

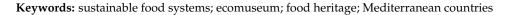
# Article Ecomuseums in the Mediterranean Area and the Promotion of Sustainable Food Systems

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Abstract: In recent years, the growing interest in food as a central component of heritage preservation has been paired with a reflection on the sustainability of food systems. At the same time, place-based food governance has undergone processes of hybridization, opening up to a wider range of stakeholders. We argue that ecomuseums can positively contribute to the promotion of sustainable food systems that can preserve cultural heritage without undermining the development of healthy food systems. To discuss this hypothesis, we conducted an exploratory study to assess the current diffusion and food-related practices of ecomuseums in the Mediterranean area. Integrating the information of existing databases with the online research of new institutions, we mapped a large sample of ecomuseums and carried out a web content analysis. The main results of the research are a geolocalized map of Mediterranean ecomuseums and their activities and an index assessing their capacity to engage users on relevant topics through their webpages. The results highlight the existence of an unbalanced distribution of experiences and the potential for growth, especially in countries in the eastern and southern Mediterranean.



## 1. Introduction

Concerns regarding sustainability are progressively becoming integral to discussions on the management and planning of food systems. Within the literature, there is a large body of scientific articles, research endeavors, and grassroots initiatives integrating sustainability principles into food systems [1–9]. Achieving sustainability remains a distant goal [10] in food systems and many other areas, but food policies and governance practices are moving towards sustainability, and this awareness is shared by international institutions. For example, the European Union (EU) recognizes the need for a holistic approach that considers the environmental, social, and economic aspects of food systems. Key policy areas that have been promoted in recent years by the EU include the following:

- The Farm to Fork Strategy [11]: As part of the European Green Deal, this strategy aims to make food systems more sustainable, ensuring that the environmental and social footprint of food production and consumption is reduced. It focuses on areas such as reducing food waste, promoting organic farming, and ensuring food security.
- The Common Agricultural Policy (CAP) [12]: The CAP has been reformed to promote sustainable agriculture. This includes measures that support organic farming, reduce greenhouse gas emissions, and preserve rural biodiversity.
- Circular Economy [13]: The EU's Circular Economy action plan includes measures that minimize food waste and ensure more sustainable food production and consumption patterns.
- The Biodiversity Strategy [14]: The EU's Biodiversity Strategy for 2030 aims to protect nature and reverse the degradation of ecosystems, which is integral to sustainable food systems.



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 Climate Policies [15]: The EU's climate policies also impact food systems, pushing for reduced emissions in agriculture and promoting sustainable land use.

Food systems can be analyzed at various scales [16,17], ranging from the micro-local to the global scale, and they can refer to all aspects of food, ranging from production to distribution, processing to retail, and consumption to waste disposal.

Although the national and supranational levels were predominant in the management of food systems for a long period of time, attention towards local food policies started to emerge at the beginning of the 2000s, with cities and local actors becoming increasingly involved in their definition and implementation [18].

This new place-based food governance paid attention to the development of local food system resources, which could be more sustainable from economic, social, and environmental points of view, aiming, for example, at the control of food quality; the promotion of local production (reducing transport costs and carbon footprints); launching campaigns to promote the production and consumption of healthy, environmentally friendly food; and regulating land use. The heightened relevance of these forms of local food systems has been characterized by an increased hybridization of governance dynamics [19], with an increasing participation of actors who were historically excluded from the governance of the food system, including civil society and food movements [20]. Among the actors involved in food governance, we can find state actors, such as government agencies and diplomatic missions, and non-state actors, such as NGOs, private companies, and civil society organizations (CSOs). This last group also includes ecomuseums, museums, and more general cultural institutions.

According to Gaitàn-Cremaschi et al. [21], hybrid food systems, described as a mixture of niche innovations and mainstream practices, can be especially useful in phases of transition, as they may foster broader processes of change by creating linkages between niche food systems and the dominant food system regime.

In light of the current reflection on the hybridization of food system governance processes, the research question that orientated this article is as follows: what is the role of ecomuseums (and, more broadly, cultural institutions) in promoting sustainable food systems? This reflection is supported by the growing implication of museums worldwide in the promotion of sustainability and initiatives related to the Sustainable Development Goals (SDG) framework and the climate change emergency. Our main hypothesis is that ecomuseums and community museums have the potential to play key roles in this field due to their inherent ties to the local territory and their inclination towards community-based activities. To obtain a wide overview of actions and processes, we decided to consider all of the Mediterranean area, firstly, because it is the area where the Mediterranean diet originated and, secondly, because the area already hosts some best practices related to food (such as the "Ecomusei del Gusto" project in Italy or the Slow Food movement in that area). Lastly, these territories are fertile and linked with ancient food traditions, where many typical products are cultivated, produced, and processed with traditional methodologies.

Within this context, the online presence of museums increasingly provides insights into their activities and roles, including with respect to food systems. In recent years, museums worldwide have increased their use of the Internet to amplify their presence, showcase artifacts virtually, and engage in meaningful communication with a diverse audience [22]. Websites have become indispensable tools, providing museums with a multifaceted platform for information dissemination, interaction with visitors, and even commerce, and studies have concluded that a well-built website, as well as social network profiles, may actually increase the desire to physically visit a museum [23].

In order to examine the above hypothesis, including an analysis of the online presence of ecomuseums, this study is organized as follows.

The first section discusses the evolving role of cultural institutions, particularly museums, in society, focusing on the emergence of ecomuseums as a significant expression of social museology. Ecomuseums, distinguished from traditional museums, are actively engaging in localized efforts for positive transformation within specific communities, and their participatory approach, deeply rooted in community engagement, is in line with the Agenda 2030 principles and the SDGs. The second section explores the roles of various cultural institutions, including museums and ecomuseums, in contributing to collaborative governance processes within the food system. Despite not being directly involved in official food policy, these institutions can still have significant impacts by raising awareness about food sustainability through exhibitions and educational programs and supporting the promotion of local networks among stakeholders. Italian ecomuseums have, for instance, developed a number of actions, including short food supply chain projects, cultural itineraries linking agri-food products to local traditions, and support for local producers.

The section that follows is dedicated to the survey carried out for this research. Museums worldwide are increasing their use of the Internet to amplify their presence and engage with diverse audiences. This section presents a dimensional model developed for analyzing web content applied to museums, comprising the following four dimensions: Information, Communication, E-commerce, and Additional Functions. An examination into how this model was adapted and simplified to analyze the webpages of Mediterranean ecomuseums and participatory cultural institutions is also carried out, considering their specificities such as small dimensions, a focus on working with local communities, and participatory practices.

The data collected are presented in the Results Section, with a focus on the characteristics connected with the effective use of webpages and the presence of food-related content among the institutions included in the sample. The last section discusses the results by considering the theoretical background, highlighting the potential that ecomuseums represent to foster the promotion of a sustainable food system.

We argue that the role of museums as active stakeholders in food governance has not yet been adequately taken into account. At the moment, there is a research vacuum that needs to be filled. For a start, no comprehensive census of active ecomuseums exists, and consequently, it is not possible to assess what activities are being carried out and their impact. Providing information on the diffusion of these institutions and their involvement with participatory practices and cultural heritage is the first step needed to promote a reflection on the potential role of museums and ecomuseums in defining food governance strategies that have an impact on the system in terms of sustainability transformations. Secondly, this study will contribute to exploring an aspect of the debate that has not yet been adequately considered, namely the role of actors who are generally not formally part of food governance but who can contribute to making it more concrete and more operational in practice.

This study was conducted within the context of the activities developed by the National Biodiversity Future Centre (nbfc.it), an initiative promoted by the Italian Ministry of Research aimed at studying and preserving the ecosystems and biodiversity of the Mediterranean area.

## 2. How Ecomuseums Contribute to Sustainable Food Systems

## 2.1. Ecomuseums and Sustainable Development

The social role of cultural institutions, particularly museums, in society has been a debated topic since the Santiago de Chile Roundtable of 1972. The Nouvelle Muséologie movement, with the establishment of MINOM (International Movement for a New Museology) in 1985, reinforced the belief that museums should answer to the needs of society. Sustainability is currently one of the main issues that need to be addressed for the creation of a fairer society that is more attentive to the impacts that are inflicted on not only the environment but also on people and culture. Indeed, even the latest definition of museums by the International Council of Museums [24] highlights this concept, confirming the importance of museums as "institutions in the service of society" that are capable of fostering sustainability. In fact, since 2018, ICOM has established a Working Group on Sustainability (WSG) that is dedicated to "conducting surveys, collecting data and investigating what sustainability meant: globally and in the context of the museum sector" (further details

are available at the webpage https://icom.museum/en/news/get-to-know-icom-wgs/ accessed on 26 June 2024). It is worth remembering that ICOM Italy has established its own WGS composed of Italian experts on this topic.

Sociomuseology examines "social" museum practices and is concerned with the effectiveness of those processes: the satisfaction of community needs. Ecomuseums comprise one expression of social museology, which also includes, among other things, community museums, Pontos de Memória, indigenous museums, and favela museums: in general, any museology expression that involves local actors in heritage management. Many authors have theorized the difference between museums and ecomuseums. According to de Varine [25], museums are composed of collections, buildings, and the public; ecomuseums, on the other hand, are formed by a community, heritage, and territory. If the museums were seen as service providers, in the former case, they would be serving the collections, while in the latter, they would be serving society. Borrelli and Davis [26] also emphasize this aspect, stating that an ecomuseum's focus extends beyond mere preservation and the display of artifacts, embracing a proactive role in community development.

De Varine's definition is enriched and echoed by other scholars. Using de Varine's paradigm, Maggi [27] defines ecomuseums as a pact through which the community takes care of its own territory. Joubert [28] emphasizes the greater educational role of ecomuseums compared to museums. Brito [29] introduces the concept of a "museum at the service of differences", which can be or not be associated with a territory (e.g., the Pontos de Memória in Brazil, places where memory is celebrated), and which responds to society's needs (e.g., LGBT museums; in that case, museums represent categories that claim more rights and visibility). Boylan [30] underlines the interdisciplinary approach of ecomuseums in a wide area that involves inhabitants, who contribute to the management, and an audience. He also proposes five criteria for distinguishing museums and ecomuseums: the reference space, the focus of interpretation, the locus of political control, organizational priorities, and the target audience.

Therefore, ecomuseums have a distinct goal compared to many traditional museums, which is the active engagement in localized efforts for fostering positive transformation. Their primary objective lies in progressively enhancing the quality of life within specific communities. For example, a recent project involving a network of European ecomuseums [31] was able to show that many of them involved community stakeholders in identifying and defining the "sustainable world" they imagine and intend to build.

The strength of ecomuseums in achieving sustainability is rooted in their participatory approach. These institutions operate by integrating the community into decision-making processes, ensuring the collaborative ownership of resources and aligning their trajectory with the expressed needs of the local population [32].

In a recent study, McGhie [33] highlights how this participatory approach resonates with the guiding principles delineated in Agenda 2030, emphasizing inclusivity and participatory governance as pivotal aspects of sustainable development. Moreover, McGhie points out the potential of ecomuseums in reference to the goals included in the SDG framework.

Within the paradigm of ecomuseums, heritage assumes the role of a communal asset of considerable significance. Whether natural, tangible, or intangible, heritage is regarded as a resource that should be conscientiously managed rather than as a mere tradable commodity. Emphasis is placed on preserving the intrinsic connections between heritage and its contextual environment, fostering a sense of belonging and continuity within the community.

In their pursuit of sustainable development, ecomuseums adopt a comprehensive approach that seeks equilibrium among social, environmental, and economic considerations. They act as catalysts for sustainable development, advocating for an integrated understanding of the intricate relationships between culture, nature, technology, and temporal continuities.

Finally, ecomuseums actively contribute to local economic sustenance. They facilitate skill development, create employment opportunities, and establish markets for locally pro-

duced goods. By doing so, they purposefully steer clear of the adverse impacts associated with mass tourism, instead prioritizing the cultivation of social capital and the holistic advancement of the community [34].

## 2.2. Museums and Ecomuseums Working on Sustainable Food Systems

Research has explored how CSOs, NGOs, and cultural institutions such as museums can contribute to the collaborative governance processes of the food system. Even though they may not be directly involved in official food policy, they can implement a number of actions with direct and indirect impacts, such as the following [35]:

- Promote food literacy, which involves initiatives aimed at enhancing access to nutritious food and promoting healthy eating habits;
- 2. Feed the visitor, emphasizing the integration of criteria related to health, nutrition, and sustainability into museum food services;
- 3. Using "food as a connector", highlighting efforts that strengthen relationships and forge connections with various stakeholders within the food system.

In fact, museums adopt various tools to promote food co-governance processes, including practices and initiatives in capacity building; the activation of learning processes; the creation and fostering of collaborative networks, communication, and information exchange; and integrating and implementing sustainability goals and practices in their internal processes. These efforts not only extend within museums but also involve collaboration between museums and other institutions and non-museum organizations.

Other notable examples of the work that museums are developing on the topic of sustainability are the Climate Museums, which draw inspiration from the principles of the "new museology" and aim to foster forms of active engagement with visitors, allowing them to emotionally connect with the urgency of sustainability issues, and emphasize the impact on the most vulnerable populations. The Museums & Climate Change Network serves as a community of interest focused on sharing ideas and inspiration related to effective outreach, powerful storytelling, and fostering understanding about the challenges of global environmental change. These museums are located in New York, Rio de Janeiro, Hong Kong, Oslo, and Bremerhaven (Germany) [36].

The Climate Museums are fostering a culture of action on climate change by inviting individuals from diverse backgrounds to engage in dialogue and community-building around equitable solutions. Despite widespread concern about the climate crisis in the US, many people remain silent and inactive. Leveraging the popularity and credibility of museums, the Climate Museums facilitate gatherings where people can educate themselves about solutions and become active participants in efforts to create a more sustainable future. Through various avenues for civic engagement, these museums offer multiple pathways for individuals to contribute to positive change [36]. The New York Climate Museum indicates that food is one of the most important topics to focus on in order to tackle climate challenges (https://climatemuseum.org/blog/talking-climate-food, accessed on 26 June 2024).

Within food system co-governance processes, ecomuseums also have become entities capable of stimulating reflexive capacity and learning processes, connecting networks, sharing information, and providing voices and opportunities to think and act towards common sustainability goals [37,38]. In doing so, they promote the inclusion of the views and needs of local communities, both within museum programming and with local, regional, national, and global food systems.

The case of Italy represents an interesting observation point regarding the relations between museums (and ecomuseums), food, and sustainability. Italy is a country known for its rich culinary heritage and diverse regional cuisines. Concerning traditional museums, a survey from 2016 [39] mapped 99 Italian food museums that are spread throughout the entire country. The museums focus on a wide range of products and beverages, with a high representation of not only wines (30%) but also olive oil (10%); spirits, cheese, and honey (4%); fruit, milk, bread, and truffles (3%); beer, other alcoholic drinks, coffee, chocolate,

sugared almonds, and salt (2%); and vinegar, eel, herbs, mushrooms, ice-cream, licorice, mint, chili pepper, pizza, cured meats, tea, and sugar (1%). Museums dedicated to general food culture represented 7% of all the museums. Moreover, the research highlighted how the primary aim of public museums (as opposed to private ones) was to strengthen existing relationships with local communities and institutions operating at different levels, along with safeguarding and promoting the food heritage they display.

At the same time, Italy has experienced, in recent years, impressive growth in its number of ecomuseums, often focusing on the topic of eco-gastronomic heritage [40].

Being "museums without walls" [32], their approach to sustainability is holistic. In their territories, they aim to safeguard and promote all aspects of local identity that could be considered a vehicle of culture, including food.

One of the characteristics of ecomuseums in Italy is their adaptation to the local context for the participatory management of heritage. Therefore, their approach to food varies in terms of their different objectives and actions depending on the territory. Indeed, there are ecomuseums aimed at preserving typical cultivations (e.g., the Ecomuseum of the Lemon Groves of Lake Garda, the Ecomuseum of Wine); others promote local products and productions (e.g., the Ecomuseum of Rye; the Ecomuseum of Castelmagno cheese).

In other cases, still, they organize networks connecting different institutions: such are the cases of the network "Ecomusei del Gusto", dedicated to the enhancement of local food and wine products, or the "Paesaggi sostenibili del cibo", an initiative that connects five Italian ecomuseums, proposing coordinated itineraries focusing on the topics of food and sustainability.

In general, ecomuseums in Italy promote the local economy and consequently support producers by organizing various activities that celebrate food—for example, the Ecomuseum Lis Aganis has specific projects related to local vegetables and cured meats. Moreover, ecomuseums participate in various activities related to Slow Food (Slow Food is an international non-profit association committed to restoring value to food and respecting those who produce it, in harmony with the environment and ecosystems), collaborating to preserve foods and products bearing the Slow Food label. Ecomuseums thus promote food in a holistic and sustainable manner: the raw materials and their processing; the production and consumption chain (favoring short supply chains); and traditional recipes. In this manner, they convey values related to food, moving away from a consumption logic.

Among the actions that Italian ecomuseums are carrying out to promote sustainable and local food systems, we can find the promotion of short food supply chain projects, the creation of cultural itineraries linking agri-food products to local specificities and traditions, attention to agricultural products and the corresponding rural landscape as a part of the cultural heritage of the communities, the support of producers for the promotion of products, the drafting of guidelines for developing and enhancing local agricultural products, and the secondary objective of supporting the promotion of typical artisan trades [41].

## 3. A Survey in Mediterranean Countries

Participatory, community-based heritage research is a spreading perspective that has taken deep root among groups in many continents, particularly Australia, Europe, and North America [42], but it is still at its early stage in African countries [43].

The Mediterranean countries are traditionally linked by the so-called "Mediterranean diet," and several research studies have delved into various aspects of this shared culinary tradition, ranging from health-related aspects to more cultural ones [44–46]. A recent work [47] highlights issues of malnutrition and the environmental impact of the food system in all Mediterranean countries, noting that even these countries would benefit were the Mediterranean diet more widely adopted in them.

Based on the results of previous research, we suggest that ecomuseums could represent valuable actors in the promotion of change towards more sustainable food systems, especially at a local level, thanks to their work in food safeguarding. The present research intends to investigate if, and how, the topic of sustainable food systems is being integrated into the activities of ecomuseums and participatory institutions in the Mediterranean countries, including in the analysis both Western European countries, with a more developed tradition of research on cultural heritage, and Eastern European/North African countries, where data are scarcer.

This study has been carried out in the context of the activities developed by the National Biodiversity Future Centre (nbfc.it), an initiative promoted by the Italian National Research Council, which is committed to studying and preserving the ecosystems and biodiversity of the Mediterranean area.

In order to develop a first exploratory study, we started with an analysis of the online presence of a sample of ecomuseums and other community-based cultural institutions. This approach was chosen on the basis of a vast body of research highlighting the role that webpages have come to assume in the activities of museums and cultural institutions.

In a specific exploration of online communication's effectiveness within museums in Campania, Italy, the researchers highlighted the web's role in establishing connections with both existing and potential audiences, especially for small- and medium-sized museums [48], as it is often used by ecomuseums and other participatory institutions. Various studies have delved into the extent to which museums utilize the web for communication, employing different perspectives. Some authors have assessed the level of dialogic communication and scrutinized museums' utilization of web platforms and social web applications [49]. Others have concentrated on the efficiency of museums' online communication [50]. In one study, Theocharidis et al. [51], reviewing the characteristics of 53 Greek museum websites, identified six dimensions: Contact–Communication, Visit the museum, The museum, Education, Website features, and Use of social media.

In their recent study, Crisobal-Fransi [52] developed a dimensional model for analyzing web content applied to museums, the Web Content Analysis (WCA) model. WCA comprised four dimensions: Information, Communication, E-commerce, and Additional Functions. In the Information dimension, aspects such as information about the museum, facilities, services, surrounding area, and promotions are evaluated. The Communication dimension assesses the capacity for interaction between museums and visitors, emphasizing the importance of effective communication tools. E-commerce focuses on the website's ability to facilitate the acquisition of museum products and services, including tickets, with considerations of payment mechanisms and data security. The Additional Functions dimension covers aspects such as data protection, quality certifications, and the existence of mobile apps.

In this study, an adapted, simplified version of the WCA model was adopted to analyze the webpages of Mediterranean ecomuseums and participatory cultural institutions. The main differences between the original model and the version adopted stem from the previously described specificities of ecomuseums and community museums when compared to traditional museums: small dimensions and a focus on work with the local community and participatory practices.

# 3.1. Materials and Methods

The first step of this research comprised undertaking a census of all ecomuseums and other participatory heritage management institutions active in 2023 in the Mediterranean area.

In order to create a wide database of all principal ecomuseums, community museums, and participatory heritage management institutions, we produced a census of these cultural institutions. The census of Italian ecomuseums (from the Italian Ecomuseum network, EMI) provided the original list of institutions. Thanks to new research, this list was integrated on Google Maps, and the terms "ecomuseums" and "community museums" were searched for in Google Maps for all countries on the Mediterranean Sea, in addition to Portugal. After the complete set of institutions that could be found online was mapped, we contacted them by email to collect suggestions about other similar institutions in order to enrich our

sample, as some small organizations do not have a strong online presence, and it is hard to find them via Google Maps or other web searches. The main aim of this phase was to have a list of all ecomuseums or even traditional museums that promote participatory practices in the Mediterranean area.

The final database consisted of 495 institutions mostly located in Italy but covering a total of 21 countries.

The tool used for analyzing webpages included the following sections and items:

Identification:

- Name of the institution, country, and type of institution;
- Specific focus of the institution on the topics of food, biodiversity, tourism, immaterial cultural heritage, and storytelling.

WCA simplified version:

- Information: whether the institution has its own page (not shared with other institutions), readability of the page, whether the page has more than one section, presence of sections dedicated to regular updates (i.e., news), and presence of recent updates (less than six months old);
- Communication: presence of links to the institution's social networks, presence and type of contact (form to be filled out, email address, telephone number, and physical address), no. of languages available, and presence of an interactive section (i.e., comment section);
- E-commerce: presence of a section selling tickets or collecting donations;
- Additional Functions (focused on the specificities of ecomuseums): mention of training activities organized by the institution, presence of a section describing projects developed by the institution, presence of a section dedicated to the local community, presence of a section related to biodiversity topics, presence of a section related to food or food systems, and presence of a section related to tourism.

The statistical analysis was conducted using STATA 18 and SPSS 29.0.1.0 (171).

## 3.2. Results

Among the 497 institutions included in the initial sample, 54 institutions had a "not available" or "under construction" webpage, 40 seemed to have ceased their activities, and 14 shared their webpage with other ecomuseums/institutions.

As for their nature, 318 were ecomuseums, while the remaining were classified as human science museums (35), natural science museums (10), or "other" (55), a category that mostly included different kinds of local administrations. It was impossible for the researchers to classify 78 of the institutions of the sample due to a lack of information (i.e., page unavailable or under construction). It is worth reminding the reader that all institutions included in the sample were selected because they promoted forms of active work with local communities that were considered to be in accordance with the principles of ecomuseums.

Among the sample, 230 had a section of their webpage dedicated to biodiversity and related topics, 178 institutions explicitly worked on the topic of tourism, and 90 worked on the topic of food (Table 1).

Table 1. Institutions included in the sample by country and by the presence of food topics.

Country	$\mathbf{n}^\circ$ of Institutions (Frequency)	Working with Food (%)
Italy	273	23.1
France	69	14.5
Spain	41	19.5
Portugal	27	11.1
Greece	23	9.5
Cyprus	10	0

Country	$\mathbf{n}^\circ$ of Institutions (Frequency)	Working with Food (%)
Israel	9	0
Tunisia	9	0
Lebanon	7	0
Croatia	4	50
Malta	4	0
Morocco	4	0
Slovenia	4	25
Turkey	4	0
Albania	2	0
Egypt	2	0
Bosnia and Herzegovina	1	0
Gibraltar	1	0
Monaco	1	0
Montenegro	1	100
Palestine	1	0

Table 1. Cont.

В

The topic of food was present only in eight countries, with Italy hosting 70% of the institutions that work on it, France with 11%, and Spain with 9%; the rest were located in Portugal, Croatia, Greece, Montenegro, and Slovenia. None of the southern countries analyzed seemed to work on the topic of food (Table 2).

497

Table 2. Details of the institutions working on food.

Total

Country	<b>N° of Food-Related</b> Institutions (Frequency)	% of All Food-Related Institutions
Italy	63	70
France	10	11.11
Spain	8	8.89
Portugal	3	3.33
Croatia	2	2.22
Greece	2	2.22
Montenegro	1	1.11
Slovenia	1	1.11
Total	90	100

A positive correlation between the topic of food and biodiversity is observed (Phi = 0.244; p < 0.001), as most of the institutions working on the topic of food also work on the topic of biodiversity.

To examine how an institution's webpage is used to present itself and engage potential participants in its activities, the answers to a selection of the items of the WCA simplified version were analyzed. The items included in this analysis are listed in Appendix A. As a first step, the internal coherence of the items was checked, and a Cronbach alpha of 0.84 was considered adequate.

A principal factor analysis was performed to better understand the relations between 12 items. The first factor obtained showed an eigenvalue of 4.00044. No other factors were retained as they exhibited eigenvalues lower than 1. Table 3 reports the factor loadings for factor 1. Factor loadings express the correlation between each item and the factor: the higher the load, the more relevant the item in defining factor dimensionality. The items with the strongest factor loadings are the presence of various sections on the webpage and the existence of a webpage specific to the institution, while the items with the lowest factor loading are sections dedicated to the local community and to the sale or collection of donations. From this principal factor analysis, we obtained a factor that represents a standardized Index of Webpage Engagement Capacity, used to further understand the

18.1

different profiles of institutions in the Mediterranean area. The high alpha value that was found among the items confirms the internal consistency of the index.

Table 3. Factor loading for each item included in the factor analysis.

Variable	Factor Loading	
Presence of various sections	0.8086	
Page of its own	0.8061	
Presence of a news section	0.7602	
News less than six months old published	0.6822	
Links to social networks	0.5786	
Section dedicated to training activities	0.5741	
Section dedicated to institution's projects	0.4620	
Page readability	0.4383	
Contact info available	0.4011	
Possibility of comments or other interactions	0.3963	
Section dedicated to sales	0.3654	
Section dedicated to the local community	0.3638	

By analyzing the distribution of the index among the sample (Figure 1), it is possible to observe a polarization, with a consistent number of institutions obtaining very low scores, and a group of highly proficient users, while fewer institutions obtained intermediate values.

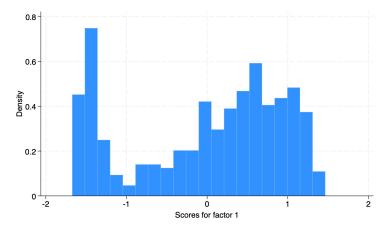


Figure 1. Frequency distribution of the index of webpage engagement capacity.

This distribution is quite different from a normal one, where we would find most institutions obtaining values close to the average and thinning out on the slopes. This seems, therefore, quite relevant for the understanding of the use of webpages among ecomuseums.

To deepen our understanding, the countries were then grouped according to geographical location and number of institutions to create four comparable groups and verify differences in the use of the Internet and in the diffusion of projects related to food. The groups are as follows (Table 4):

- 1. Italy;
- 2. Western Europe (Portugal, Spain, Gibraltar, France, and Monaco);
- 3. Eastern Europe (Slovenia, Albania, Bosnia and Herzegovina, Cyprus, Croatia, Greece, and Montenegro);
- 4. Southern Mediterranean (Malta, Egypt, Israel, Lebanon, Morocco, Palestine, Tunisia, and Turkey).

Country Group	$\mathbf{n}^\circ$ of Cases	% of the Whole Sample	n° of Food-Related Institutions	% Within the Group	Webpage Engagement Capacity Index Mean
Italy	273	55	63	23.08	-0.07
Western Europe	139	28	21	15.11	-0.05
Eastern Europe	45	9	6	13.33	0.28
Southern Mediterranean	40	8	0	0.00	0.32
Total	497	100	90		

**Table 4.** Four country groups by the number of cases, presence of food-related institutions, and webpage engagement capacity index mean score.

It is interesting to point out that the mean value obtained in the webpage engagement capacity index grows as the number of institutions included in the groups decreases; the Italian institutions score the lowest mean values, while the Southern Mediterranean and Eastern Europe groups report the highest mean values.

The relations between the described variables were tested to assess the impacts that different aspects of ecomuseum (or other participatory institution) activities have on their use of the web to engage the public. We carried out multiple linear regression, adopting the enter method. This method allowed us to predict the behavior of the dependent variable based on the values of the independent variables. The R<sup>2</sup> coefficient is the value that allows to see what proportion of the total variance of the independent variable can be explained using the model, and this can range between 0% (no variance explained) and 100% (we can perfectly predict the values of the dependent variable based on the values of the independent variables). We included the 388 webpages that had available data for all variables of interest in our analysis, excluding all institutions with "under construction" or "unavailable" pages or those shared with other institutions.

The results of our analysis are summarized in Table 5. The model presents an  $R^2$  of 0.158 and an  $R^2$ adj of 0.147. As pointed out by Ozili [53], we consider the  $R^2$  value acceptable because the main aim of this model is to assess whether our independent variables actually have a significant impact on the dependent variable and not to predict the value of the webpage engagement capacity index solely on the basis of our independent variables set list.

Variable	<b>B</b> Value	95.0% Confidence Interval for B		β	t	p
		Lower Bound	Upper Bound			
Constant <sup>1</sup>	6.415	5.846	6.984		22.182	<0.001
Biodiversity Section	1.689	1.029	2.349	0.251	5.033	<0.001
Food	0.870	0.100	1.641	0.109	2.221	0.027
Intangible Heritage	1.601	0.936	2.266	0.225	4.731	< 0.001
Eastern European	1.526	0.457	2.594	0.135	2.807	0.005
Southern Mediterranean	2.369	1.143	3.595	0.185	3.800	<0.001

Table 5. Regression model results.

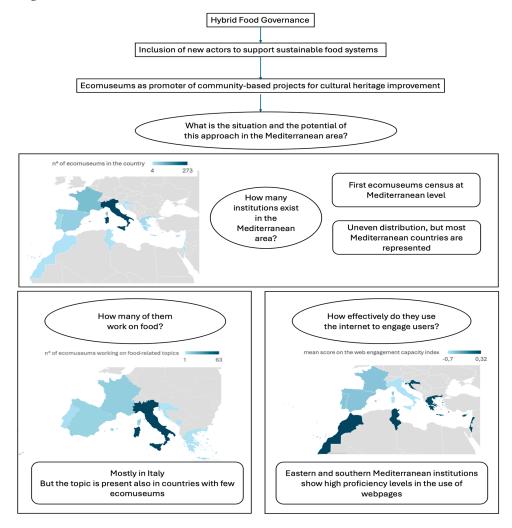
<sup>1</sup> The constant can be defined as the mean of the dependent variable when all the independent variables in the model are set to a value of zero.

All of the variables included in the model are dichotomous and present positive and statistically significant beta values. This means that the presence of each of the included characteristics predicts a higher score in the index of webpage engagement capacity.

Other variables that were included in the analysis but did not yield significant impacts were whether the institution had a section dedicated to tourist activities on its webpage and whether its geographical location was in Italy or another Western country.

## 4. Discussion and Conclusions

In this article, we explore the potential role that specific cultural institutions, such as ecomuseums or community museums, may play in promoting sustainable food systems (Figure 2).



**Figure 2.** Distribution of ecomuseums in the Mediterranean area, with a focus on their work on food and their efficiency in the use of webpages.

Given their inherent ties to the local territory and their inclination towards communitybased activities, we hypothesize that these institutions could have a significant impact, particularly on the communication and promotion of the sustainability of the food system.

The first step of the research was undertaking the first census of active ecomuseums and community museums operating in the Mediterranean area, which was produced to gain a better understanding of their diffusion and involvement in the development of participatory activities, mobilization of local resources, and promotion of cultural heritage, including food heritage. The data collected reveal a marked difference in their distribution within the Mediterranean area. Even though the concept of ecomuseums has its roots in the reflections of the French Nouvelle Muséologie, their spread in Italy is significantly broader compared to all other countries under consideration. In Western European countries (with France at the forefront), the presence of these institutions is lower than in Italy but still significant, while it is much scarcer in countries in the eastern and southern Mediterranean areas (except for Greece and Cyprus).

Regarding the focus on the theme of food and food systems, it appears that the predominance of Italian experiences is even more pronounced. However, it is interesting to note the presence of ecomuseums focusing on food topics in some of the Eastern European countries, where the overall presence of ecomuseums is low. This theme could, therefore, prove to be of interest even for countries with a less rooted tradition of ecomuseums.

Almost all ecomuseums addressing the theme of food also work on biodiversity, confirming a particularly attentive approach to the systemic dimension of food and the connection that production and consumption have with maintaining ecosystem balances. In this sense, the ecomuseums' vocation of focusing on the conservation of cultural heritage and the promotion of local development is combined with aspects more closely linked to environmental sustainability.

Finally, the construction of an index for assessing the effectiveness of webpages in engaging the public has highlighted the fact that institutions presenting experiences related to food and biodiversity seem to be more proficient in this regard. More generally, two particularly widespread profiles of webpage engagement capacity are observed.

On one hand, there are institutions who are low-proficiency users, which tend to be prevalent in countries with a higher presence of ecomuseums, where at least some of the analyzed webpages present less elaborate experiences, lacking effective references to activities engaging the local population.

On the other hand, there are institutions who are high-proficiency users, who have webpages that appear particularly suited for promoting and eliciting participation. While countries with a high presence of ecomuseums present a mixture of more and less engaging pages, it seems that in countries with a low diffusion of ecomuseums and other institutions dedicated to promoting participative activities, the presence of high-proficiency users is particularly high. These are instances of excellence that could pave the way for a wider dissemination of this type of experience.

An explanation for the wider difference in profiles found in Italy and Western countries can be found in the observation that the proliferation of initiatives has led to a distancing, at least in some of the ecomuseums, from the original principles guiding their actions. For example, the census of Italian ecomuseums published by D'Amia [40] observed how, among the large body of institutions recorded, some ecomuseums proved to be longlasting organizations well rooted in the territory; others were ephemeral bodies, created occasionally to intercept resources provided on the basis of local or European funding. The author observes that the name "ecomuseum" could be defined as a buzzword, which lends itself to multiple interpretations (and distortions), even those far removed from the definitions formulated by ecomuseology. In this scenario, it is easy to imagine that not all ecomuseums have the same level of resources dedicated to their promotion and their use of the Internet.

In recent years, institutions like the International Council of Museums (ICOM) have increasingly recognized the importance of sustainability and the role museums can play in promoting it [54]. Through dedicated initiatives and working groups, these institutions are actively exploring ways in which museums can contribute to sustainability efforts on both global and local scales.

One area in which museums can provide a significant impact is in addressing sustainability within food systems. Museums can be strategic partners for the involvement of users in regional food innovation processes [55]. They can serve as experiential and participatory spaces where it is possible to build solutions for regional challenges and forge collaborations with other actors in the system, such as academia, food producers, restaurants, and local and tourism organizations. Food systems play a crucial role in environmental, social, and economic sustainability, particularly in regions such as the eastern and southern Mediterranean where agricultural practices are deeply intertwined with cultural heritage and local livelihoods [56]. In accordance with other recent studies [57], this research suggests that increasing the level of involvement and interaction between museums, cultural institutions, and other local actors in these areas would allow the exploitation of latent effective but still underutilized resources.

These results could be taken up by food policy makers not only at the local level but also and especially at the national and European levels. For example, the EU could invest in these institutions by promoting research or research projects that verify the impact of food-related actions promoted by museums and ecomuseums. By partnering with local actors and communities working on sustainability in food systems, ecomuseums can contribute to the development of hybrid models of governance that can facilitate the transition from dominant food systems to more sustainable ones, integrating niche experiences and traditional heritage [21].

By reinforcing their efforts to connect with local actors in eastern and southern Mediterranean countries, institutions such as ICOM can facilitate knowledge exchange, capacity building, and collective action towards more sustainable food systems.

In conclusion, by strengthening their networking efforts with local actors working on sustainability in food systems, institutions such as ICOM can enhance their impact and contribute to positive change in the eastern and southern Mediterranean region. By leveraging the power of museums as platforms for education, dialogue, and advocacy, we can collectively work towards a more sustainable future for all.

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#### Appendix A

Table A1. The simplified WCA and the items included in the index of webpage engagement capacity.

Section	Item	Type of Answer	Included in the Index of Webpage Engagement Capacity
	Name of the institution	Open	No
Identification	Country	Open	No
	Type of institution	Closed	No
	The institution has its own page (not shared it with other institutions)	Y/N	Yes
	Readability of the page	Likert 1 to 4	Yes
Information	The page has more than one section	Y/N	Yes
	Presence of sections dedicated to regular updates (i.e., news)	Y/N	Yes
	Presence of recent updates (less than six months old)	Y/N	Yes

Section	Item	Type of Answer	Included in the Index of Webpage Engagement Capacity
	Presence of links to the institution's social networks	Y/N	Yes
Communication	Presence and type of contact (form to be filled out, email address, telephone number, physical address)	Closed, multi-answer	Yes (transformed in a Y/N)
Communication	No. of languages available	Open	No
	Presence of an interactive section (i.e., comment section)	Y/N	Yes
E-commerce	Presence of a section selling tickets or collecting donations	Y/N	Yes
	Mention of training activities organized by the institution	Y/N	Yes
Additional Functions	Presence of a section describing projects developed by the institution	Y/N	Yes
	Presence of a section dedicated to the local community	Y/N	Yes
	Presence of a section related to biodiversity topics	Y/N	No
	Presence of a section related to food or food systems	Y/N	No
	Presence of a section related to tourism	Y/N	No

# Table A1. Cont.

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