

Ecosystem Services and SDGs, Sustainability and Craftsmanship activities in Sicily

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Abstract

Ecosystem services linked to biodiversity conservation, sustainable natural resource use and to the Sustainable Development Goals (SDGs) are underscored as a crucial research focus. Ecosystem services contribute to the achievement of various objectives, including the environmental sustainability and human well-being. Preserving and developing ecosystem services could lead to a reduction of inequalities and promotion of sustainable development models. Furthermore, the universal access to these services in all regions and communities is crucial for addressing existing territorial disparities among different regions or communities, especially socioeconomic, environmental, and access to resources (such as clean water, food, healthy air, and soil).

The paper wants to zoom in on a pilot study in Sicily, a marginal territory of Italy. The primary aim is to classify economic activities in Sicilian craftsmanship, identifying those aligning with the transition to a new model of economic and environmental development.

The structure of the paper is outlined: the first part defines circular and bio-economy and Ecosystem services exploring their connections and relevant sectors. The second part delves into ecosystem services and the CICES classification. The final part compares ATECO (ISTAT) and CICES classifications, analyzing the distribution of Sicilian craftsmanship to identify ecosystem services impacting well-being. Additionally, GIS tools are mentioned as a means of creating maps to aid in the analysis.

In summary, the abstract provides an overview of a comprehensive study that integrates societal resilience, sustainable economic approaches, and ecosystem services. It focuses explicitly on Sicilian craftsmanship and its alignment with the transition towards a circular and bio-based economy.

Keywords: Ecosystem services, Craftsmanship, Sustainability, Sicily, Firms

1. A brief literature review about connection among Circular economy, Bioeconomy, and Ecosystem Services

Extensive literature describes the role of the circular economy as a protagonist in the challenges that will characterize global development in the coming years. The circular economy emerges as a key player in shaping the trajectory of global development, with a pivotal role in fostering sustainability within cities and societies. Its transformative impact is underscored by a shift from a linear economic model to a more adaptive transition model, emphasizing the importance of innovation in research and entrepreneurship. These companies, recognized internationally for sustainable practices, turn food by-products into innovative materials, fostering new productive life cycles through waste reduction and reuse. Their impact extends beyond individual companies, creating a network of local businesses that contribute to well-being and economic returns in the area [2].

This ripple effect represents both a challenge and an opportunity for regions seeking enhanced economic development by establishing green tech companies and promoting a sustainable, innovative, and circular regional context. Moreover, social enterprises and companies aligned with circular economy principles generate regional impacts and create new jobs and networks, contributing to a sustainable environment and triggering unique cultural and social developments. Essentially, these entities act as ecosystem services, providing direct and indirect benefits to the community and the territory [1]. Recognizing the importance of ecosystem services, this article proposes a pilot experiment using NACE, ATECO, and CICES classifications in the second paragraph to identify craftsmanship sector activities in Sicily aligned with the bioeconomy and those contributing to ecosystem services as specified in the third paragraph. This multidimensional approach offers a valuable framework for understanding the symbiotic relationship between circular economy practices, the bioeconomy, and ecosystem services in pursuing sustainable regional development.

2. CICES classification for Ecosystem services

The Common International Classification of Ecosystem Services (CICES), established in 2009 and now in its thoroughly revised version V5.1, provides an alternate classification system. Rooted in the concept that ecosystem services contribute to human well-being, CICES defines these contributions as 'what ecosystems do' for people, distinct from the goods and benefits derived from them. The cascade mode within CICES classifies final ecosystem services as the direct outputs of ecosystems—natural, semi-natural, or highly modified—directly impacting human well-being. This model considers the purposes or uses of people for different types of ecosystem services and the specific attributes or behaviors of ecosystems that support them.

Since any classification must be internally consistent, the structure initially proposed and further developed in version V5.1 has been refined. The CICES structure has been designed based on a hierarchy to accommodate the fact that people operate at different thematic and spatial scales. Through this hierarchy, it is possible to aggregate classes

differently, allowing users to select those most beneficial. The composition of the CICES classification is shown in the following figure.

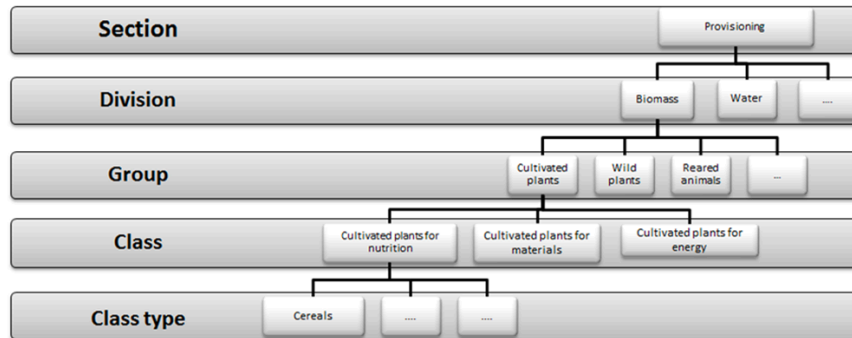


Figure 1: The Structure of CICES Classification V5.1. Note: The Structure of CICES is derived from the Common International Classification of Ecosystem Services (CICES) V5.1 Guidance on applying the Revised Structure.

At the broadest level, the "Sections" provide a foundational framework, further subdivided into "Divisions," "Groups," and "Classes." The figure exemplifies the hierarchical structure focusing on Provisioning Services [1]. This design empowers users to navigate through various levels of specificity, tailoring their exploration to the desired depth for their specific application. As users progress from Section to Division, Group, and Class, services become increasingly detailed while remaining nested within overarching categories [1].

CICES, being a classification system rather than an arbitrary nomenclature, aligns with the requirements for this pilot study in Sicily [1]. The upcoming sections will reveal the data and results of applying this refined structure.

3. Methodology and first results

The decision to focus on enterprises in the craftsmanship sector in Sicily stems from the sector's dynamic growth, as evidenced by an increase in active enterprises and their widespread distribution across the region. According to data from the Chamber of Commerce of the Marche region, artisanal enterprises in Sicily grew from 71,074 in December 2019 to 72,022 in December 2022, indicating sustained growth despite the challenges posed by the pandemic. The Ente Bilaterale Artigianato Siciliano (Bilateral Craftsmanship Sicilian Entity", EBAS) saw a notable increase in artisan enterprises from 3,427 in 2019 to around 10,016 in 2022. This growth positions the craftsmanship sector as a pivotal reference point for exploring the transition towards a bioeconomic model and identifying ecosystem services that contribute to well-being in the region. Based on a sample of 10,016 craftsmanship enterprises in Sicily, the analysis provides a comprehensive overview derived from EBAS data, representing approximately 14% of all active enterprises in Sicily based on Chamber of Commerce data.

The reference sample is distributed at the provincial level, as shown in the following figure.

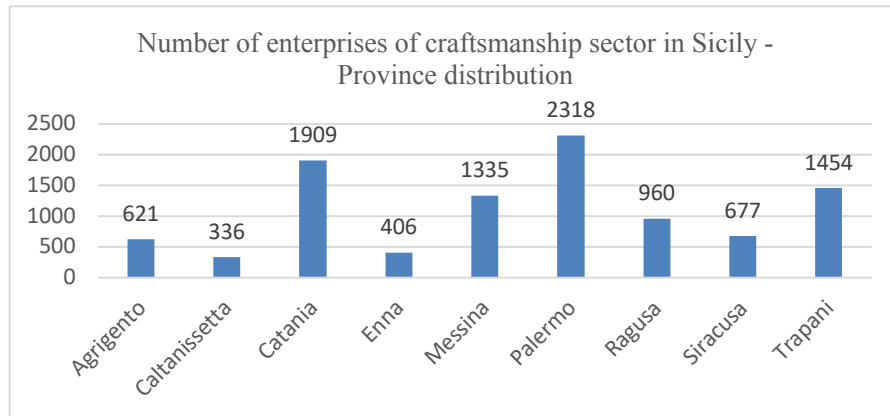


Fig. 2: Authors' elaboration based on EBAS data 2023.

The provincial distribution of the reference sample is illustrated in Figure 3, highlighting a concentration of companies in Palermo, Catania, Trapani, and Messina. Despite its smaller territorial size, Ragusa boasts more enterprises (677) than some larger provinces, emphasizing its significance in diverse areas.

Before investigating the results, a brief methodological explanation is warranted. ISTAT and ATECO codes were cross-referenced to identify bioeconomic companies, aligning them with NACE classifications. The CICES classification was employed to analyze ecosystem services, considering its highest hierarchical level—Cultural, Provisioning, and Regulation and Maintenance sections.

3.1 The Presence of Ecosystem Services in Sicily

It has been summarized the Sicilian economic activities falling within the definition of the three ecosystems for each appropriately described section. In the case of the Cultural ecosystem, enterprises with ATECO codes I, R, and S are included. This section embraces all non-material, typically non-rival, and non-consuming products of ecosystems (both biotic and abiotic) that influence the physical and mental states of individuals. Activities with codes A, C, G, I, and N are included in the Provisioning ecosystem. This section encompasses all activities and sectors that generate nutritional and non-nutritional material, energy products from living systems, and abiotic products (including water). Finally, the Regulation and Maintenance section is the broadest and may include sectors of the other ecosystems. Indeed, it has economic activities with codes B, C, E, F, G, H, I, J, K, L, N, Q, and S. The reason why so many sectors are included is that this section encompasses all ways in which living organisms can mediate or moderate the environmental surroundings that affect human health, safety, or comfort, along with their abiotic equivalents. By having the description of each activity through the ISTAT tax code, it was possible to verify whether it falls within the definition of this ecosystem.

Moving on to the distribution of businesses by ecosystem at the provincial level, we can observe that approximately 59% of enterprises fall into the Regulation and Maintenance section. In comparison, 21% of enterprises fall into the Cultural section, and 20% into the Provisioning section. Once again, Palermo, Trapani, and Catania are the provinces with the highest number of businesses for each ecosystem. The most stimulating aspect is also regarding Ragusa, which, despite being smaller than other provinces, has several companies per ecosystem that is only lower than the fourth province, Messina. Agrigento and Caltanissetta, on the other hand, are the last in terms of the number of businesses per ecosystem. Some maps were created and compared to obtain a spatial overview of ecosystems' presence and ecosystem services in Sicily. From the examination of the maps it suggests that the spatial proximity to larger provinces with positive economic dynamics (the development of economic activities and the presence of companies) generates a positive and expansive effect, influencing the surrounding territory.

4. Conclusions

The analysis of ecosystem services in Sicily reveals a complex relationship with the potential clustering of other economic activities. Examining enterprises in the craftsmanship sector in Sicily, indicates notable patterns. First, the craftsmanship sector in Sicily has experienced growth, with an increase in active enterprises, reflecting resilience even during challenging times like the pandemic. The analysis focused on approximately 10,016 craftsmanship enterprises distributed across different provinces. The exploration of CE in Sicily, categorized into Cultural, Provisioning, and Regulation and Maintenance sections, provides insights into the spatial distribution of these services. The Palermo, Catania, Messina, and Trapani provinces consistently emerge as hubs for various economic activities, including ecosystem services. The maps depicting the concentration of enterprises and ecosystem services in Sicily reinforce the idea that the larger provinces tend to have more businesses. However, the clustering of enterprises and ecosystem services is not solely determined by spatial size. The relationship between ecosystem services and economic activities in Sicily underscores the importance of understanding the interplay between different sectors. Spatial dynamics, economic clustering, and the integration of sustainable practices, such as those seen in the craftsmanship sector, contribute to a nuanced perspective on regional development and the potential for creating well-being and economic progress. The analysis suggests that fostering sustainable practices and innovation in various economic sectors can have positive spillover effects, creating a more resilient and interconnected regional context moving to reducing of territorial disparities and to achieving SDGs objectives.

References

1. European Environment Agency, Common International Classification of Ecosystem Services (CICES) V5.1 Guidance on the Application of the Revised Structure, January 2018;
2. Scaffidi, F.: Regional implications of the circular economy and food greentech companies. Sustainability, 14(15), 9004 (2022).