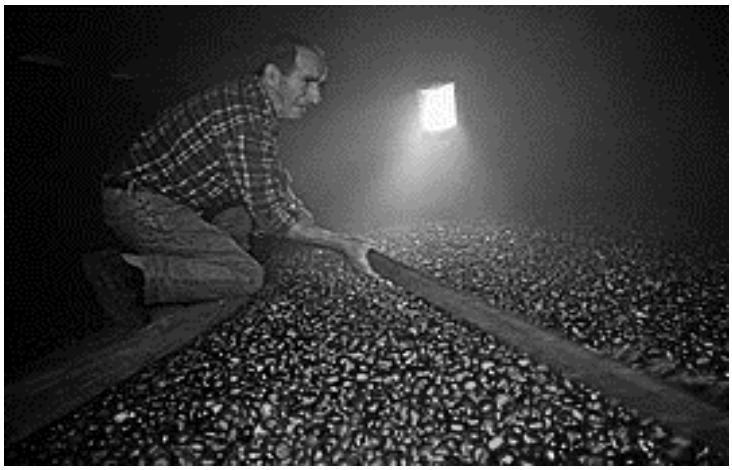


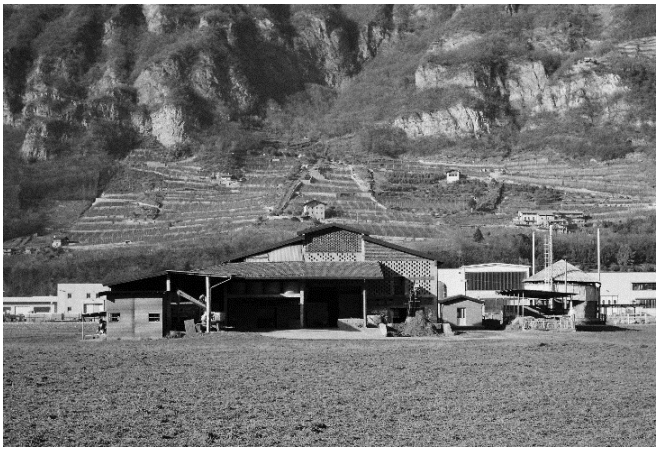

**Fig. 28.** Structure of the evaluated Principal Component Analysis semantics.

Antonyms, which represent contrasting meanings, are examined in relation to different topics, such as “Active Citizenship” versus “Inactive Citizenship”, “Landscape Architecture” versus “Urban Design”, and “Rural Biodiversity” versus “Urban Biodiversity”. Homophones, which are words that sound alike but have different meanings, are also discussed, including variations of “Active Citizenship” and “Landscape Architecture”. Homonyms, on the other hand, are words that are spelled identically but have diverse meanings, such as the different interpretations of “Active Citizenship” and “Landscape Architecture”. Hyponyms, which are more specific words under a general term, are identified, such as various forms of civic engagement under “Active Citizenship” and specific aspects of landscape architecture. Lastly, hypernyms, which are general terms referring to a category of more specific words, are examined, such as “Civic Engagement” as a hypernym for “Active Citizenship” and “Wildlife Conservation” as a hypernym for “Rural Biodiversity”.

Traditional crafts: rituals of seasonal gentrification: **Fig. 29.** “Sheep shearing” (Anghiari, AR, Sicilia). April 2006. CC BY 2.0 DEED. Author: Monica Arellano-Ongpin. Flickr. **Fig. 30.** “Jewels of the Metato” (Borgo a Mozzano, Associazione Castanicoltori della Lucchesia, LU, Toscana). October 2022. CC BY 4.0 DEED. Author: Simobati1978. Wikimedia Commons.

The results indicate that the categories “Mountain Forest” and “Rural Education” show similarity and compactness within the Antonyms grouping. This suggests that these two categories have semantic similarities and are closely related in terms of their characteristics or features. On the other hand, the categories “Political Strategy” and “Bottom-Up” appear in different quadrants, indicating that they are distinct from each other and exhibit different semantic characteristics.




Montainous gentrification in the Alpine context: **Fig. 31.** “rus” (Piancogno, BS, Lombardia). CC BY 2.0 DEED. Author: Uqbar is back. January 2022. Flickr. **Fig. 32.** “Cow shed” (Pieve di Cadore, BL, Veneto). CC BY 2.0 DEED. Author: John Mason. April 2019. Flickr.

The positioning of these categories in different quadrants suggests that they have different properties or attributes, and they are not closely related in terms of their semantic meaning or concept. Overall, the results of the analysis highlight the similarities and differences between these categories and provide insights into their semantic relationships.

## 3.3. Statistical analysis of semantic classes and keywords : distribution and variance

The statistical analysis of semantic classes and keywords provides valuable insights into their distribution and variance within a given dataset. This analysis involves examining the frequency and occurrence of different semantic classes and keywords to understand their patterns and variations.

The distribution though a preliminary semantic classification, subdivided into ontological classes, **(Tab. 8)**, has highlighted crucial and potential wide-ranging keywords spread across the textual datasets, allowing to plot and understand the prevalence or occurrence of each pivotal semantic sub-class by manually counting keywords.

| ***Semantics*** | ***Probing terminology & Dichotomy*** | ***Ontological classes*** |
|---|---|---|
| Antonyms | Dissimilar, opposite, contrasting, contrary, conflicting, disparate, inverse, such as: i) for *"Active Citizenship"*, "Inactive Citizenship", ii) for *"Landscape Architecture"*, "Urban Design", iii) for *"Life Cycle Assessment"*, "Death Cycle Analysis", iv) for *"Rural Biodiversity"*, "Urban Biodiversity", v) for *"Rural Community Empowerment"*, "Urban Community Disempowerment", vi) for *"Rural Gentrification"*, "Urban Depopulation". | *"Active Citizenship" "Landscape Architecture" "Life Cycle Assessment" "Rural Biodiversity" "Rural Community Empowerment" "Rural Gentrification"* |
| Homophones | Sound-alike words with different meanings, such as: i) for *"Active Citizenship"*, "Activism Citizenship", "Actuated Citizenship"; ii) for *"Landscape Architecture"*,"-scape Architecture"; iii) for *"Life Cycle Assessment"*, "Life Cycle Appraise"; iv) for *"Rural Biodiversity"*, "Rural Bio diverseness"; v) for *"Rural Community Empowerment"*, "R. C. Enfranchisement", "R. C. Authorization", "R. C. Franchise", "R. C. Permit"; vi) for *"Rural Gentrification"*, "Countryside Gentrification", "Rural Renovation", "Rural Renewal", "Rural Revitalization"; *et similia*. | |
| Homonyms | Words that are spelled identically but have disparate meanings, such as : i) for *"Active Citizenship"*, "Engaged Citizenship", "Participatory Citizenship", "Responsible Citizenship", "Proactive Citizenship", "Involved Citizenship", "Active Involvement", "Civic Participation", "Civic Responsibility", ii) for *"Landscape Architecture"*, "Landscaping", "Site Planning", "Gardening", "Land Forming", "Land Design", "Outdoor Planning", "Land Art", "Landscape Infrastructure", ii) for *"Life Cycle Assessment"*, "Environmental Impact Analysis", "Sustainability Analysis", "Carbon Footprint Analysis", "Resource Utilization Analysis", iii) for *"Life Cycle Assessment"*, "Environmental Impact Assessment", iv) for *"Rural Biodiversity"*, "Rural Biology", "Rustic Microbiology", v) for *"Rural Community Empowerment"*, "Community Development", for vi) *"Rural Gentrification"*, "Small Town Revival" | |
| Hyponyms | Specific words that are more specific than the general term, such as: i) for "*Active Citizenship*", "Community Service", "Voter Registration", "Volunteering", "Social Activism", "Political Engagement", "Environmentalism", "Civic Education", "Participatory Governance", "Charitable Giving", "Public Awareness Campaigns", ii) for *"Landscape Architecture"*, "Hardscaping", "Site Furnishings", "Plantings", "Urban Design", "Garden Design", "Stormwater Management", "Irrigation Design", "Grading and Drainage", "Erosion Control", "Green Roofs", "Green Walls", iii) for *"Life Cycle* Assessment", "Environmental impact assessment", "Carbon footprint assessment", "Resource use assessment", "Life cycle costing", "Eco-efficiency assessment", "Sustainability assessment", "Environmental impact modelling", "Environmental performance assessment", "Life cycle inventory analysis", "Life cycle energy analysis", "Material flow analysis", "Embodied energy analysis", *for iv) "Rural Biodiversity"*, "Pollinator conservation", "Crop diversity", "Agroforestry", "Native species conservation", "Livestock diversity", "Soil conservation", "Wetland conservation" ,"Landscape connectivity", for v) *"Rural Community Empowerment"*, "Educational Opportunities", "Entrepreneurial Support", "Access to Resources", "Leadership Development", "Youth Engagement", "Civic Engagement", "Health Care Services", "Environmental Conservation", "Economic Development", "Community Development", for vi) *"Rural Gentrification"*, "Urbanization of rural areas", "Migration of city-dwellers to rural areas", "Suburbanization of rural areas", "Influx of wealthy people to rural areas", "Increase in land prices in rural areas", "Increase in housing prices in rural areas", "Increase in amenities in rural areas", "Shift from agricultural to non-agricultural land use in rural areas", "Expansion of tourist industry in rural areas", "Increase in retail services in rural areas", "Social issues within rural patterns". | |
| Hypernyms | General terms that refer to a category of more specific words, such as: for i) "*Active Citizenship*", "Civic Engagement", "Citizen Participation", "Grassroots Activism", "Community Involvement", "Political Empowerment", "Public Involvement", "Social Advocacy", for ii) "*Landscape Architecture*", "Environmental Design", "Ecological Planning", "Urban Design", "Site Planning", "Public Space Design", "Parks and Recreation Design", "Land Art", for iii) *"Life Cycle Assessment"*, "Ecological Footprint", "Carbon Footprint Analysis", "Environmental Impact Assessment", "Sustainability Assessment", "Cradle-to-grave Analysis", "Greenhouse Gas Accounting", for iv) *"Rural Biodiversity"*, "Wildlife Conservation", "Agroecology", "Habitat Restoration", "Ecosystem Management", "Sustainable Agriculture", "Landscape Ecology", "Conservation Biology", for v) *"Rural Community Empowerment"*, "Community Development", "Participatory Approaches", "Grassroots Mobilization", "Capacity Building", "Socioeconomic Empowerment", "Rural Livelihoods Enhancement", "Citizen Engagement", for vi) *"Rural Gentrification"*, "Rural Displacement", "Exclusionary Development", "Urbanization of Countryside", "Disruption of Rural Heritage", "Inequitable Growth", "Rural Revitalization", "Cultural Erasure", "Property values estimated". | |

**Tab. 8.** Study of semantics involves probing terminology, exploring dichotomies, and ontological classes.

Active Citizenship, characterized by civic engagement and participation, stands in contrast to Inactive Citizenship or Non participatory Citizenship.

While Active Citizenship involves various forms of involvement, such as volunteering, advocating for social issues, and participating in community organizations, Inactive Citizenship is referred to a lack of engagement and participation in civic affairs.

Similarly, the field of Landscape Architecture focuses on the design and planning of outdoor spaces, while Urban Design pertains specifically to the design and planning of urban areas. "*Life Cycle Assessment*" examines the environmental impact of products and processes, whereas the opposite, "*Death Cycle Analysis*" would be intended as the end-of-life stage and disposal methods.

Rural Biodiversity encompasses the variety of species and ecosystems in rural areas, while Urban Biodiversity refers to the diversity of species and ecosystems in urban environments. Rural Community Empowerment seeks to enhance the well-being and capacity of rural communities, while Urban Community Disempowerment refers to the weakening or marginalization of urban communities. Lastly, Rural Gentrification describes the transformation and influx of wealthier residents into rural areas, while Urban Depopulation signifies a decline in urban population and the associated challenges.

Variance will be implemented forward to measure this variability or diversity of each semantic classes and keywords, whether a high variance indicated that the semantic classes and keywords has been more diverse and widely distributed, while a low variance suggested that they were more concentrated or limited in their occurrence.

Active Citizenship through rural reenactments: positive Rural Gentrification: **Fig. 33.** "Intramontabile Passione" Municipal mill (Le Cure, Fabbriche di Vergemoli, Garfagnana, LU, Toscana). CC BY 4.0 DEED. Author: Simobati1978 December 2019. Wikimedia Commons. **Fig. 34.** "Artisan of sporti baskets" the craft of cherry wood (Source: Barleri P. La Starza e il suo Castello: 51).

## 3.4. Data extraction from TF-IDF

The structure, by counting each keyword respectively structured in the following table, has noted important variations or patterns, with the implementation of the TF-IDF (*Term Frequency-Inverse Document Frequency*) technique used for data extraction in natural language processing and information retrieval: its numerical representation becomes of importance whereby a term within a document or a collection of documents is transformed in dimensional metrics measuring the frequency of Rural Gentrification terms implied within the unique website and 57 manuscript documents.

The assignment of a higher weight to terms might appear more frequently, as they are likely to be more important in representing the content of the document; respectively, the IDF (*Inverse Document Frequency*) measures the rarity of a term across a collection of documents; i.e. it assigns a higher weight to terms that are less common across the collection, as they are considered more informative or distinctive in this collection.

## 3.5. Risk of bias assessment

Risk of bias assessment in a Meta-Analysis is a systematic evaluation of the methodological quality and potential sources of bias in the included studies: various aspects of study design, conduct, and reporting have been benchmarked to determine the overall risk of bias in the collected data.
Common domains assessed for bias include randomization, allocation concealment, blinding, selective reporting, and funding sources, within the borders of the Italian context privileging mountainous and hilly areas.

By identifying and addressing potential biases, the risk of drawing misleading conclusions from the Meta-Analysis is minimized, and the overall quality of the evidence is enhanced: keywords were chosen and limitedly picked up in the reference section, to give robustness as for 1305/2013 policy-making specificity in the context of word TF-IDF (*Term Frequency-Inverse Document Frequency*) involving the process of retrieving relevant information from a collection of documents or texts up to 2023, at what time the new CAP begun.

TF-IDF is a numerical representation that measures the importance of a word in a document relative to a corpus of documents within the beforementioned semantic classes. **Tab. 9** illustrates the potential deficits highlighted to deepen the choice of corresponding *Bag of Words* (BoW) to Rural Gentrification.

| Semantic class | Keywords | No. | Mean | Variance | Std. dev. | Std. error | Skew | Kurt. | Shapiro-Wilk K *p** | | Anderson-Darling *p** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Antonyms (Rural areas) | A1 - Depopulation | 27 | 3 | 7,61 | 2,7595 | 0,53 | 2,07 | 5,56 | 0,74 | 1,54 E-05 | 2,14 | 1,456 E-05 |
| | A2 – Neglect/Abandon/De-ruralisation | 41 | 6,17 | 25,24 | 5,024 | 0,78 | 1,21 | 1,07 | 0,87 | 233,7 E-06 | 1,56 | 436,7 E-06 |
| | A3 – Fragility/(inter-farm) Difficulty of access/Distance/Isolation/Fragmentation/Desertification/Disadvantaged/Marginalization | 53 | 109,64 | 491196,5 | 700,85 | 96,27 | 7,27 | 52,88 | 0,13 | 4,91 E-16 | 31,59 | 2,36 E-71 |
| | A4 - Blight/Degradation (rural/urban) | 16 | 13,81 | 808,83 | 28,44 | 7,11 | 2,92 | 8,71 | 0,52 | 3,14 E-06 | 3,26 | 1,29 E-08 |
| Homophones (Rural) | B1 - Gentrification | 9 | 22,77 | 1112,944 | 33,36 | 11,12 | 1,74 | 2,71 | 0,73 | 0,0038 | 1,02 | 0,0056 |
| | B2 – Renovation/Rebirth/Resettlement | 15 | 2,86 | 6,55 | 2,56 | 0,66 | 1,35 | 0,93 | 0,76 | 0,0014 | 1,45 | 594 E-06 |
| | B3 - Renewal | 20 | 5,9 | 123,56 | 11,12 | 2,48 | 11,12 | 3,64 | 0,48 | 2,41 E-07 | 3,74 | 1,02 E-09 |
| | B4 – Revitalization/Promotion/Recovery/Defense/Defence | 45 | 14,06 | 725,60 | 26,94 | 4,01 | 3,82 | 16,01 | 0,48 | 2,16 E-11 | 8,31 | 1,47 E-20 |
| | B5 – Protection (Landmarks/Cultural & natural resources) | 40 | 26,45 | 3452,20 | 58,75 | 9,29 | 3,99 | 17,98 | 0,46 | 5,89 E-11 | 7,85 | 1,64 E-19 |
| Homonyms (Small Town) | C1- Revival | 5 | 1 | 0 | 0 | 0 | 0 | 0 | N/A | N/A | N/A | N/A |
| Hyponyms (Rural areas) | D1 – Population for Migration/Emigration/Migrants/Emigrants | 40 | 16,5 | 312,41 | 17,67 | 2,79 | 1,35 | 0,82 | 0,79 | 5,86 E-06 | 3,05 | 8,46 E-08 |
| | D2 – Dwellers/Montanari/Inhabitants | 30 | 8,7 | 68,63 | 8,28 | 1,51 | 1,70 | 2,47 | 0,79 | 4,90 E-05 | 2,28 | 6,40 E-06 |
| | D3 – Suburbanization/Antropizzazione | 23 | 2,91 | 7,54 | 2,74 | 0,57 | 1,74 | 2,78 | 0,74 | 5,30 E-05 | 2,16 | 1,13 E-05 |
| | D4- Demographic influx/Resilience/Decline/Imbalance/(counter)Trends/Indexes/Increase/Decrease | 26 | 7,46 | 70,02 | 8,37 | 1,64 | 1,96 | 3,99 | 0,76 | 3,49 E-05 | 2,15 | 1,27 E-05 |
| | D5 – Increase/Decline/Appreciation (in land prices/rural products/Forest/Policy-oriented) | 18 | 12,78 | 1378,89 | 37,13 | 8,75 | 4,19 | 17,67 | 0,32 | 3,14 E-08 | 5,30 | 1,10 E-13 |
| | D6 - Increase (in housing prices) | 17 | 3,12 | 8,36 | 2,89 | 0,70 | 2,012 | 4,84 | 0,75 | 470,5 E-06 | 1,37 | 10,03 E-04 |
| | D7- Increase (in heritage amenities/rural factors/functional weight) | 32 | 10,91 | 656,41 | 25,62 | 4,53 | 4,75 | 24,45 | 0,39 | 22,23 E-10 | 6,61 | 1,33 E-17 |
| | D8 – (rural) Landscape/Cultural/Heritage/Territory/Historic/History constraint | 53 | 30,64 | 3608,70 | 60,07 | 8,25 | 4,43 | 23,90 | 0,49 | 26,44 E-13 | 8,402 | 10,11 E-21 |
| | D9 – Agricultural/Shift/Intensity/Supply/Labour chain | 48 | 34,37 | 2283,18 | 47,78 | 6,90 | 1,87 | 2,79 | 0,71 | 23,83 E-09 | 5,10 | 8,45 E-13 |
| | D10 - Tourism | 37 | 7,89 | 82,88 | 9,10 | 1,50 | 2,20 | 4,64 | 0,71 | 3,07 E-07 | 3,57 | 4,19 E-09 |
| | D11 - Retail services /Agricultural/Internal services/Monitoring services | 37 | 23,57 | 58,71 | 58,71 | 9,65 | 4,36 | 21,43 | 0,41 | 4,89 E-11 | 8,12 | 3,44 E-20 |
| | D12 – (Rural/Agricultural)Community/Cohesion (Policies/Involvement)/Common/Collective | 48 | 28,5 | 2661,49 | 51,59 | 7,45 | 3,23 | 10,78 | 0,52 | 2,82 E-11 | 8,57 | 3,74 E-21 |
| | D13 – Active Civic/Citizenship/Citizenry (Democratic Engagement)/Partecipants | 32 | 20,62 | 2624,56 | 51,23 | 9,06 | 4,80 | 24,93 | 0,39 | 1,98 E-10 | 6,66 | 10,01 E-17 |
| | D14 – Democracy/Democratic | 11 | 5,36 | 72,25 | 8,50 | 2,56 | 2,89 | 8,38 | 0,57 | 96,85 E-06 | 1,94 | 23,54 E-05 |
| | D15 - Social Justice/Socio-economic/Settlement situations (chains) | 43 | 21,37 | 1802,76 | 42,46 | 6,47 | 3,65 | 14,51 | 0,49 | 56,88 E-11 | 7,85 | 17,49 E-19 |
| | D16 - (Grassroots) Activism/Active Management/Holistic approach/Activities/Circularity/Circular economy/Waste/Life Cycle Assessment | 33 | 41,72 | 20796,27 | 144,21 | 25,10 | 5,48 | 30,87 | 0,27 | 12,96 E-11 | 8,963 | 29,42 E-23 |
| | D17 – Debate (Political Participation/interests/season/attention/change) | 49 | 25,08 | 5908,08 | 76,86 | 10,98 | 6,33 | 42,23 | 0,28 | 37,33 E-15 | 12,12 | 17,95 E-29 |
| | D18 - (Urban) Renewal/Renewable/Renewing (built) | 18 | 6,67 | 144 | 12 | 2,83 | 3,35 | 12,13 | 0,52 | 10,98 E-06 | 3,318 | 10,79 E -08 |
| | D19 - Economic Development/Econometrics/Economic/Economia/Economy/Bioeconomy/Agro-forestry-pastoral-food industry/Energy demand | 55 | 62,71 | 34134,32 | 184,75 | 24,91 | 4,71 | 22,44 | 0,32 | 1,49 E-14 | 14,78 | 16,01 E-35 |
| | D20 Soil/Land structure/Science/Component/Degradation/Consumption /bio-ecological/Water/Irrigation | 37 | 31,46 | 2642,14 | 51,40 | 8,45 | 2,32 | 5,40 | 0,64 | 30,36 E-09 | 5,11 | 68,08 E-14 |
| | D21 - (Public) Policymakers/Policy(making) | 38 | 28,71 | 12714,48 | 112,76 | 18,29 | 6,01 | 36,67 | 0,23 | 70,62 E-14 | 11,23 | 15,35 E-28 |
| | D22 – Social Inclusion/Change/Innovation (practices) | 46 | 29,04 | 6326,22 | 79,54 | 11,72 | 5,97 | 38,10 | 0,32 | 25,78 E-14 | 10,26 | 37,24 E-26 |
| | D23 - (Exclusionary/Marginalized) zoning (Minorities) | 35 | 6,17 | 70,91 | 8,42 | 1,42 | 4,41 | 22,61 | 0,51 | 12,31 E-10 | 4,67 | 76,58 E-13 |
| | D24 – Business / Resource Management /Performance/ Entrepreneur(ship) | 39 | 25,38 | 4832,45 | 69,51 | 11,13 | 5,25 | 29,87 | 0,35 | 6,8 E-12 | 8,546 | 35,46 E-22 |
| | D25 – Tools/Instruments (Decision Making) | 38 | 15,84 | 1798,78 | 42,41 | 6,88 | 4,08 | 16,27 | 0,36 | 10,74 E-12 | 9,80 | 35,83 E-25 |
| | D26- Environmental Protection/Greening/Green practices/Bioeconomy/Recycling | 49 | 46,51 | 8880,09 | 94,23 | 13,46 | 3,77 | 16,17 | 0,49 | 91,49 E-13 | 8,87 | 74,51 E-23 |
| | D27 - Internal areas/Inland/Inner areas/Consumption | 39 | 6,85 | 79,24 | 8,90 | 1,42 | 2,01 | 3,06 | 0,66 | 34,72 E-09 | 5,16 | 5,23 E-13 |
| | D28 – National Strategy/Centralism/Central government/Research orientated | 43 | 24,60 | 5303,20 | 72,82 | 11,10 | 5,10 | 28,05 | 0,32 | 80,88 E-14 | 11,14 | 29,79 E-28 |
| | D29 – National Fundings | 7 | 5,43 | 57,62 | 7,59 | 2,87 | 1,88 | 3,13 | 0,68 | 22,23 E-04 | 1,08 | 31,11 E-04 |
| | D30 – European Strategy | 34 | 18,44 | 1696,31 | 41,19 | 7,06 | 3,58 | 12,30 | 0,43 | 21,96 E-11 | 7,55 | 74,38 E-20 |
| | D31 – European Funds | 16 | 8,81 | 258,03 | 16,06 | 4,02 | 2,69 | 7,67 | 0,57 | 84,02 E-07 | 2,85 | 15,27 E-08 |
| | D32 – Wealth | 14 | 2 | 2,77 | 1,66 | 0,44 | 1,64 | 1,71 | 0,67 | 20,55 E-05 | 2,04 | 16,09 E-06 |
| | D33 – Heritage/National forest/Forest/Cultural resources | 36 | 16,61 | 1661,84 | 40,77 | 6,79 | 4,44 | 21,05 | 0,39 | 44,68 E-12 | 8,10 | 37,86 E-21 |
| | D34 – Joint action/Integrated approach | 42 | 12,59 | 928,25 | 30,47 | 4,70 | 5,15 | 29,41 | 0,38 | 44,08 E-13 | 8,64 | 2,3 E-21 |
| | D35 – Local strategy/Development/Assessment/Management/Shared values | 50 | 26,88 | 2050,68 | 45,28 | 6,40 | 3,59 | 15,30 | 0,56 | 50,49 E-12 | 7,07 | 1,46 E-17 |
| | D36– Mountain/ M. Communities/Mountain land | 49 | 25,86 | 986,08 | 31,40 | 4,49 | 1,50 | 1,80 | 0,78 | 49,33 E-08 | 3,82 | 11,38 E-10 |
| | D37 – Rural Education/Schooling/Teachers/Teaching/Curricula/On-farm/Training/Forest operators/Operators | 40 | 14,05 | 790,61 | 28,12 | 4,45 | 3,19 | 10,08 | 0,50 | 17,31 E-11 | 7,78 | 25,17 E-20 |
| | D38 – Self-autonomy/Governance/Organization/Representation/Autonomous/ Autonomies | 31 | 8,39 | 139,44 | 11,81 | 2,12 | 2,55 | 6,40 | 0,63 | 13,96 E-08 | 4,06 | 23,13 E-11 |
| | D39 – Neo-endogenous paradigm | 7 | 6,29 | 110,90 | 10,53 | 3,98 | 2,57 | 6,69 | 0,56 | 84,78 E-06 | 1,51 | 18,18 E-05 |
| | D40 – Organic farming/Farmers/Farm/Farmland/Cultivation/Crops/Inter-farm/Farmhouses | 46 | 57,98 | 13426,87 | 115,87 | 17,08 | 2,75 | 7,45 | 0,55 | 11,48 E-11 | 8,31 | 14,83 E-21 |
| | D41 – Exogenous paradigm | 6 | 3,5 | 27,1 | 5,21 | 2,12 | 2,33 | 5,48 | 0,59 | 32,06 E-05 | 1,24 | 82,27 E-05 |
| | D42 – Resilience/Resilient paradigm | 24 | 2,75 | 8,20 | 2,86 | 0,58 | 1,91 | 3,08 | 0,67 | 46,22 E-07 | 3,13 | 4,03 E-08 |
| | D43 - Anthropology | 13 | 6,15 | 48,31 | 6,95 | 1,93 | 1,59 | 1,90 | 0,77 | 35,39 E-04 | 1,15 | 33,46 E-04 |
| | D44 – Monetary tools/Payments/Margin gross/Margin loss/Cost/Economy | 39 | 15,77 | 952,66 | 30,86 | 4,94 | 3,62 | 14,57 | 0,51 | 3,53 E-10 | 6,56 | 20,82 E-17 |
| | D45 – Land use/Land economy/Land change/Land science/Land quality/Land biodiversity/Management | 40 | 23,85 | 1374,69 | 37,08 | 5,86 | 1,98 | 3,02 | 0,66 | 24,44 E-09 | 5,44 | 11,37 E-14 |
| | D46 – Forest Community/Wood/Silvicolture | 43 | 211 | 526771,6 | 725,79 | 110,68 | 5,07 | 27,14 | 0,30 | 5,28 E-13 | 11,68 | 16,19 E-29 |
| Hypernyms (General) | E1 – Displacement for the Territory/Territory | 48 | 28,96 | 1725,53 | 41,54 | 6,00 | 3,15 | 11,05 | 0,61 | 47,68 E-11 | 5,71 | 27,56 E-15 |
| | E2 – Exclusion | 11 | 3,36 | 10,85 | 3,29 | 0,99 | 2,01 | 4,75 | 0,74 | 1,52 E-03 | 1,05 | 56,22 E-04 |
| | E3 - Urbanization | 41 | 26,71 | 4123,61 | 64,21 | 10,03 | 5,55 | 33,28 | 0,36 | 36,97 E-13 | 8,24 | 20,37 E-21 |
| | E4 – Disruption/discontinuity | 12 | 4,42 | 49,54 | 7,04 | 2,03 | 2,46 | 5,82 | 0,57 | 56,99 E-06 | 2,36 | 20,24 E-07 |
| | E5 - Growth | 39 | 6,44 | 134,46 | 11,60 | 1,86 | 4,08 | 18,37 | 0,47 | 97,39 E-12 | 7,10 | 10,62 E-18 |
| | E6 - Revitalization zoning/zone/Reconversion | 16 | 2,62 | 9,18 | 3,03 | 0,76 | 2,38 | 5,94 | 0,62 | 26,96 E-06 | 2,44 | 16,66 E-07 |
| | E7 – Cultural,identity | 53 | 23,32 | 1391,30 | 37,30 | 5,12 | 3,62 | 13,79 | 0,52 | 57,37 E-13 | 8,63 | 28,95 E-22 |
| | E8 – Empowerment | 6 | 3,33 | 22,67 | 4,76 | 1,94 | 2,39 | 5,78 | 0,58 | 23,78 E-05 | 1,28 | 63,46 E-05 |
| | E9 - Development | 34 | 41,82 | 5593,24 | 74,79 | 12,83 | 2,73 | 7,27 | 0,56 | 56,55 E-10 | 6,07 | 28,31 E-16 |
| | E10 - Estimation | 11 | 11,09 | 429,09 | 20,71 | 6,25 | 2,46 | 5,85 | 0,55 | 59,65 E-07 | 2,34 | 20,78 E-07 |

**Table 9.** Semantic Analysis Metrics: Bag of Keywords.

As "*Bayes evidence*" value of 5.142E-10, the strong evidence was manifested agreeing to the specified hypothesis or model. Such a low value suggests strong support for the hypothesis or model in question, indicating that the collected data align extremely well with the proposed hypothesis or model.

In general, "*Bayes evidence*" values below 0.01 are considered indicative of strong evidence approving the hypothesis or model. There is a significant difference between the medians of the samples; the *Kruskal-Wallis* test

is, on the other hand, a non-parametric statistical test used to compare the distributions of multiple independent groups.

Nonetheless, the value of 290.9 you mentioned cannot be directly interpreted as the result of the *Kruskal-Wallis* test: the *Kruskal-Wallis* test produces a test value called the "*test statistic*" (*H*); this value represents the difference between the distributions of the groups and is compared to a reference distribution to determine if there are significant differences among the groups. In most statistical software, an associated *p*-value is also provided with the test statistic: this *p*-value indicates the probability of obtaining a test statistic as extreme as the observed one, assuming the null hypothesis (i.e., the absence of differences among the groups) is true.

To properly interpret the result of the *Kruskal-Wallis* test, it is important to consider both the test statistic (*H*) and the *p*-value.

A *p*-value of 0.9687 indicates that there is a high probability of observing the given data or a more extreme result under the null hypothesis; in statistical hypothesis testing, the *p*-value is used to assess the strength of evidence against the null hypothesis so that, in this case, with a *p*-value of 0.9687, **(Tab. 10)**, and *p*-value equal to 0,9976 **(Tab. 11)** it suggests that there is no significant evidence to reject the null hypothesis, and the observed data is likely due to random chance **(Fig. 35)**.

| | SS | df | MS | *F* | *p*(same) |
|---|---|---|---|---|---|
| **Between-subjects** | 1,77105E14 | 66 | 2,68342E12 | 0,5741 | 0,9976 |
| **Intra-group** | 7,63273E15 | 1633 | 4,67405E12 | **Permutation-based *p*-value (n=99999)** | |
| **Aggregate** | 7,80983E15 | 1699 | | | 0,9687 |

**Table 10.** *Kruskal-Wallis* rank sum test. Test for equal averages.

| | | | | | |
|---|---|---|---|---|---|
| **Variance components (limited to random effects)** | | | | | |
| **Var(group):** | -7,865E10 | **Var(error):** | 4,67405E12 | **ICC:** | -0,0171149 |
| ***omega2*:** | 0 | | | | |
| **Levene's test for equality of variances, based on means** | | | ***p* (same):** | | 4,384E-09 |
| **Levene's median test** | | | ***p* (same):** | | 0,9976 |
| **Welch's test for unequal variances:** *F*=6,267, df=418,5, *p*=6,081E-33 | | | | | |
| **Bayes evidence:** 5,142E-10 (conclusive evidence for equal means) | | | | | |

**Table 11.** Variance components.

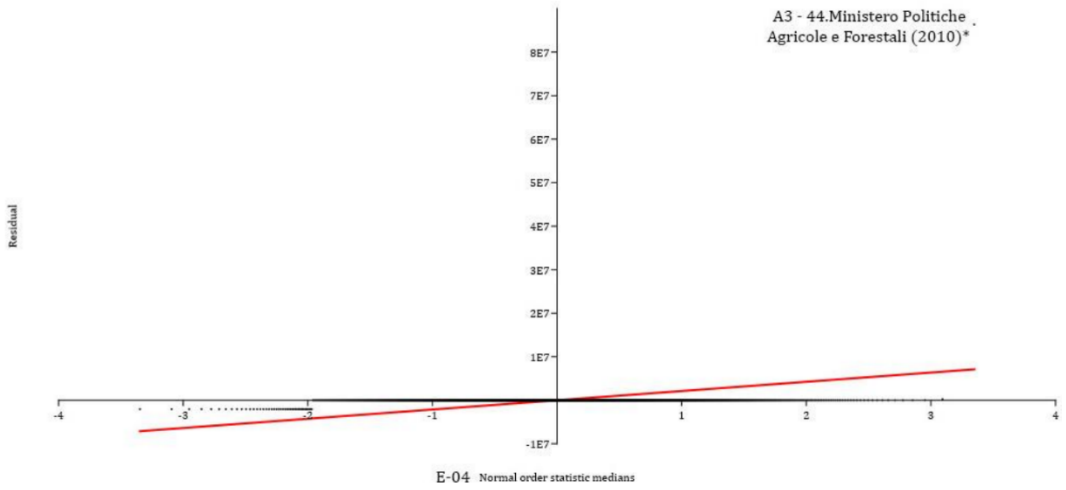



**Fig. 35.** Similarity of Normal order stastics medians. *H* (*chi 2*): 290,9. *Hc* (tie corrected): 290,9. *p* (same): 5,254E-30.

## 3.6. Shapiro Anderson correlation

*Shapiro-Wilk* test assessed normality showing the dataset has followed an experimental but uniform distribution based on the rarefaction of observed keywords on a large number of characters and compared it to the expected distribution under the assumption of normality; the *p*-value associated with the test is another novel aspect of this Meta-Analysis, considered predetermined significance level that ranges from 0.05 to 1, so in this case, the data significantly deviate from a normal distribution with regard of the 44th item).

| Frequency | Power | Frequency | Power | Frequency | Power | Frequency | Power |
|---|---|---|---|---|---|---|---|
| 0 | 1.0972E-15 | 8 | 0.12752 | 16 | 0.1422 | 24 | 0.13008 |
| 1 | 0.35471 | 9 | 0.056887 | 17 | 0.10713 | 25 | 0.086265 |
| 2 | 0.15915 | 10 | 0.11144 | 18 | 0.11474 | 26 | 0.14476 |
| 3 | 0.0607 | 11 | 0.10672 | 19 | 0.18285 | 27 | 0.07059 |
| 4 | 0.06218 | 12 | 0.15074 | 20 | 0.079886 | 28 | 0.12139 |
| 5 | 0.14247 | 13 | 0.058823 | 21 | 0.14753 | 29 | 0.098743 |
| 6 | 0.10418 | 14 | 0.15142 | 22 | 0.14678 | 30 | 0.277 |
| 7 | 0.11212 | 15 | 0.18936 | 23 | 0.16302 | 31 | 0.12961 |

| Frequency | Power |
|---|---|
| 32 | 0.15441 |

**Table 12.** *Kruskal-Wallis* rank sum test.

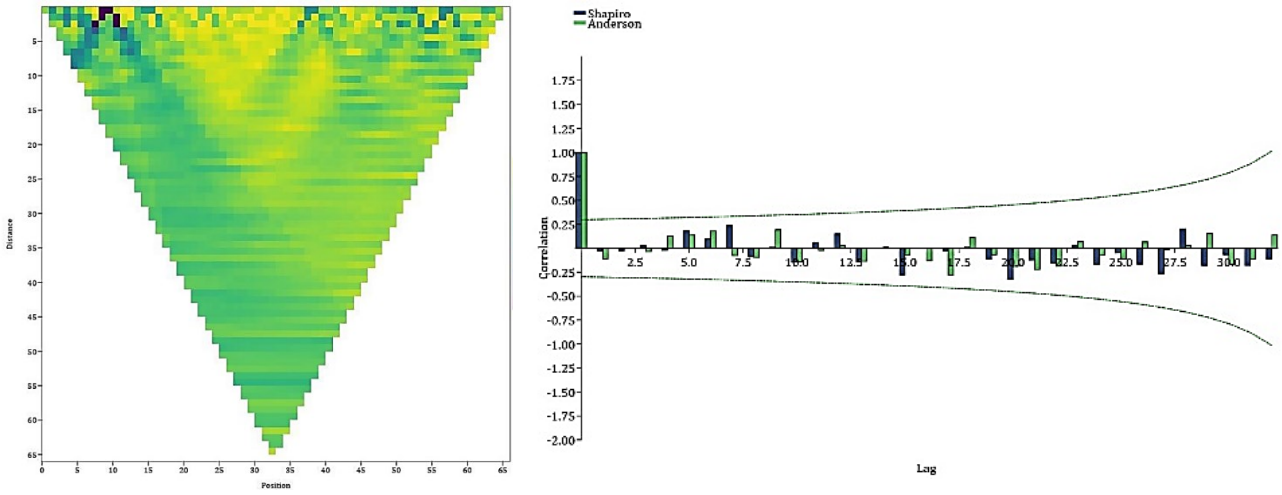



**Fig. 36-37.** Correlogram and its correlation based on Shapiro & Anderson.

## 3.7. Establishing the spatial-thematic PCA representation model of Term Frequency Inverse Document Frequency

The process of retrieving relevant information from a collection of documents or texts, TF-IDF, was plotted to numerically represent refined measurements of the importance of the thematic relative to a corpus of documents.

*Principal Component Analysis* (PCA) has simplified the dimensional complexity of such datasets, by reducing their values and placing them in the cartesian space. This pattern recognition, has identified the most important features or variables confining the alien aspect of Rural Gentrification, addressed to fragility, and narrowed to the lowest dimensionality constituted by Forestry disciplines achieving a large set of uncorrelated but however aggregated set of keywords, two large clusters, accessible through the D19 Econometrics position, on the edge of the ellipse and linked to D40 Farmland and D36, Bioeconomy. The eigenvectors signify the directions in which the data exhibit the most variation, while the eigenvalues quantify the amount of variance explained by each eigenvector. Within this context, D16 Circularity (0.36465, -0.12212) and E9 Development (0.39706, 0.61824) are specifically disassociated with the two beforementioned clusters. **Figure 38** provides statistics for various keywords.

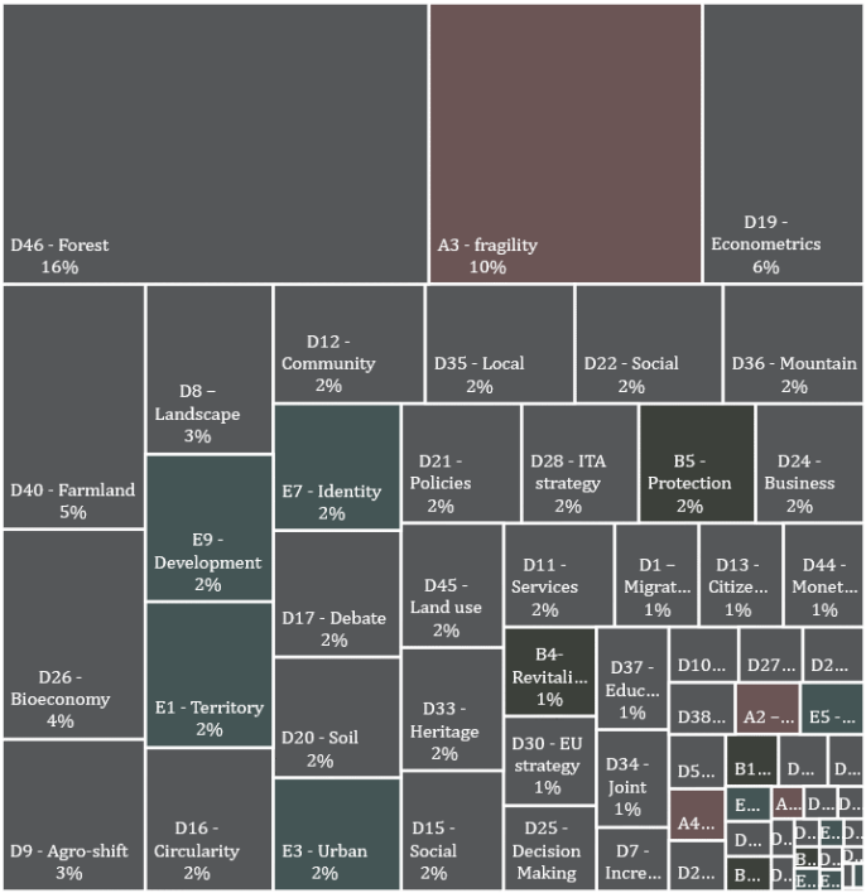



**Fig. 38.** Quantitative analysis of Keyword utilization: percentage coverage across databases.

*Principal Component Analysis* (PCA) has simplified the dimensional complexity of such datasets **(Fig. 39)**, by reducing their values and placing them in the cartesian space: this pattern recognition, has identified the most important features or variables confining the alien aspect of Rural Gentrification, addressed to fragility, and narrowed to the lowest dimensionality constituted by Forestry disciplines achieving a large set of uncorrelated but however aggregated set of keywords, two large clusters, accessible through the D19 Econometrics position, on the edge of the ellipse and linked to D40 Farmland and D36, Bioeconomy.

The original variables are transformed into two new sets of correlated variables known as principal components. The dominant component reflects factors such as revitalization, neglect, growth, education, and heritage, while the subordinate component considers demographic, resilience, and depopulation factors as significant obstacles to this cohesion, resulting in a decrease in the *y*-value until reaching the point of gentrification, which is closely associated with endogenous factors, empowerment, and funding from Italy (ITA).

The process starts by computing the covariance matrix of the dataset to capture the relationships among the variables. *Principal Component Analysis* (PCA) was at this instance employed to identify the eigenvectors and eigenvalues of this covariance matrix: the eigenvectors signify the directions in which the data exhibit the most variation, while the eigenvalues **(Tab. 13)** quantify the amount of variance explained by each eigenvector; within this context, D16 Circularity (0.36465, - 0.12212) and E9 Development (0.39706, 0.61824) are specifically disassociated with the two beforementioned clusters.

Accessory statistics for various keywords are provided: the table includes columns for the keyword, term frequency (*tf*), inverse document frequency (*idf*), weight, and frequency; each keyword is associated with its respective values in these columns and was accurately computed.

The *tf* represents the number of times a keyword appears in a specific context, while the *idf* indicates the significance or rarity of the keyword across the entire document; the weight combines the *tf* and *idf* values to determine the relative importance of each keyword. The frequency column shows the total number of occurrences for each keyword.

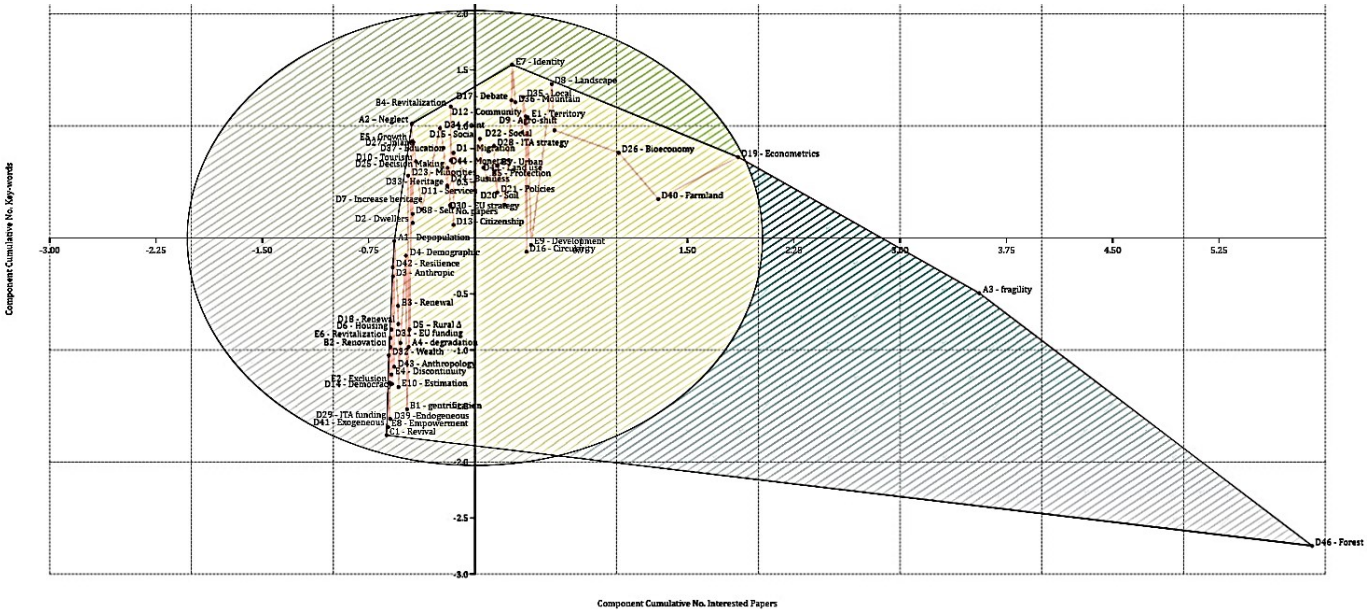



**Fig. 39.** Principal Component Analysis: dimensionality of document corpus and collection frequency.

| PC | Eigenvalue | % variance | No. Papers Loadings | No. Keywords Loadings |
|---|---|---|---|---|
| 1 | 1.92782E06 | 99.992 | 0,0055456 | 0,99998 |
| 2 | 154.895 | 0.0080341 | 0,99998 | -0,0055456 |

| | PC 1 | PC 2 |
|---|---|---|
| A1 - Depopulation | -0.56877 | -0.026735 |
| A2 – Neglect | -0.44484 | 10.215 |
| A3 - fragility | 35.582 | -0.49087 |
| A4 - degradation | -0.46798 | -0.97294 |
| B1 - gentrification | -0.47953 | -15.282 |
| B2 - Renovation | -0.59618 | -0.97398 |
| B3 - Renewal | -0.54215 | -0.60566 |
| B4- Revitalization | -0.17114 | 11.736 |
| B5 - Protection | 0.13493 | 0.58245 |
| C1 - Revival | -0.62359 | -17.605 |
| D1 – Migration | -0.15171 | 0.7598 |
| D2 - Dwellers | -0.43912 | 0.1341 |
| D3 - Anthropic | -0.57887 | -0.34189 |
| D4- Demographic | -0.48739 | -0.15743 |
| D5 – Rural Δ | -0.46149 | -0.81626 |
| D6 - Housing | -0.58897 | -0.81774 |
| D7 - Increase heritage | -0.37573 | 0.25559 |
| D8 - Landscape | 0.54262 | 13.748 |
| D9 - Agro-shift | 0.56133 | 0.96145 |
| D10 - Tourism | -0.41676 | 0.68273 |
| D11 - Services | 0.00095958 | 0.42429 |
| D12 - Community | 0.35823 | 10.871 |
| D13 - Citizenship | -0.15175 | 0.11701 |
| D14 - Democracy | -0.58468 | -13.025 |
| D15 - Social | 0.034834 | 0.88543 |
| D16 - Circularity | 0.36465 | -0.12212 |
| D17 - Debate | 0.25812 | 12.294 |
| D18 - Renewal | -0.54072 | -0.76724 |
| D19 - Econometrics | 1.857 | 0.72229 |
| D20 - Soil | 0.21126 | 0.29418 |
| D21 - Policies | 0.15869 | 0.40705 |
| D22 - Social | 0.33517 | 0.94067 |
| D23 - Minorities | -0.47151 | 0.55589 |
| D24 - Business | 0.085953 | 0.53241 |

| | PC 1 | PC 2 |
|---|---|---|
| D25 - Decision Making | -0.19349 | 0.62494 |
| D26 - Bioeconomy | 10.143 | 0.76153 |
| D27 - Inland | -0.43476 | 0.85456 |
| D28 - ITA strategy | 0.13494 | 0.8235 |
| D29 - ITA funding | -0.5991 | -1.615 |
| D30 - EU strategy | -0.1755 | 0.29241 |
| D31 - EU funding | -0.5256 | -0.9373 |
| D32 - Wealth | -0.60699 | -10.476 |
| D33 - Heritage | -0.19638 | 0.46603 |
| D34 -Joint | -0.24605 | 0.97886 |
| D35 - Local | 0.34095 | 12.585 |
| D36 - Mountain | 0.28549 | 12.125 |
| D37 - Education | -0.22229 | 0.80346 |
| D38 - Self | -0.43983 | 0.2149 |
| D39 -Endogeneous | -0.5955 | -16.172 |
| D40 - Farmland | 12.938 | 0.3476 |
| D41 - Exogeneous | -0.61206 | -16.873 |
| D42 - Resilience | -0.57958 | -0.26109 |
| D43 - Anthropology | -0.56954 | -11.512 |
| D44 - Monetary | -0.17044 | 0.69103 |
| D45 - Land use | 0.060029 | 0.62879 |
| D46 - Forest | 59.074 | -27.478 |
| E1 - Territory | 0.37407 | 10.773 |
| E2 - Exclusion | -0.60052 | -12.927 |
| E3 - Urban | 0.16158 | 0.64632 |
| E4 - Discontinuity | -0.58899 | -12.195 |
| E5 - Growth | -0.44628 | 0.86169 |
| E6 - Revitalization | -0.5969 | -0.89318 |
| E7 - Identity | 0.26318 | 15.477 |
| E8 - Empowerment | -0.61279 | -16.869 |
| E9 - Development | 0.39706 | -0.061824 |
| E10 - Estimation | -0.5393 | -13.306 |

**Table 13.** Eigenvectors computed from Bag of Keywords.

| Keyword | D19 | A3 | D8 | E7 | D35 | D17 | D26 | D36 | D9 | D12 | E1 | D22 | D40 | B4 | D15 | D28 | D46 | D47 | D34 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| tf | 10,720 | 1637031,8 | 24,82 | 24,071 | 13,18 | 9,73 | 16,03 | 27,93 | 28,11 | 14,71 | 27,58 | 9,795065 | 26,24 | 10,57 | 5,06 | 10,75 | 18,11 | 6366,34 | 9,071 |
| idf | 1,740 | 1,73 | 1,72 | 1,72 | 1,70 | 1,69 | 1,69 | 1,69 | 1,68 | 1,68 | 1,67 | 1,66 | 1,66 | 1,65 | 1,63 | 1,63 | 1,63 | 1,633468 | 1,623 |
| weight | 3,74 | 24,94 | 1,74 | 1,81 | 3,04 | 3,67 | 2,55 | 1,27 | 1,21 | 2,7 | 1,2 | 3,5 | 1,27 | 3,28 | 4,74 | 3,13 | 1,96 | 12,08 | 3,45 |
| Frequency | 55 | 54 | 53 | 53 | 50 | 49 | 49 | 49 | 48 | 48 | 47 | 46 | 46 | 45 | 43 | 43 | 43 | 43 | 42 |
| Keyword | E3 | A2 | D45 | B5 | D1 | D37 | D44 | D24 | D27 | E5 | D21 | D25 | D10 | D11 | D20 | D33 | D23 | D30 | E9 |
| tf | 31,98 | 7,30 | 15,02 | 16,48 | 7,75 | 34,17 | 7,12 | 16,02 | 22,80 | 5,92 | 23,55 | 9,37 | 25,27 | 10,92 | 28,05 | 4,91 | 13,39 | 5,19 | 21,29 |
| idf | 1,62 | 1,61 | 1,61 | 1,60 | 1,60 | 1,60 | 1,60 | 1,59 | 1,59 | 1,59 | 1,58 | 1,58 | 1,59 | 1,57 | 1,57 | 1,56 | 1,54 | 1,53 | 1,53 |
| weight | 0,58 | 3,86 | 2,27 | 2 | 3,67 | 0,31 | 3,85 | 2 | 1,19 | 4,18 | 1,05 | 3,14 | 0,83 | 2,73 | 0,58 | 4,37 | 2,14 | 4,12 | 1,02 |
| Frequency | 42 | 41 | 41 | 40 | 40 | 40 | 40 | 39 | 39 | 39 | 38 | 38 | 37 | 37 | 37 | 36 | 35 | 34 | 34 |
| Keyword | D16 | D7 | D13 | D38 | D2 | A1 | D4 | D42 | D3 | B3 | D5 | D6 | D18 | A4 | D31 | E6 | B2 | D32 | D43 |
| tf | 29,45 | 1,66 | 24,02 | 10,55 | 19,83 | 5,56 | 10,25 | 1,96 | 9,03 | 2,86 | 567,27 | 4,40 | 27,64 | 9,34 | 11,89 | 3,96 | 4,40 | 2,55 | 5,16 |
| idf | 1,52 | 1,50 | 1,50 | 1,49 | 1,48 | 1,43 | 1,41 | 1,38 | 1,36 | 1,30 | 1,25 | 1,25 | 1,25 | 1,20 | 1,20 | 1,20 | 1,18 | 1,15 | 1,11 |
| weight | 0,19 | 6,01 | 0,59 | 2,39 | 0,88 | 3,42 | 2,02 | 5,06 | 2,01 | 3,97 | 8,34 | 2,91 | 1,12 | 1,05 | 0,52 | 2,83 | 2,47 | 3,32 | 1,81 |
| Frequency | 33 | 32 | 32 | 31 | 30 | 27 | 26 | 24 | 23 | 20 | 18 | 18 | 18 | 16 | 16 | 16 | 15 | 14 | 13 |
| Keyword | E4 | D14 | E2 | E10 | B1 | D29 | D39 | D41 | E8 | C1 | | | | | | | | | |
| tf | 4,49 | 8,91 | 3,12 | 7,68 | 29,71 | 32,05 | 19,39 | 109,48 | 5,97 | 3,12 | | | | | | | | | |
| idf | 1,08 | 1,04 | 1,04 | 1,04 | 0,95 | 0,90 | 0,84 | 0,78 | 0,78 | 0,70 | | | | | | | | | |
| weight | 1,89 | 0,25 | 2,37 | 0,57 | 2,97 | 3,43 | 2,58 | -7,04 | 0,36 | 0,47 | | | | | | | | | |
| Frequency | 12 | 11 | 11 | 11 | 9 | 8 | 7 | 6 | 6 | 5 | | | | | | | | | |

**Tab. 14.** BoW statistics.

## 3.8. System-drivers subdivision : semantic classes retrieved for this Meta-Review

The term "*System-Drivers Subdivision*" refers to the categorization or subdivision of drivers within a system.
In the context of our Meta-Review focused on semantic classes, it implied that the drivers or factors influencing a particular system or domain are being analysed and categorized based on their semantic or meaning-related characteristics for which the term "revival" was found in five papers and constitutes an initial stage of reconnaissance of forest economy for foreigner eastern countries (Cesaro L. et al., 2008), aligned with European wood and derivates demand that Italy can not provide due to its morphological structure and rural displacement.

Another paper by Corti M. (2007) also discusses the concept of revival, describing the rejuvenation of the image and the attraction of consumers towards industrial complexes that offer standardized agro-food products.

These complexes present artificial and idealized representations of rural life, showcasing osterie (traditional taverns), "*frantoi*" (olive mills), and "*antichi forni*" (ancient ovens), which in reality have minimal production and visual flaws.

Nonetheless, they are portrayed in an idyllic manner distant from the reality, often encountered by urban people on Sundays in the village, visiting the humble and muddy rural families, until the second post world war decade; the migration to the mountainous town of Bolzano, which encompasses both rural and urban aspects, can be interpreted indirectly as a manifestation of the revival concept, as it involves the revitalization of the image of an alpine border region (Curzel V., 2021).

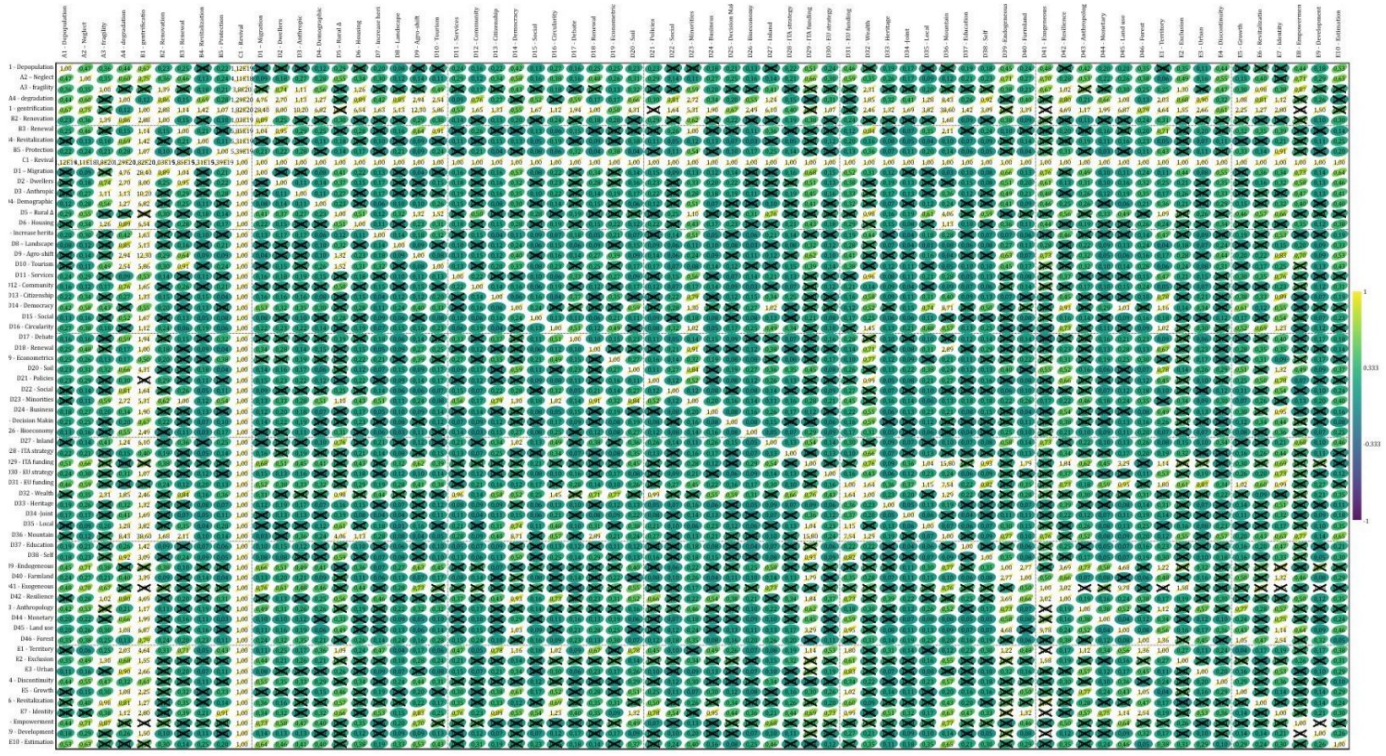
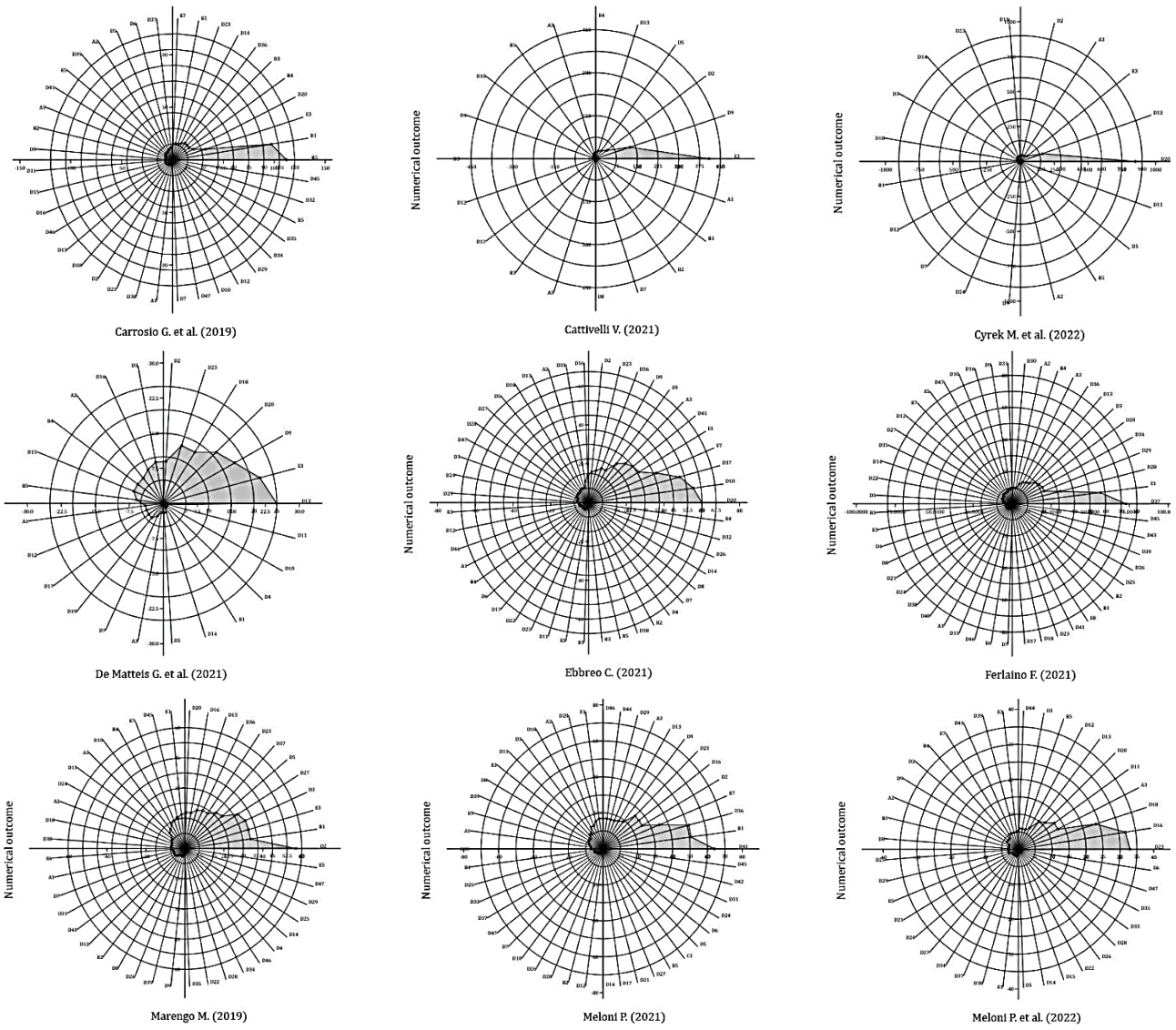


**Fig. 40.** Pearson correlation: interdependencies across BoW.

More explicitly, the article by Meloni P. (2021) reflects perhaps the most evident form of rural gentrification, in this case, productive but intertwined with the renowned Tuscan landscape of Chianti.

It imports the English term of "gentrification" and associates it with the "*Chiantishire"*, characterized by ancient rural farmhouses and cypress trees, with each district specializing in historical cultivars and animal production.

In the last instance, nine articles highlight the current state of rural gentrification. It is worth mentioning that, according to Carrosio, the concept of "eco-gentrification" is applied: this term specifically originated in urban contexts but experts are applying it to the study of processes in rural areas.




**Tab. 15.** Scholarly focus: nine papers incorporating the Rural Gentrification keyword.

While there is significant international literature on Rural Gentrification, this focus is limited in Italy, by which only nine papers cite RG, **(Tab. 15)**, furthermore, on the combination of the term with the "eco" suffix.

Therefore, it is necessary to define the specific characteristics and semantic boundaries of this concept: the research emphasizes the highest count of this keyword in the Italian scenario; it also acknowledges that this term is not widely recognized, and the phenomenon, in this sense, is perceived as negligence, reflecting a constant and inevitable internal structural decline limited to second homes that are closed during the working season.

Two main morphologies of rural gentrification have been identified:

1. Sparse renovation within or outside the village walls.
2. Renovation of an entire village driven by a financial actor.

Versatile Heritage: a best practice for Rural Gentrification, the many functions behind the rural settlement of Buzzoletto:

**Fig. 41.** "Aerial view of the Buzzoletto Vecchio farmhouse" (Garbagna Novarese, NO, Piemonte). September 2022. CC BY 1.0 Universal Public Domain. Author: Davide Giannicolo. Wikimedia commons.

**Fig. 42 (below).** "Layout of Buzzoletto Vecchio farmhouse" (Garbagna Novarese, NO, Piemonte)". March 2003. CC BY 4.0 International. Author: UmbraSolis. Wikimedia commons.

The latter type resembles the classical gentrification model as it involves significant external investments and usually occurs in nearly abandoned villages; expulsion is not a prominent issue in this scenario.

Nonetheless, a different situation arises when older inhabitants engage in self-renovation, such as the case of the L'Aquila earthquake, where residents qualify their reconstruction as an eco-village introducing new social and farming techniques. This *bottom-up* approach aligns closely with the concept of green gentrification and does not involve direct expulsion of poorer individuals, although it may result in a selection of inhabitants based on new criteria.

The dimensions identified in the literature analysis and the description of the Italian situation will now be used to describe the selected cases.

Two criteria have been employed in the case selection process: (1) a territorial criterion representing three Italian macro-areas characterized by different rural-urban dynamics, and (2) a criterion aiming to showcase the extraordinary diversity with which rural gentrification manifests in Italian rural areas. These cases demonstrate how "eco-gentrification" in rural Italy is a multifaceted and ambivalent phenomenon that cannot be easily categorized within a few analytical frameworks unless a sustained and funded research.



The many faces of the disadvantaged-scape: vestiges from the « recent-past »: **Fig. 43.** "Country house in ruins" (Anghiari, AR, Toscana). February 2010. CC BY 2.0 DEED. Author: Monica Arellano-Ongpin. Flickr. **Fig. 44.** "Taglianico panorama" (Taglianico, Bisenzio, PR, Toscana). February 2021. CC BY-SA 4.0 DEED. Author: Naioli. Wikimedia. **Fig. 45.** "Vecchio Cimitero Uliveto" (Vicopisano, PI, Toscana). March 2005. CC BY-SA 2.5 Italy. Author: Taccolamat. Wikimedia commons.

## 4. Cosine Similarity : encoding of RG vectorizations

Cosine Similarity is a statistical measure used to determine the similarity between two vectors; in the context of the Italian Rural Gentrification typology, it has been employed to compare and evaluate the similarity between different textual data representing various aspects of Rural Gentrification.

The process started with encoding the textual data into numerical vectors, using techniques like one-hot encoding or word embeddings; these encoding vectors represent the textual information in a numerical format that can be processed and analysed statistically.

In this specific study, 26 groups were created, each containing the B1 Gentrification component, to ensure literary consistency.

Nonetheless, it was observed that the least significant vector was represented by the group "*P*" – "*Gentrification and the Pursuit of Self-Autonomy in the Exogenous Paradigm*": this suggests a weak correlation between the concept of self-autonomy and external variables outside the context considered by the co-authors.

One notable finding from the analysis was the "*U*" vector, which indicated the application of European funds for renovation: it was observed that the PRIN program and the resilience of the PNRR were widely present, slightly exceeding the limit of: this indicates a strong correlation between the utilization of European funds and the renovation efforts related to rural gentrification.

The final benchmark or result obtained through the application of Cosine Similarity **(Tab. 16)** helps determine the degree of similarity or correlation, which was generally found to be strong, between different textual data points in the context of Italian Rural Gentrification.

This statistical measure provides valuable insights into the relationships and similarities between various aspects of rural gentrification, enabling researchers and policymakers to better understand and address this complex phenomenon. "*Gentrification and the Preservation of Heritage/National Forest: Empowering Forest Communities*" typology was observed with attention by authors: this precise topic of gentrification, along with the preservation of heritage/national forests highlights the interconnectedness between urban development and the protection of natural landscapes.

An important literature was studied in the current scope, to detect the current orientation on the empowerment of the Italian forest communities within the context of gentrification processes.

Gentrification, typically associated with urban areas, involves the influx of wealthier residents and the subsequent transformation of neighbourhoods, often leading to rising property values, displacement of existing residents, and changes in the social fabric.

Nonetheless, when considering the preservation of heritage/national forests, the concept takes on a unique perspective. In this context, gentrification can be seen as an opportunity to empower forest communities by promoting sustainable practices, i.e., integrated bio-architecture, preserving heritage, such as Agroforestry tailored systems and immaterial practices, and enhancing the ecological integrity of the forests.

It involved striking a balance between urban development and the conservation of natural resources, ensuring that the local communities have a say in the decision-making processes and benefit integrity from the radical changes taking place.

| Italian Rural Gentrification typology | Encoding Vector | Textual Vectorization | *Textual Data* | *Final benchmark* | *Semantic group* |
|---|---|---|---|---|---|
| *"Urban Dynamics: Depopulation, Gentrification, and Revitalization"* | Vector « A » | A1 - Depopulation | *3,42* | | |
| | | B1 - Gentrification | *2,97* | *N/A* | *N/A* |
| | | C1- Revival | *0,47* | | |
| *"Urban Awakening: Gentrification, Political Debate"* | Vector « B » | B1 - Gentrification | *2,97* | | |
| | | D17 – Debate (Political Participation/interests/season/attention/change) | *3,67* | *0,94* | *a)* |
| | | D23 - (Exclusionary/Marginalized) zoning (Minorities) | *2,14* | | |
| *"Urban Contrasts: Gentrification, Land and Rural Product Price Fluctuations"* | Vector« C » | A2 – Neglect/abandon/de-ruralisation | *3,86* | | |
| | | B1 - Gentrification | *2,97* | *0,61* | *b)* |
| | | D5 – Increase/decline/appreciation (in land prices/rural products/forest/policy-oriented) | *8,34* | | |
| *"Gentrification and Rural Community: Active Citizen Engagement"* | Vector « D » | B1 - Gentrification | *2,97* | | |
| | | D12 – (Rural/Agricultural)Community/Cohesion (Policies/Involvement)/Common/Collective | *2,70* | *0,98* | *a)* |
| | | D13 – Active Civic/Citizenship/Citizenry (Democratic Engagement)/Partecipants | *0,59* | | |
| *"Gentrification, Socioeconomic Fragility, and Local Development: Local Strategies"* | Vector « E » | A3 – Fragility/Difficulty of access/Distance/Isolation/Fragmentation/Desertification/Disadvantaged | *24,94* | | |
| | | B1 - Gentrification | *2,97* | *0,83* | *a)* |
| | | D35 – Local strategy/Development/Shared values | *3,04* | | |
| *"Gentrification, Impoverishment, and Active Civic Engagement"* | Vector « F » | A3 – Fragility/Difficulty of access/Distance/Isolation/Fragmentation/Desertification/Disadvantaged | *24,94* | | |
| | | B1 - Gentrification | *2,97* | *0,82* | *a)* |
| | | D13 – Active Civic/Citizenship/Citizenry (Democratic Engagement)/Partecipants | *0,59* | | |
| *"Gentrification, Soil Structure, and Environmental Protection"* | Vector « G » | B1 - Gentrification | *2,97* | | |
| | | D20 Soil/Land structure/Degradation/Consumption/Bio-ecological | *0,58* | *0,73* | *c)* |
| | | D26- Environmental Protection/greening/green practices/Bioeconomy/Recycling | *2,55* | | |
| *"Transformative Urban Shift: Gentrification, Exclusionary Marginalization, and National Strategy"* | Vector « H » | B1 - Gentrification | *2,97* | | |
| | | D23 - (Exclusionary/Marginalized) zoning (Minorities) | *2,14* | *0,82* | *b)* |
| | | D28 – National Strategy/Centralism/Central government | *3,13* | | |
| *"Revitalizing Urban Spaces: Gentrification, Economic Development, and Internal Area Growth"* | Vector « I » | B1 - Gentrification | *2,97* | | |
| | | D19 - Econometrics/Bioeconomy/Agro-forestry-pastoral-food industry/Energy demand | *3,74* | *0,97* | *c)* |
| | | D27 - Internal areas/Inland/Inner areas | *1,19* | | |
| *"Urban Transformation: Gentrification, Agricultural Shift, and Social Inclusion"* | Vector « J » | B1 - Gentrification | *2,97* | | |
| | | D9 – Agricultural/shift | *1,21* | *0,71* | *c)* |
| | | D22 – Social/Inclusion/Change/Innovation | *3,5* | | |
| *"Urban Revitalization: Gentrification, Tourism, and Retail Services"* | Vector « K » | B1 - Gentrification | *2,97* | | |
| | | D10 - Tourism | *0,83* | *0,74* | *c)* |
| | | D11 - Retail services/Agricultural/Internal services/Monitoring services | *2,73* | | |
| *"Sustainable Urban Transformation: Gentrification, Circularity, and Tools/Instruments"* | Vector « L » | B1 - Gentrification | *2,97* | | |
| | | D16 – Activism/Holistic approach/Activities/Circularity/Waste/Life Cycle Assessment | *0,19* | *0,62* | *c)* |
| | | D25 – Tools/Instruments (Decision Making) | *3,14* | | |
| *"Strategic Approaches to Gentrification: National Strategy and Joint Action"* | Vector « M » | B1 - Gentrification | *2,97* | | |
| | | D28 – National Strategy/Centralism/Central government/Research orientated | *3,13* | *0,84* | *b)* |
| | | D34 – Joint action/Integrated approach | *3,45* | | |
| *"Gentrification in Mountainous and Rural Areas: Exploring Education Initiatives"* | Vector « N » | B1 - Gentrification | *2,97* | | |
| | | D36– Mountain/M. Communities/Mountain land | *1,27* | *0,95* | *d)* |
| | | D37 – Rural Education/Schooling/Teachers/Teaching/Curricula/On-farm/Training/Forest Operators | *0,31* | | |
| *"Gentrification and the Quest for Self-Autonomy in Neo-Endogenous Regions"* | Vector « O » | B1 - Gentrification | *2,97* | | |
| | | D38 – Self-autonomy/Governance/Organization/Representation/Autonomous/ Autonomies | *2,39* | *0,88* | *c)* |
| | | D39 – Neo-endogenous paradigm | *2,58* | | |
| *"Gentrification and the Pursuit of Self-Autonomy in the Exogenous Paradigm"* | Vector « P » | B1 - Gentrification | *2,97* | | |
| | | D38 – Self-autonomy/Governance/Organization/Representation/Autonomous/ Autonomies | *2,39* | *0,38* | *c)* |
| | | D41 – Exogenous paradigm | *-7,04* | | |
| *"Gentrification and the Role of Organic Farming and Monetary Tools/Payments"* | Vector « Q » | B1 - Gentrification | *2,97* | | |
| | | D40 – Organic farming/Farmers/Farm/Farmland/Cultivation/Crops/Inter-farm/Farmhouses | *1,27* | *0,69* | *c)* |
| | | D44 – Monetary tools/Payments/Margin gross/Margin loss/Cost | *3,85* | | |
| *"Gentrification and the Intersection of Rural Education and Land Use"* | Vector « R » | B1 - Gentrification | *2,97* | | |
| | | D37 – Rural Education/Schooling/Teachers/Teaching/Curricula/On-farm/Training/Forest Operators | *0,31* | *0,71* | *e)* |
| | | D45 – Land use/Land economy/Land change/Land science/Land quality/Land Biodiversity | *2,27* | | |
| *"Gentrification and the Preservation of Heritage/National Forest: Empowering Forest Communities"* | Vector « S » | B1 - Gentrification | *2,97* | | |
| | | D33 – Heritage/National Forest/Cultural resources | *4,37* | *0,94* | *d)* |
| | | D46 – Forest Community/Wood/Silvicolture | *1,96* | | |
| *"Gentrification, Rural Education, and Exclusion: Addressing Social Disparities"* | Vector « T » | B1 - Gentrification | *2,97* | | |
| | | D37 – Rural Education/Schooling/Teachers/Teaching/Curricula/On-farm/Training/Forest Operators | *0,31* | *0,70* | *e)* |
| | | E2 – Exclusion | *2,37* | | |
| *"Gentrification and Urban Renewal: Leveraging European Funds for Transformation"* | Vector « U » | B1 - Gentrification | *2,97* | | |
| | | B2 – Renovation/Rebirth/Resettlement | *2,47* | *1,0017* | *b)* |
| | | D31 – European Funds | *0,52* | | |
| *"Gentrification, Heritage Preservation, and Challenges of Displacement"* | Vector « V » | B1 - Gentrification | *2,97* | | |
| | | D33 – Heritage/National Forest/Cultural resources | *4,37* | *0,96* | *d)* |
| | | E1 – Displacement | *1,2* | | |
| *"Gentrification and National Strategy: Empowering Local Communities"* | Vector « W » | B1 - Gentrification | *2,97* | | |
| | | D28 – National Strategy/Centralism/Central government | *3,13* | *0,99* | *b)* |
| | | E8 – Empowerment | *0,36* | | |
| *"Gentrification and Resilience: Nurturing Cultural Identity"* | Vector « X » | B1 - Gentrification | *2,97* | | |
| | | D42 – Resilience/Resilient paradigm | *5,06* | *0,93* | *c)* |
| | | E7 – Cultural identity | *1,81* | | |
| *"Gentrification and Urban Tools: Exploring the Anthropological Perspective"* | Vector « Y » | B1 - Gentrification | *2,97* | | |
| | | D25 – Tools/Instruments (Decision Making) | *3,14* | *0,95* | *c)* |
| | | D43 - Anthropology | *1,81* | | |
| *"Gentrification and Forest Communities: Estimating Impacts"* | Vector « Z » | B1 - Gentrification | *2,97* | | |
| | | D46 – Forest Community/Wood/Silvicolture | *1,96* | *0,95* | *d)* |
| | | E10 - Estimation | *0,57* | | |

**Tab. 16.** Cosine similarity weights with similarity drivers.

## 5. Discussion and Conclusions

Italy, with its fragmented historical tapestry and deeply entrenched socio-economic divides, stands at the crossroads of modernization and tradition.

Despite advances in infrastructure and policy, the nation struggles with a legacy of urban migration and regional disparities that date back to the last century.

Additionally, the uneven allocation of European structural funds and the varied academic interpretations of rural landscapes underscore a national landscape still grappling with its identity in the face of European integration.

Besides, the transformation observed from the peri-urban fringes to the secluded inner regions of the Italian peninsula and the Alpine areas is marked by only partial alignment with broader European interregional initiatives, reflecting a selective assimilation of external influences.

Rural Gentrification, a term that resonates with charged implications, remains largely theoretical within the confines of Italian public administration; the academic sector continues to parrot Anglophone methodologies, applying them in a cookie-cutter fashion that starkly overlooks the nuanced requirements of local contexts.

This myopic adoption perpetuates a cycle of intellectual colonialism, where foreign concepts are superimposed on Italian realities without sufficient localization, thereby stunting their practical application across varied and complex rural landscapes.

Furthermore, the rural ethos, characterized by its staunch resistance to change, clings desperately to anachronistic lifestyles that prioritize slow living and traditional family structures, including practices such as recycling and bartering. Current gentrification efforts, narrowly focused on transforming rural dwellings into second homes for urban escapees, fail to tap into the rich potential of these landscapes as nurseries for innovative, small-scale production.

This oversight squanders a critical opportunity to rejuvenate the once-vibrant self-sufficiency that defined diverse agricultural communities—from hillside to alpine settings—where interconnected farming and livestock practices thrived.



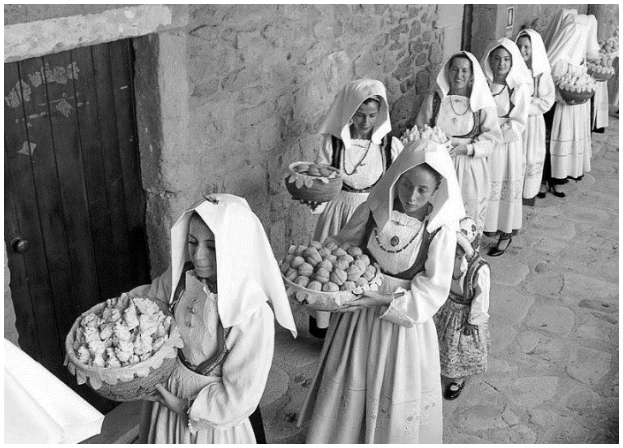
Circular Memories: sculpting History through commemorative installations: **Fig. 46.** "Closed wagon repurposed in Camponogara-Campagna Lupia after World War II as a substitute for the destroyed goods warehouse" (VE, Veneto). October 2006. CC BY-SA 3.0 DEED. Author: ivanfurlanis. Wikimedia commons**. Fig. 47.** "Mondine Roundabout" (San Pietro in Casale, BO, Emilia Romagna). March 2008. CC BY-SA 4.0 DEED. Author: Nicola Quirico. Wikimedia commons. **Fig. 48.** „Freud Promenade Winter Panorama ©Tourismusverein" (BZ, Trentino Alto Adige). December 2020. CC BY-ND 2.0 DEED. Author: Ritten_Renon. Flickr.


Past preserved: **Fig. 49.** "Parmiggiano Reggiano Cheese Museum" (Soragna, PR, Toscana). December 2010. CC BY-NC-ND 2.0 DEED. Author: Alessandro Gallione. Flickr. **Fig. 50.** "Parmiggiano Reggiano Cheese Museum" (Soragna, PR, Toscana). December 2010. CC BY-NC-ND 2.0 DEED. Author: Alessandro Gallione. Flickr.

In this context, the "*Circular Memories: Sculpting History through Commemorative Installations*" and "*New Horizons, Old Foundations: Shaping of Rural Heritage*" series serve not only as artistic reflections but also as incitements.

These reflections challenge viewers to reconsider the narrative of Rural Gentrification, juxtaposing the historical depth and cultural richness of rural Italy against the superficial modernization efforts; visually these accompaniments act as critical commentaries, inviting onlookers to engage with the complex interplay of past and present that shapes the rural Italian landscape today.

By weaving together, the threads of historical resilience, academic insularity, and cultural preservation, this conclusion not only critiques but also calls for a re-envisioned approach to rural development: it advocates for a model that harmonizes with the intrinsic values of rural communities, ensuring that the evolution of these areas is both respectful of their heritage and inclusive of innovative albeit traditional practices that can sustain their future.



New horizons, old foundations: shaping of Rural Heritage: **Fig. 51.** "Huts - Archeodrome" (Poggibonsi, SI, Toscana) January 2016. CC BY-NC 2.0 DEED. Author: Mirella Bruni. Flickr. **Fig. 52.** "Sagra de su succu a Busachi" (Busachi, OR Sardegna). February 2021. CC BY-SA 4.0 DEED. Author: Mirella Bruni. Wikimedia Commons.

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## Conflict of Interests

The author declares no conflict of interest. The numerical conclusions, as well as their numerical processing, have not accountability in the role, design, collection, or interpretation of data but aims at demonstrating adequate and fine-tuned methodologies in favour of "*Valutazione Impatto Ambientale*" (VIA) (Environmental Impact Assessment (EIA), "*Valutazione Impatto Strategica*" (VAS) (Strategic Environmental Assessment, SEA), that are derived from three branches in the process of Training and Internationalization c/o the *Ordine degli Architetti Pianificatori Paesaggisti Conservatori di Napoli e Provincia*: architecture of landscape, engineering for the territory and agronomy whose international commitment was inaugurated by former President Arch. Raffaele Sirica (1995-1997) in occasion of the Habitat II program by the second United Nations Conference on Human Settlements, taken place from June 3 to 14, 1996, in Istanbul, Turkey. The Department does not promote any misconduct, e.g., 95/46/EC and Regulation (EC) No 45/2001 (EC) No 45/2001, by endorsing: the reintroduction of historical components ecologically suitable, a sustainable land use perspective and data extraction techniques without animal experimentation and environmental invasive footprint in accordance with the rigorous Italian legislation for the

landscape. No research institution, e.g., university teaching, has ever been involved in the research.

## References


Agenzia per la Coesione Territoriale. Strategia Nazionale Aree Interne, SNAI. Misure di contrasto agli incendi boschivi. (2022). https://www.agenziacoesione.gov.it/strategia-nazionale-aree-interne/ Accessed April 2023.

«Anderson–Darling Test». (2008). In *The Concise Encyclopedia of Statistics*, 12–14. New York, NY: Springer New York. https://doi.org/10.1007/978-0-387-32833-1_11.

Barleri, P. (2000). La starza e il suo castello in Marano di Napoli. In apertura del III millennio, pp. 102-102

Bartolini, Rudi, Giuseppina Rita Jose Mangione, Francesca De Santis, e Anna Tancredi. (2021). «Piccole Scuole e Territorio». *Scienze Del Territorio*, 5 gennaio 2021, Vol. 9 : La nuova centralità della montagna / The new centrality of mountains. https://doi.org/10.13128/SDT-12483.

Belliggiano, Angelo, Alberto Sturla, Marco Vassallo, e Laura Viganò. (March 2020): «Neo-Endogenous Rural Development in Favor of Organic Farming: Two Case Studies from Italian Fragile Areas». *European Countryside* 12, fasc. 1 : 1–29. https://doi.org/10.2478/euco-2020-0001.

Bergamasco, Giulia, Andrea Membretti, e Maria Molinari. (2021). «Chi Ha Bisogno Della Montagna Italiana?» *Scienze Del Territorio*, 25 dicembre 2020, Vol. 9 : La nuova centralità della montagna / The new centrality of mountains. https://doi.org/10.13128/SDT-12408.

Bertolino, Maria Anna. (2021). «Agri-Cultural Resistance and Local Development». *Scienze Del Territorio*, 7 gennaio 2021, Vol. 9 : La nuova centralità della montagna / The new centrality of mountains. https://doi.org/10.13128/SDT-12490.

Bertoni, Danilo, Giacomo Aletti, Daniele Cavicchioli, Alessandra Micheletti, e Roberto Pretolani. (May 2021). «Estimating the CAP Greening Effect by Machine Learning Techniques: A Big Data Ex Post Analysis». *Environmental Science & Policy* 119 : 44–53. https://doi.org/10.1016/j.envsci.2021.01.008.

Bertoni, Danilo, Laure Latruffe, e Daniele Cavicchioli. (2023). «Impact of Business Transfer on Economic Performance: The Case of Italian Family Farms». *International Journal of Entrepreneurship and Small Business* 1, fasc. 1 : 1. https://doi.org/10.1504/IJESB.2021.10040377.

Bolognesi, Monica, e Corrado Federica. (2021). «Editoriale». *Scienze Del Territorio*, 9 maggio 2021, Vol. 9 : La nuova centralità della montagna / The new centrality of mountains. https://doi.org/10.13128/SDT-12815.

Borrello, Massimiliano, Altomonte Elisa, Cembalo Luigi, D'Amico Valentina, e Lombardi Alessia. (January 2023) «Circular Bioeconomy and the Forest-Wood Sector: Bridging the Gap between Policies and Disadvantaged Forest Areas». *Applied Sciences* 13, fasc. 3 : 1349. https://doi.org/10.3390/app13031349.

Camana, D., Toniolo S., Zuliani F., Manzardo A. (2021b). Il piano nazionale di ripresa e resilienza in ottica LCA: una valutazione preliminare per sviluppi futuri. X Convegno dell'associazione Rete Italiana LCA. Innovazione e circolarità: il contributo del life cycle thinking nel green deal per la neutralità climatica. Poster - 22-24 September 2021 – Reggio Calabria, Italia. https://www.reteitalianalca.it/ wp-content/uploads/2022/03/AttiConvegno2021LCA.pdf ISBN: 979122100456. Accessed April 2023.

Cantiani, Paolo, e Raoul Romano. (August 2022). «Sfide poste del TUFF: stato dell'arte e prospettive». *L'Italia Forestale e Montana* 77, fasc. 3 : 131–41. https://doi.org/10.36253/ifm-1724.

Capobianco, Lorenzo, Salvatore Polverino, e Hourakhsh Ahmad Nia. (2023). «Grey Literature Systematic Rapid Review of Neo-Endogenous Life Cycle Rural Development within EAFRD regulation 1305/2013», 84–99. https://doi.org/10.38027/ICCAUA2023EN0365

Caridi, Giuseppe. (2021). «Il Margine Che Sta al Centro». *Scienze Del Territorio*, 12 febbraio 2021, Vol. 9 : La nuova centralità della montagna / The new centrality of mountains. https://doi.org/10.13128/SDT-12585.

Carrosio, Giovanni, Natalia Magnani, e Giorgio Osti. (July 2019). «A mild rural gentrification driven by tourism and second homes. Cases from Italy». *SOCIOLOGIA URBANA E RURALE*, fasc. 119: 29–45. https://doi.org/10.3280/SUR2019-119003.

Cattaneo, Maria Chiara. (December 2020). «Una Finestra Di Opportunità per La Montagna». *Scienze Del Territorio*, , Vol. 9 (2021): La nuova centralità della montagna / The new centrality of mountains. https://doi.org/10.13128/SDT-12406.

Cattivelli, Valentina. (April 2021). «Planning Peri-Urban Areas at Regional Level: The Experience of Lombardy and Emilia-Romagna (Italy)». *Land Use Policy* 103 : 105282. https://doi.org/10.1016/j.landusepol.2021.105282.

Cavicchioli, Daniele, Danilo Bertoni, Dario Gianfranco Frisio, e Roberto Pretolani. (December 2019). «Does the Future of a Farm Depend on Its Neighbourhood? Evidence on Intra-Family Succession among Fruit and Vegetable Farms in Italy». *Agricultural and Food Economics* 7 https://doi.org/10.1186/s40100-019-0129-5.

Cesaro L., Gatto P., Pettenella D. (2008). – The Multifunctional Role of Forests: Policies Methods and Case Studies. EFI Proceedings, 55.

Corona, Piermaria, e Emanuela Lombardo. (January 2023). «Elementi di riferimento per la gestione selvicolturale dei boschi soggetti a vincolo paesaggistico provvedimentale». *L'Italia forestale e montana* 77, fasc. 6 : 229–33. https://doi.org/10.36253/ifm-1088.

Corti, M. (2007). Quale neoruralismo? L'ecologist Italian, 7: 169-186

Cottini Anastasia . (2022). «La documentazione digitale per la comunicazione del Patrimonio Culturale: il caso dell'Eremo delle Carceri ad Assisi». In *DIALOGHI / DIALOGUES • visioni e visualità / visions and visuality*. FrancoAngeli srl. https://doi.org/10.3280/oa-832-c93.

Curzel, Vittorio. (February 2021). «Minoranze Che Innovano». *Scienze Del Territorio*, Vol. 9 (2021): La nuova centralità della montagna / The new centrality of mountains. https://doi.org/10.13128/SDT-12588.

Cyrek, Magdalena, e Piotr Cyrek. (July 2022). «Rural Specificity as a Factor Influencing Energy Poverty in European Union Countries». *Energies* 15, fasc. 15 : 5463. https://doi.org/10.3390/en15155463.

D'Amato, D., M. Gaio, e E. Semenzin. (March 2020). «A Review of LCA Assessments of Forest-Based Bioeconomy Products and Processes under an Ecosystem Services Perspective». *Science of The Total Environment* 706 : 135859. https://doi.org/10.1016/j.scitotenv.2019.135859.

Decandia, Lidia. (December 2020). «La Centralità Della Montagna in Una Inedita Forma Di Urbanità». *Scienze Del Territorio,* Vol. 9 (2021): La nuova centralità della montagna / The new centrality of mountains. https://doi.org/10.13128/SDT-12407.

Dematteis, Giuseppe, e Alberto Magnaghi. (2021). «La Visione Della Montagna Nel Manifesto Di Camaldoli». *Scienze Del Territorio*, 11 febbraio 2021, Vol. 9 : La nuova centralità della montagna / The new centrality of mountains. https://doi.org/10.13128/SDT-12582.

De Seta Cesare, Di Mauro Leonardo, Perone Maria (1980). «*Ville Vesuviane*». Collana: Ville Italiane. Milano. Rusconi Libri. ISBN 8818326244.

Di Mauro Leonardo (2001). «*Le ragioni di una visita; Città e architettura: dall'antichità al Regno d'Italia; L'immagine della città; Folclore, tradizioni, artigianato; I modi della visita*». Touring Club Italiano. Guida d'Italia (Ed.) Napoli e dintorni. Milano: Touring Club Italiano, ISBN: 88-365-1954-7

Di Mauro Leonardo, Senape Antonio (2001). «*Cento disegni per un Grand Tour del 1829*». Napoli: Grimaldi & C., ISBN: 88-88338-52-7

Di Fazio, Salvatore, e Giuseppe Modica. (October 2018). «Historic Rural Landscapes: Sustainable Planning Strategies and Action Criteria. The Italian Experience in the Global and European Context». *Sustainability* 10, fasc. 11 : 3834. https://doi.org/10.3390/su10113834.

Dunoyer, Christiane. (February 2021). «L' Anthropologie Alpine Aujourd'hui et Ses Nouveaux Défis». *Scienze Del Territorio*, Vol. 9 (2021): La nuova centralità della montagna / The new centrality of mountains. https://doi.org/10.13128/SDT-12594.

Ebbreo, Carlotta. (2021). «Neocontadinizzazione Nelle Montagne Mediterranee». *Scienze Del Territorio*, 16 febbraio 2021, Vol. 9 : La nuova centralità della montagna / The new centrality of mountains. https://doi.org/10.13128/SDT-12595.

Ferlaino, Fiorenzo. (February 2021). «Politiche per La Centralità Della Montagna». *Scienze Del Territorio*, Vol. 9: La nuova centralità della montagna / The new centrality of mountains. https://doi.org/10.13128/SDT-12584.

Fox, Eric P. (1998). «Data Analysis: A Bayesian Tutorial». Technometrics 40, fasc. 2: 155–56. https://doi.org/10.1080/00401706.1998.10485200.

Gasparini, Patrizia, e Giovanni Tabacchi. (2022). «Changes of Italian Forests Over Time Captured by the National Forest Inventories: L'evoluzione Nel Tempo Delle Foreste Italiane Secondo Gli Inventari Forestali Nazionali». In *Italian National Forest Inventory—Methods and Results of the Third Survey*, a cura di Patrizia Gasparini, Lucio Di Cosmo, Antonio Floris, e Davide De Laurentis, 545–68. Springer Tracts in Civil Engineering. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-98678-0_13.

Guccione Dara, Giovanni & Sturla, Alberto & Vaccaro, Alessandra & Viganò, Laura & Carlotta, Bergamelli. (2021). Approccio Agroecologico e Biodistretti. Analisi di due casi di studio. *Council for Agricultural Research and Agricultural Economy Analysis*. ISBN 9788833851273.

Halbac-Cotoara-Zamfir, Rares, Gloria Polinesi, Francesco Chelli, Luca Salvati, Leonardo Bianchini, Alvaro Marucci, e Andrea Colantoni. (February 2022). «Found in Complexity, Lost in Fragmentation: Putting Soil Degradation in a Landscape Ecology Perspective». *International Journal of Environmental Research and Public Health* 19, fasc. 5 : 2710. https://doi.org/10.3390/ijerph19052710.

Hair, Joseph F. (2011). «Multivariate Data Analysis: An Overview». In *International Encyclopedia of Statistical Science*, a cura di Miodrag Lovric, 904–7. Berlin, Heidelberg: Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-04898-2_395.

Hochkirchen, Thomas. (2010). «Modern Multivariate Statistical Techniques: Regression, Classification, and Manifold Learning». Journal of the Royal Statistical Society Series A: Statistics in Society 173, fasc. 2: 467–467. https://doi.org/10.1111/j.1467-985X.2009.00634_10.x.

Kruskal, William H., e W. Allen Wallis. (1952). «Use of Ranks in One-Criterion Variance Analysis». *Journal of the American Statistical Association* 47, fasc. 260: 583–621. https://doi.org/10.1080/01621459.1952.10483441.

Ian H. Witten, Eibe Frank and Mark A. Hall (2011). Data Mining: Practical Machine Learning Tools and Techniques. Elsevier. https://doi.org/10.1016/C2009-0-19715-5.

Iovino, Francesco, Antonino Nicolaci, Alessio De Dominicis, e Alfonso De Nardo. (2020). «Gestione forestale e prevenzione del dissesto idrogeologico in territori ad elevata vulnerabilità in Campania». *L'Italia Forestale e Montana*, 11–37. https://doi.org/10.4129/ifm.2020.1.02.

Iovino, Francesco, Carlo Galiano, Antonino Nicolaci, Vincenzo Perrone, e Salvatore Spanò. (2019). «I rimboschimenti litoranei in Calabria: miglioramento e conservazione». *L'Italia Forestale e Montana*, 155–87. https://doi.org/10.4129/IFM.2019.3.03.

Lella, Ludovica, e Francesca Silvia Rota. (January 2021). «Le Montagne Italiane Tra Dinamicità e Marginalità». *Scienze Del Territorio*, Vol. 9 (2021): La nuova centralità della montagna / The new centrality of mountains. https://doi.org/10.13128/SDT-12497.

Marandola, Danilo. (2012). «Establishing Forest Stakeholders' Associations to revitalize forestry in mountain areas. Contributions from EU rural development programmes: a case study from an Italian Region». *L'Italia Forestale e Montana*, 237–51. https://doi.org/10.4129/ifm.2012.3.02.

Marchi, Enrico, e Giacomo Certini. (2015). «Environmental impact of forest operations and possible countermeasures». In *Atti del Secondo Congresso Internazionale di Selvicoltura = Proceedings of the Second International Congress of Silviculture*, 448–53. Accademia Italiana di Scienze Forestali. https://doi.org/10.4129/2cis-em-imp.

Marengo M. (2019). «Diversamente migranti: il ruolo delle lifestyle migrations nelle dinamiche di gentrification rurale contemporanee. Il caso della Vallesanta (Casentino)», *AGEI GEOTEMA*, 61.

Marino, Davide (2016). «La nuova mappatura. Le filiere corte nel contesto dell'agricoltura urbana in Italia»,

Marone, Enrico. (January 2023). «La sostenibilità economica delle ipotesi gestionali dei boschi soggetti a vincolo paesaggistico». *L'Italia forestale e montana* 77, fasc. 6 : 235–41. https://doi.org/10.36253/ifm-1089.

Marucci, Angelo, Davide Marino, Margherita Palmieri, e Silvia Pili. (October 2022). «The role of agroforestry areas in the potential provision of ecosystem services: the case of the Molise Region.» *L'Italia forestale e montana* 77, fasc. 4 : 153–63. https://doi.org/10.36253/ifm-1723.

Meloni P. (2021). La gentrification della campagna nella Toscana meridionale: l'invenzione del Chiantishire, in «L'Uomo», XI, 2: 35-60. https://rosa.uniroma1.it/rosa03/uomo/article/view/17941 Accessed April 2023

Meloni, Pietro, e Andrea Valzania. (March 2023). «Slowdown. Una questione di classe?» *SocietàMutamentoPolitica* 13, fasc. 26 : 65–72. https://doi.org/10.36253/smp-14322.

Ministero delle Politiche Agricole Alimentari e Forestali. (June 2010). «Atlante nazionale del Territorio rurale». *Monografie regionali sulla geografia delle aree svantaggiate*. Regione Lazio. Caire Urbanistica.

Mogotsi, I.C. Christopher D. Manning, Prabhakar Raghavan, and Hinrich Schütze. (2010): Introduction to information retrieval. Inf Retrieval 13, 192–195. https://doi.org/10.1007/s10791-009-9115-y

Motta, R, M Agnoletti, M Marchetti, P Mori, R Romano, F Salbitano, T Sitzia, e G Vacchiano. (December 2020). «On the protection of cultural heritage in forest landscapes». *Forest@ - Rivista di Selvicoltura ed Ecologia Forestale* 17, fasc. 6 : 109–13. https://doi.org/10.3832/efor3690-017.

Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. (2020). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. (Paragraph). doi: 10.1136/bmj.n71. For more information, visit: http://www.prisma-statement.org/

Pazzagli, Rossano. (December 2020). «Risalire». *Scienze Del Territorio*, Vol. 9 (2021): La nuova centralità della montagna / The new centrality of mountains. https://doi.org/10.13128/SDT-12409.

Poli, Piera, Pietro Bertolotto, e Alessandro Pistoia. (2018). «Impatto del cinghiale (Sus scrofa L.) sulla biodiversità vegetale - ISBN 978-884675376-2», 14–22.

Prete, Filemona. (December 2022). «The Italian Legal Framework of Agricultural Land Succession and Acquisition by Legal Persons». *Journal of Agricultural and Environmental Law = Agrár- és Környezetjog* 17, fasc. 33 : 141–54. https://doi.org/10.21029/JAEL.2022.33.141.

Pqsf, 2008 – Il Programma Quadro per il Settore Forestale. A cura di R. Romano. https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/755 Accessed May 2023.

Regione Marche. BOZZA Programma di Sviluppo Rurale 2014-2020. Reg. (UE) n. 1305/2013.

Robertson, Stephen. (2004): «Understanding Inverse Document Frequency: On Theoretical Arguments for IDF». Journal of Documentation 60, fasc. 5. 503–20. https://doi.org/10.1108/00220410410560582.

Salsa, Annibale. (2021). «Autogoverno Dei Territori Montani». *Scienze Del Territorio*, Vol. 9 : La nuova centralità della montagna / The new centrality of mountains. https://doi.org/10.13128/SDT-12583.

Smiraglia, Daniela, Ilaria Tombolini, Loredana Canfora, Sofia Bajocco, Luigi Perini, e Luca Salvati. (August 2019). «The Latent Relationship Between Soil Vulnerability to Degradation and Land Fragmentation: A Statistical Analysis of Landscape Metrics in Italy, 1960–2010». *Environmental Management* 64, fasc. 2 : 154–65. https://doi.org/10.1007/s00267-019-01175-6. "The final publication is available at link.springer.com".

Società Dei Territorialisti/E. (2021). «Manifesto Di Camaldoli per Una Nuova Centralità Della Montagna». *Scienze Del Territorio*, 13 giugno 2021, Vol. 9 : La nuova centralità della montagna / The new centrality of mountains. https://doi.org/10.13128/SDT-12924.

Sorbetti Guerri, Francesco, Orazio La Marca, e Sara Bartolozzi. (2020). «Interazioni fra ungulati selvatici e foresta: necessità di una gestione integrata». *L'Italia Forestale e Montana*, 243–51. https://doi.org/10.4129/ifm.2020.5.02.

Stefani, Alessandra. (2021). «Verso la nuova Direzione generale economia montana e foreste: il percorso e le nuove sfide». *L'Italia Forestale e Montana*, 55–82. https://doi.org/10.4129/ifm.2021.2.01.

Stefani, Alessandra. (January 2023). «Il Decreto legislativo 42 del 2004 e il Testo unico delle foreste e filiere forestali: un percorso comune da completare verso la gestione forestale sostenibile». *L'Italia forestale e montana* 77, fasc. 6 : 211–15. https://doi.org/10.36253/ifm-1085.

Taffetani, Fabio. (2009). «Boschi residui in Italia tra paesaggio rurale e conservazione». In *Atti del Terzo Congresso Nazionale di Selvicoltura*, 283–94. Accademia Italiana di Scienze Forestali. https://doi.org/10.4129/CNS2008.038.

Wu, Ho Chung, Robert Wing Pong Luk, Kam Fai Wong, e Kui Lam Kwok. (2008). «Interpreting TF-IDF Term Weights as Making Relevance Decisions». ACM Transactions on Information Systems 26, fasc. 3: 1–37. https://doi.org/10.1145/1361684.1361686

Zollet, Simona. (January 2021). «Alla Ricerca Di Un Modello Territoriale Agroecologico e Integrato per l'agricoltura Di Montagna». *Scienze Del Territorio*, Vol. 9 (2021): La nuova centralità della montagna / The new centrality of mountains. https://doi.org/10.13128/SDT-12498