

LOCAL PRODUCE AND DECARBONIZATION IN RURAL TOURIST DESTINATIONS: FINDINGS FROM THE CATALAN PYRENEES

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With 1 figure and 5 tables

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Summary: This paper seeks to investigate the role played by local actors involved in the catering sector in relation to the use of local food products and decarbonization processes in their activities. The geographical framework in which the research is carried out is the high mountains of the western Catalan Pyrenees. The methods used in its elaboration were based on the delimitation and clarification of the dimensions of the local product to later, through fieldwork, survey the actors in relation to the proposed theme. A basic statistical treatment was used with the answers of the informants to conclude with the pertinent conclusions. In the first part of the paper, the definition of the four dimensions of the local agri-food product (cultural, social, economic and environmental) is deepened. In the development of this work, general guidelines were found that suggest that the restorers of the study area are concerned because their region is affected by climate change and that some of them implement actions in this regard. In relation to the use of local agri-food products, they believe that the most important attribute is cultural and not environmental and, within the latter, the contribution to the fight against climate change occupies a prominent place. Finally, before the conclusions, the assessments on the different decarbonization options for their businesses are collected.

Keywords: Local agri-food products dimensions, strategies to combat climate change, restaurateurs, rural mountain areas

1 Introduction

In recent years, food has become a topic of cultural and environmental – not merely physiological and economic – relevance, and in the process, it has acquired an evident geographical dimension. Foodstuffs are no longer just the raw material from which meals may be prepared (ARMESTO-LÓPEZ et al. 2023), rather they are an asset that, aside from their intrinsic nutritional properties, may have numerous symbolic connotations (BESSIÈRE 1998, FRISVOLL et al. 2016). This symbolism arises from the affluent classes in highly urbanized regions of the world with predominantly tertiarized economies (ESSER & HIRSCH 1994, MORAITIS 2022), with Europe being a clear example of this capitalist spatial restructuring (SOJA 1985). In order to understand this phenomenon, which has been apparent since the 1990s, one needs to consider the role played by awareness of new scientific evidence, growing demands among the public, and the response of institutions to these demands. As a result of these factors, knowing where food comes from and its geographical and emotional proximity to consumers has become an increasingly important issue in the minds of European citizens. The trend in more affluent countries is therefore toward greater transparency for consumers as regards production processes (ENTHOVEN & VAN DEN BROECK 2021).

The introduction of the three Geographical Indication (GI) quality schemes in the European Union (EU), namely Protected Designation of Origin (PDO), Protected Geographical Indication (PGI) and Traditional Speciality Guaranteed (TSG), together with legal recognition of organic farming, has seen the wider public become increasingly aware of the importance of a food's origin. However, PDO-labelled foods are not evenly distributed across the continent, and their presence is much greater in southern Europe (ALBUQUERQUE et al. 2018). In addition, designations of this kind tend to be found in economically weaker regions with older and declining populations and to be associated with high natural value farmland, sustainable agriculture, and areas with strong cultural values and tourism potential (FLINZBERGER et al. 2022). A further point to consider is that in the European context, food products are acquiring a greater symbolic value, such that the different agents in the agri-food chain must now engage with questions of territorial identity, social justice and environmental sustainability (ARMESTO-LÓPEZ et al. 2023). In this respect, the attribute *local* that is attached to certain foods has begun to be widely perceived as an indicator of a series of benefits over the industrialized food produced by global corporations. Some recent studies have, however, challenged the idea that local food is inherently good, it being argued that this de-



depends on the geographical context and the type of product and supply chain (ENTHOVEN & VAN DEN BROECK 2021). In the scientific literature, the issue of food production re-localization has been addressed from different perspectives (BRUNORI 2006) – that of rural producers and communities, of consumers or in terms of the policies implemented by public institutions. And it may be seen as an example of what some authors refer to as processes of re-territorialization, as in the case of the so-called alternative food networks (ANDERSSON et al. 2024, BERTI 2020, JAROSZ 2008, SCHNEIDER et al. 2016).

In this context, food and gastronomy have become an important resource for tourism, a key factor of appeal that contributes to the competitiveness and positioning of national and international tourist destinations (ARMESTO-LÓPEZ & GÓMEZ-MARTÍN 2006, GÓMEZ-MARTÍN & ARMESTO-LÓPEZ 2005). Indeed, various studies have shown how gastronomy and food are important attributes of a destination's place branding (JOPPE et al. 2001, PAMUKÇU et al. 2021). As SEYITOĞLU & IVANOV (2020) point out, the integration of local gastronomy and tourism is now a core feature of the marketing strategy of many destinations. In particular, and as TREGAR (2003) argues, the so-called typical products of a place are conceptualized as occupying a middle ground between the productive dimension (ingredients and production techniques) and the consumptive dimension (symbolic aspects such as identity and branding), and thus they should not be seen as being elements of a bygone pre-industrial age; indeed, for this author they are legitimized elements of international trade, industrial production and contemporary markets, and thus they should not be regarded as objects out of time. One must also take into account that gastronomy, especially that based on tradition and the use of local produce, is viewed positively by consumers (KIM et al. 2009, TELLSTRÖM et al. 2006), and this is reflected in the content of restaurant menus. A further point to note here is that in the context of the climate emergency, the push towards more sustainable consumption is leading many tourists to seek out authenticity and sensory experiences that are distinctive, socially fair and environmentally responsible, thus allowing them to feel more connected to the place they are visiting (CSERGO 2006, GÓMEZ-LISSARRAGUE & MORAL-JIMÉNEZ 2024). And because tourists are seeking new gastronomic experiences during their travels, food and how it is obtained, produced and prepared is now an important element in promoting and differentiating sustainable destinations (LEONG 2017).

Rather than offering an in-depth theoretical discussion of the concept of local produce, one that has been widely debated and is difficult to encompass as it varies considerably across geographical contexts (ARMESTO-LÓPEZ & GÓMEZ-MARTÍN 2016, BRUNE et al. 2023, MAKITA 2022, RECKINGER 2022), the purpose of this article is to explore and interpret the views of restaurateurs in the area of study, the Catalan Pyrenees, with regard to the meaning that local food and agricultural produce has for them as a potential decarbonization lever in the context of climate change. Most studies to date on the relationship between the restaurant sector and local produce have highlighted identity-related and economic aspects of the issue (BESSIÈRE 1998, ROY et al. 2017, SHAFIEZADEH & TAO 2020, TREGAR et al. 1998, TREGAR 2003), with only a few focusing on the environmental implications (FILIMONAU & KRIVCOVA 2017, GÖSSLING et al. 2011, LUND-DURLACHER & GÖSSLING 2021); furthermore, some authors have cast doubt on or refute the potential contribution of local food systems to climate change mitigation (EDWARDS-JONES 2010) or to environmental maintenance or improvement in general (BORN & PURCELL 2006). With this in mind, the primary hypothesis of the present article is that for restaurateurs, the idea that the use of local produce in their establishments might contribute to climate change mitigation is one that they recognize but which is secondary to other environmental and socioeconomic dimensions of the issue.

2 Dimensions of local produce and tourism

2.1 Local produce as a marker of identity on restaurant menus

The question of where food comes has gained in prominence over the past thirty years. The emergence of official European certifications and their consideration as quality stamps has meant that foods which bear such labelling stand out from others in international markets, leading in turn to greater awareness among consumers of new places of production. Through this process of differentiation, places and regions that would once have been unfamiliar beyond a given country's borders may now come to the attention of average consumers elsewhere (ARMESTO-LÓPEZ et al. 2023). Certain restaurants and/or chefs who use products emblematic of a place or region may also act as a draw for tourists and visitors (BESSIÈRE

1998, SENDEL et al. 2015), who can thus encounter first hand not only a region's gastronomy but also its cultural features (DURAN & CRAWLEY 2012). Recognition of these products beyond their traditional borders can also generate among locals a stronger sense of identification with place (BESSIERE 1998).

Local foods are seen as part of the ethnic and cultural heritage of the human collectives to which they belong. Accordingly, local food identity may be understood as the shared food habits of people within a defined geographical region, which include regularly used cooking techniques and ingredients (MORENO & MALONE 2020). Tradition is intrinsic to this concept, insofar as traditional foods can be defined as those prepared by people with a shared culture and which have long been linked to a certain place or region (JORDANA 2000, ROCILLO-AQUINO 2021, SANZ-CANADA et al. 2023). Local agricultural and food produce may therefore be considered a symbol of territorial identification, to no lesser extent than is a flag, a place name or a language (ARRESTO-LÓPEZ et al. 2023). Furthermore, in the mind of the tourist, a place may become intrinsically and reciprocally associated with local food and/or gastronomy, just as it may with a town or city (BERG & SEVON 2014). It should be noted, however, that the extent to which the inhabitants of a given geographical area identify themselves with local foods is likely to depend on age, lifestyle and social trends (FREZ-MUÑOZ et al. 2021).

As ARRESTO-LÓPEZ et al. (2023) point out, it is now common for restaurant menus to refer to the geographical origin of a product or dish. This identification may take the form of quality stamps or certifications issued under official legislation (e.g. lamb from Aragon, asparagus from Navarra, wine from Rioja, etc.) or simply involve reference to a particular (and traditional) place or region (e.g. Galician broth, Cordoba-style tomato soup, Cantabrian shellfish, etc.). References of this kind on restaurant menus gain particular relevance when they relate to the very place that is being visited (ALISTE et al. 2019, PIZARRO-GÓMEZ et al. 2020).

2.2 The contribution of local produce to social balance: Implications for tourism

Local agri-food systems may also be seen as contributing to social balance (DELIND 2011), insofar as geographical proximity implies and ena-

bles social proximity (FONTE 2010). According to MARSDEN & SMITH (2005), 'the local' can be considered a form of local contingency, and hence this local geographical framework becomes a place that is destined to be shared socially. Insofar as some local foods are offered to the public in alternative ways, they may help to create community ties (HINRICHS 2000), especially if it is considered that each citizen has reasons to feel directly involved in the local business network (JÜRGENS 2012).

The fact that some forms of production can facilitate more equal access to healthy food, that some commercial enterprises aim to promote social inclusion, and that an increasing number of businesses seek to respect natural cycles should have the effect of strengthening social networks in rural areas. As STEIN & SANTINI (2022) point out, however, the use of local produce is not in itself a guarantee of sustainable development, because local agri-food systems are not necessarily more resilient to outside influences, even if they contribute to rural development and enhance the sense of community (ARRESTO-LÓPEZ et al. 2023).

One of the ways through which restaurateurs may, by using local produce, become agents of regional development is that it represents a social commitment to the local population (ARRESTO-LÓPEZ et al. 2023). Consumers appreciate this social aspect, above and beyond other benefits associated with the use and consumption of local products in restaurants (LANG & LEMMERER 2019). It should be remembered that the use of local produce helps to maintain those who produce and sell these products, which has a positive knock-on effect in terms of community support networks, the social fabric, family structures or the feasibility for young people of remaining in the area, among other aspects (ARRESTO-LÓPEZ et al. 2023). In this respect, the inclusion and explicit labelling of local products on restaurant menus can create a positive image of the establishment in the minds of customers (SHAFIEIZADEH & TAO 2020). This forms part of the process of social construction to which SANZ-CANADA et al. (2023) refer when discussing the concept of local agri-food systems in terms of geographical and organizational proximity. As for the internal organization of these systems, NEWMAN et al. (2013) argue that restaurants may be regarded as dissemination hubs for local produce, and hence they could have a role to play in educating society, being able to be part of what KAREVOLL et al. (2024) refer to as knowledge creation networks applied to artisan food networks.

2.3 The role of restaurants in boosting profits from local produce

Any analysis of local produce needs to consider the economic dimension. From an economic perspective, sustainable local development depends upon the sustainable creation of wealth, ensuring that, as far as possible, the profits generated by local products remain within the community or region. To achieve this, social and business initiatives need to have a shared set of goals, respecting the ecological, human, social and manufacturing capital of the area (MARSDEN & SMITH 2005). Accordingly, a closer relationship between producers and final customers, whether these be local residents or visitors to the area, is usually beneficial to both parties. At the local level, and aside from ensuring a market niche, products can be sold at a higher price directly to the public than to intermediaries (ARMESTO-LÓPEZ et al. 2023). For their part, consumers are often willing to pay more for agri-food products of specified origin which are unique in some way or present a particular social image, whether this be in restaurants or when purchasing for consumption at home (ANSELMSSON et al. 2014, ENTHOVEN & VAN DEN BROECK 2021). Consumers come to trust in these products, because they know where they come from, and they choose to eat in restaurants that advertise their use of local produce (SHAFIEIZADEH & TAO 2020).

As for restaurateurs, they can incorporate the exclusivity associated with local products into their own brand image and cuisine, and this adds greater economic value to the service they offer. Consumers too tend to regard these products as superior in terms of their organoleptic properties and accept that this (re-)connection with tradition and place comes at a price (ARMESTO-LÓPEZ et al. 2023). In this respect, the factors that determine whether a local product will be successful in the market are those which satisfy urban consumers' search for authenticity. The opportunity to work with foods derived from high-quality raw materials or which represent an exclusive option in gourmet restaurants favours and promotes this popularity (TELLSTRÖM et al. 2006).

Gastronomic resources can be regarded as complementary to others of interest to tourism, insofar as quality products or establishments act as a draw for visitors (PIZARRO-GÓMEZ et al. 2020, MILLÁN et al. 2011). Thus, local products come to generate complex win-win relationships, leading not only to satisfaction among both purveyors and customers but also to benefits for the community or region as a whole. In this way, the use of local produce by restaurants

creates or helps to consolidate specific market niches that would be difficult to achieve without such synergies. Indeed, without this link between local restaurants and producers a tourist destination or resource would be at risk of losing an aspect of its uniqueness, potentially leading to reduced income for all parties. From an economic perspective, therefore, the relationship between the agri-food and tourist sectors may be considered to be symbiotic (ARMESTO-LÓPEZ et al. 2023). If, in addition to mostly local produce, a restaurateur uses organic products, then this engagement with what is referred to as eco-gastronomy (ZAMBRANO-NÚÑEZ et al. 2023) may further boost the economic value of the service offered.

2.4 Local produce as a driver of environmental improvement

Finally, local agri-food products may be seen as tools for improving the environment in various ways (BRISTOW & JENKINS 2018, DURAM & OBERHOLTZER 2010, FEAGAN 2007, SIMS 2010, WANI et al. 2023). If agri-food systems function in a way that respects both natural and cultural landscapes, they may help to conserve the local environment. Likewise, biodiversity can be maintained through the use of native plants and animals, while an emphasis on seasonal crop cycles can reduce the need for external inputs. Above all, agri-food systems have an important role to play in our response to climate change (ARMESTO-LÓPEZ et al. 2023).

Environmental issues related to local food include biodiversity, water use, agro-ecological variables and energy use (DURAM & OBERHOLTZER 2010). According to BENIS & FERRÃO (2017), the possibility of mitigating the environmental impact of food systems (in terms of greenhouse gas emissions) depends on the expansion of urban and peri-urban agriculture so as to shorten distances between producers and consumers, as well as cutting wastage across the supply chain and, above all, a reduction in meat and dairy consumption. MAKITA (2022) similarly argues that proximity initiatives and organic farming can generate positive synergies, while in the view of JUNG et al. (2024), greater consumption of local produce would help to reduce greenhouse gas emissions and, therefore, contribute to environmental improvement. As noted by DURAM & OBERHOLTZER (2010), greater use of local food could help to address the problems caused by excessive energy use in food production and transport, two challenges that are set to intensify in coming years. Ecological studies of local food sys-

tems therefore need to consider crop selection, production methods, energy demands, carbon emissions, transport, and post-harvest energy expenditure, and it is here that restaurants have a role to play.

The environmental benefits that follow from the use of local produce by restaurants in tourist areas are primarily related to shorter distances between producers and consumers, which implies less energy use in transport and distribution, and consequently a smaller carbon footprint (PRETTY et al. 2005). However, although emissions are in theory reduced by shorter farm-to-table journeys, local distribution methods may paradoxically be less energy efficient than are larger networks that benefit from economies of scale (NEWMAN et al. 2013). It should be noted here that while a third of global carbon emissions are related to food, whether in terms of its production, processing, transport, distribution, preparation, consumption or waste disposal, the emissions associated with transport and distribution are substantially lower than those attributable to food production. Studies of the emissions associated with food production as a whole estimate that transport accounts for between 4% (WEBBER & MATTHEWS 2008), for food consumed in the USA, and 6% globally (POORE & NEMECECK 2018), and hence only a relatively small reduction in emissions would be achieved by switching entirely to local produce. Regardless of the figures for different geographical locations or types of produce, a greater emphasis on local food systems is one of the measures being considered by governments in their attempts to mitigate the impact of climate change. For example, in line with the EU Fit for 55 packages for achieving climate neutrality by 2050, one of the measures included in the 2050 long-term decarbonization strategy launched by the Spanish government's Ministry for Ecological Transition and Demographic Challenge is *Promoting the Mediterranean diet and the consumption of local produce*. Similarly, over 4000 of the more than 300,000 establishments in the Spanish hospitality sector have signed up for various decarbonization initiatives, which include a greater commitment to the use and promotion of local products in restaurants (ARMESTO-LÓPEZ et al. 2023).

A further and highly important point to consider in relation to the emissions produced by agri-food systems concerns the use not only of local but also of seasonal products. By using both local and seasonal products, restaurants can contribute to improved sustainability while also enhancing their own brand image (KARAGIANNIS & ANDRINOS 2021). However, as several authors have pointed out (DURAM & OBERHOLTZER 2010, VARGAS-SARMIENTO & HANANDEH 2018), shop and restaurant customers are not always willing to give up their desired foods out of season, showing little sensitivity to this issue. Few studies to date have examined the perspective of restaurateurs on this issue, with the exception of reports such as those by BATAT (2020) and PENG (2020), which focus on the luxury restaurant sector.

3 Brief overview of the region

The area chosen for this study covers around 3,148 km² and encompasses three administrative sub-regions in the western Catalan Pyrenees: Alta Ribagorça, Pallars Jussà and Pallars Sobirà. In 2022 this area had a population of 24,320 (IDESCAT 2023), and hence the average population density was just 7.7 inhabitants/km². On a macroeconomic level, it is worth noting that in 2020, GDP per capita across the study area as a whole was €20,800–23,500, well below the average for Catalonia as a whole (€29,100) (IDESCAT 2023). Table 1 shows 2020 data for gross value added (GVA) by sector. Given the focus of the present research, it should be pointed out that within the service sector, the hospitality industry generated €50,000,000 in that year (14.6% of GVA in the study area).

Despite what the figures in the table show, it is important to note that until the middle of the twentieth century, the three sub-regions, in common with the Pyrenees as a whole, had a similar productive base based on livestock farming and forestry use (GARCÍA-RUIZ & LASANTA 1989). In terms of tourism, the minimal human pressure on the area, coupled with the maintenance of extensive agricultural activities, has enabled the preservation of a natural

Tab. 1: Gross value added by sectors of the economy (2020) in the three sub-regions and for Catalonia as a whole

Sector	Alta Ribagorça	Pallars Jussà	Pallars Sobirà	Catalonia
Agriculture	3.3	11.1	3.4	1.2
Industry	17.1	12.6	13.7	19.6
Construction	7.9	8.4	9.4	5.2
Service	71.8	68.0	73.5	74.0

Source: IDESCAT 2023

and cultural heritage of undeniable value and appeal, which over time has become the area's main economic resource. Snow tourism has been the main driver behind the economic growth of certain towns and villages in Alta Ribagorça and Pallars Sobirà, where it has generated intense activity in the speculative real estate sector (GÓMEZ-MARTÍN et al. 2019). In Pallars Jussà, by contrast, tourism has a more diffuse nature, and the sub-region has a notably smaller accommodation capacity.

Particular mention should be made here of rural tourism, which in the 1970s began to be seen as one way of reversing the exodus from the high Pyrenean valleys. The three sub-regions that comprise the study area were among the first to recognise its potential, with tourism activities of this kind becoming further consolidated from the 1990s onwards. The area now has 237 tourist establishments offering accommodation for 1,627 visitors, a development that has been accompanied by a parallel increase in the number of restaurants in the area, which currently stands at 201. In this context, local produce (lamb, horse meat, beef, trout, wild mushrooms, etc.) and traditional foods or dishes (different types of cheese and cured sausage products, etc.) have become important tourism assets that reach the target public through small shops and/or restaurants.

4 Method

This research uses mixed (quantitative and qualitative) methods (TASHAKKORI & TEDDLIE 1998, 2010) and the localized approach suggested by WILBANKS (2003), with the study being geographically confined to the main tourist destinations in the area. As demonstrated in other studies (BECKEN 2005, LORENZONI et al. 2007, GÓMEZ-MARTÍN et al. 2017), the combination of these approaches allows for triangulation and complementarity of results. Specifically, it enabled us to explore how bar and restaurant owners view the environmental dimension of local produce and to examine the perceived relevance or role of local produce in relation to decarbonization initiatives undertaken within the restaurant sector.

Data were obtained through interviews and surveys conducted in May and July 2023 with a selection of bar and restaurant managers from across the study area. These establishments had been identified in a previous study (ARMESTO-LÓPEZ et al. 2020) as ones that made use of local produce. A total of 10 interviews were conducted, and we

contacted 81 establishments to administer the survey, of whom 82.7% completed the questionnaire. Meetings with owners/managers took place on their respective premises, although in some cases, the survey was conducted via telephone or email.

The survey and interviews were structured around four themes: 1) Knowledge, perceptions and degree of concern about the problem of climate change; 2) Perceived importance of the different dimensions of local produce; 3) The weight attributed to climate change in the environmental dimension of local produce; and 4) Decarbonization options within the bar/restaurant sector. This sequence of themes is followed below when presenting the results.

To develop the survey questions, we began by reviewing the literature on sustainable rural tourism, local cuisine, local agri-food products, sustainable production and climate change. We then selected the main items and adapted them to the characteristics of the study area. Field work involved an adaptation of the procedures proposed by BERG & SEVON (2015). Thus, we employed direct observation (using cameras, notebooks and other means of recording and storing information) and conducted semi-structured interviews with individuals who, given their high profile within the study context, could be considered as key informants.

Surveys were completed by the owners/managers of 67 establishments that encompass the three types within the sector (21 bars, 30 restaurants, and 16 hotel restaurants). Respondents were evenly split in terms of gender (33 men and 34 women), corresponded to a middle-age group (defined in the present study as 30-55 years) and mostly had an average level of education.

The objective in analysing survey data was to describe the study population and identify patterns in responses based on the profile of respondents. To this end, we constructed contingency tables to visualize possible relationships between two or three categorical variables. Gender differences in means were explored using the independent samples t-test, while one-way analysis of variance (ANOVA) was used to compare the means of three or more groups. The null hypothesis (H_0) was interpreted as equality of means among groups, and it was rejected when $p < .05$, it being assumed, therefore, that at least one of the means was significantly different to the others. When ANOVA was significant, we applied Tukey's HSD (Honestly Significant Difference) post hoc test to establish which specific group means differed significantly from one another. All analyses were performed using R 4.4.0.

5 Results

5.1 Characteristics of informants

In this study participated 67 informants (33 men, 34 women). The majority ($n = 37$) were of middle age, followed by young ($n = 21$) and older ($n = 9$) respondents. Regarding education, the large majority had either primary ($n = 20$) or secondary ($n = 40$) education, with only 7 reporting higher education. In terms of the three types of establishments, the distribution was as follows: 21 bars, 30 restaurants and 16 hotel restaurants.

5.2 Knowledge, perception and degree of concern about the problem of climate change

There was considerable awareness of the problem of climate change, its origins and consequences. Almost all informants (97%) recognised it as being an anthropogenic phenomenon, and the same proportion said they had personally detected signs of a changing climate within the local environment, the most noticeable being rising temperatures, increasingly irregular rainfall, fewer days of snow, a thinner snow cover in the Pyrenean mountains, and changes to seasons. This knowledge and awareness of the signs of a changing climate is reflected in the fact that 92.5% of restaurant proprietors agreed with the statement “I’m concerned about climate change and its impact”. Of the remainder, 3% were undecided and 4.5% said they disagreed.

Those surveyed appeared well aware of the risks associated with climate change, which likely reflects the high vulnerability of the study area (a mountain environment) and the general level of public knowledge about the problem. This awareness and concern about climate change should have a positive impact in terms of attitudes and a willingness to take mitigating action and move towards decarbonization in this sector of the hospitality industry.

5.3 Perceived importance of the different dimensions of local produce

Regarding the different dimensions of local produce, culture/identity was the one ascribed the greatest importance by informants (mean rating on a 10-point scale of 9.26 among women and 8.70 among men), followed by the economic dimension (8.68 women, 8.36 men), the environmental dimension (8.35 women, 7.82 men) and the social dimension (8.03 women, 7.36 men). The importance attributed to the cultural dimension likely reflects the fact that food is widely acknowledged to be a vehicle of culture. By contrast, the results (Tab. 2) suggest that the social dimension of local produce is the one that is least apparent to bar or restaurant owners; in some cases, we had to clarify what this survey item referred to. Notably, ratings on all four dimensions were higher among women: overall mean of 8.58 *vs.* 8.06 among men; $t = -1.3151$, $df = 5.931$, $p = .237$. The greatest difference by gender was observed in

Tab. 2: Ratings by gender of the perceived importance of different dimensions of local produce (scale: 1 to 10)

Environmental dimension											
	1	2	3	4	5	6	7	8	9	10	Mean
Men (n)	0	0	0	0	3	4	6	7	9	4	7.82
Women (n)	0	0	0	0	1	2	7	6	10	8	8.35
Cultural/Identity dimension											
	1	2	3	4	5	6	7	8	9	10	Mean
Men (n)	0	0	0	0	2	1	1	4	18	7	8.70
Women (n)	0	0	0	0	0	0	0	2	21	11	9.26
Economic dimension											
	1	2	3	4	5	6	7	8	9	10	Mean
Men (n)	0	0	0	0	0	0	3	18	9	3	8.36
Women (n)	0	0	0	0	0	0	2	13	13	6	8.68
Social dimension											
	1	2	3	4	5	6	7	8	9	10	Mean
Men (n)	0	0	0	0	2	10	6	6	7	2	7.36
Women (n)	0	0	0	0	0	9	3	5	12	5	8.03

relation to the social dimension of local produce, which has already noted, was also the one with the lowest importance ratings.

When repeating this analysis according to the type of establishment (bar, restaurant and hotel restaurant), the highest rating in each case corresponded to restaurants (Tab. 3). Ratings by restaurant owners of the perceived importance of the social dimension of local produce were significantly higher than those of their counterparts in bars (Restaurant 8.57 *vs.* Bar 6.71), whereas the two groups gave broadly similar ratings for the economic dimension (Restaurant 8.63 *vs.* Bar 8.29). Table 4 shows the results of the ANOVA conducted to compare mean ratings by type of establishment.

The differences between types of establishments in the perceived importance of different dimensions of local produce may be related to the kind of dishes they prepare and, therefore, to the products they generally use. Bars tend to offer simple foods or dishes for quick consumption, and it is not always necessary for these to be based on local produce; indeed, bars frequently make use of products from far afield that they source through large food suppliers. The only local produce that one generally encounters in bars are the cured meats that are typical of this mountain area and which are commonly used as sandwich fillings. Very occasionally, bars may also serve typical bread

from the area. As we have seen, restaurant owners ascribed much greater importance to local produce. This reflects the presence of restaurants whose philosophy is based on healthy eating, to which end they prioritise the local when sourcing meat and meat products, dairy produce, wild mushrooms and berries or seasonal vegetables. As regards the hotel restaurant category, here one finds two distinct philosophies and business models. Some establishments are clearly geared toward mass tourists who come primarily to engage in outdoor activities (especially skiing) and who are generally less interested in the geographical origin of the products they consume while in the area. However, there are also establishments that aim to appeal to tourists looking for a more relaxed experience, those who are happy to spend longer over meals. These establishments tend to ascribe greater importance to local produce.

Product identity and the image of local gastronomy are, for these restaurants, the best tool in the fight against globalization and the loss of cultural identity. Without this identity, it is perceived as more difficult to position their businesses and tourist destinations within an increasingly competitive regional and global context. In this respect, three of the restaurant managers we interviewed referred to the singular nature of the Pyrenees and of the sub-regions where the study was conducted. In their view, this was a place

Tab. 3: Ratings by type of establishment of the perceived importance of different dimensions of local produce (scale: 1 to 10)

Environmental dimension											
	1	2	3	4	5	6	7	8	9	10	Mean
Bar	0	0	0	0	0	3	11	3	3	1	7.43
Restaurant	0	0	0	0	2	2	1	4	12	9	8.63
Hotel restaurant	0	0	0	0	2	1	1	6	4	2	7.94
Cultural/Identity dimension											
	1	2	3	4	5	6	7	8	9	10	Mean
Bar	0	0	0	0	0	0	1	4	15	1	8.76
Restaurant	0	0	0	0	0	0	0	2	18	10	9.27
Hotel restaurant	0	0	0	0	2	1	0	0	6	7	8.75
Economic dimension											
	1	2	3	4	5	6	7	8	9	10	Mean
Bar	0	0	0	0	0	0	2	12	6	1	8.29
Restaurant	0	0	0	0	0	0	1	13	12	4	8.63
Hotel restaurant	0	0	0	0	0	0	2	6	4	4	8.63
Social dimension											
	1	2	3	4	5	6	7	8	9	10	Mean
Bar	0	0	0	0	1	11	5	2	1	1	6.71
Restaurant	0	0	0	0	0	1	3	8	14	4	8.57
Hotel restaurant	0	0	0	0	1	7	1	1	4	2	7.38

Tab. 4: Results of the ANOVA conducted to compare mean ratings by type of establishment of the importance of the four dimensions of local produce

	df	Sum Sq	Mean Sq	F statistic	Pr (>F)
Group	2	1.946	0.9728	2.165	.171
Residuals	9	4.044	0.4493		

where cultural traditions are reflected in local gastronomy and the presence of foods that are not found elsewhere in Catalonia, and this they saw as an asset for tourism. Regarding the economic dimension, while those we surveyed did not agree on whether it was cheaper or more costly to use local produce, the general view was that doing so had a positive impact on the local economy and increased the value of the dishes they served, although not all of them were clear that this meant higher prices for customers.

As already noted, the social dimension of local produce was the one whose importance appears to be less apparent to bar and restaurant owners. The majority of those we consulted only saw an indirect relationship between the use of local produce and the maintenance of agricultural activity in the region; the benefits of using local produce were almost always interpreted purely in terms of the socioeconomic impact on producers or, occasionally, on local shops, without reference being made to other social impli-

cations (maintaining the social fabric, encouraging mutual aid, raising social and territorial awareness, strengthening family ties, addressing depopulation and ageing, etc.). Finally, and as regards the environmental dimension of using local produce, the main relationship identified by informants was between certain agricultural practices (i.e. those considered sustainable, primarily organic farming) and environmental conservation. Some of those we surveyed considered that local meant more sustainable, due to shorter transport distances and reduced packaging, while others saw it more in terms of preserving agricultural landscapes and biodiversity.

5.4 The weight attributed to climate change in the environmental dimension of local produce

Among the restaurant owners we surveyed, the main environmental benefit of using local produce was perceived to be its contribution to climate change mitigation (Tab. 5). By contrast, informants from bars and hotel restaurants considered that the primary benefit was in helping to maintain the agricultural and environmental characteristics of the area. Of the four possible benefits of using local produce, helping with the fight against climate change was rated

Tab. 5: Ratings by type of establishment for the potential environmental benefits of using/consuming local produce (scale: 1 to 10)

Helps to maintain the agricultural and environmental characteristics of the area											
	1	2	3	4	5	6	7	8	9	10	Mean
Bar	0	0	0	0	0	1	1	13	5	1	8.19
Restaurant	0	0	0	0	0	2	4	6	11	7	8.57
Hotel restaurant	0	0	0	0	0	2	2	1	9	2	8.44
Helps to maintain agricultural diversity through the use of indigenous plants and animals											
	1	2	3	4	5	6	7	8	9	10	Mean
Bar	0	0	0	0	0	0	11	3	7	0	7.81
Restaurant	0	0	0	0	0	2	4	4	13	7	8.63
Hotel restaurant	0	0	0	0	0	2	1	9	3	1	8.00
Contributes to the fight against climate change											
	1	2	3	4	5	6	7	8	9	10	Mean
Bar	0	0	0	0	0	2	15	3	0	1	7.19
Restaurant	0	0	0	0	0	2	4	4	11	9	8.70
Hotel restaurant	0	0	0	1	1	0	2	8	3	1	7.75
Use of fewer external inputs											
	1	2	3	4	5	6	7	8	9	10	Mean
Bar	0	0	0	2	1	4	8	0	6	0	7.00
Restaurant	0	0	0	0	2	1	5	6	9	7	8.33
Hotel restaurant	0	0	0	0	0	2	2	7	3	2	8.06

the third most important by bar owners and fourth by hotel restaurant managers. Results of the ANOVA with a post hoc Tukey HSD test indicated a significant difference between the ratings of restaurant and bar owners (adjusted $p = .009$). Differences between the other pairs of establishments were not significant: Hotel restaurant *vs.* Bar, adjusted $p = .173$; Hotel restaurant *vs.* Restaurant, adjusted $p = .193$. These differences between different types of establishment, as well as the uniformity of ratings among restaurant owners, could be due to several factors: the business model, the extent to which what they offer is dependent on the local area, and the previous training of those we surveyed.

5.5 Decarbonization options within the bar/restaurant sector

To explore the views of bar and restaurant owners regarding different decarbonization options (regardless of whether their particular establishment implemented them or not), we presented them with a list of 19 measures, each of which they had to rate on a scale of 1 to 10 in terms of importance (the higher the rating, the greater the perceived importance). Results of the ANOVA to compare mean ratings across types of establishment indicated no significant differences between groups ($F = 1.165, p = .32$), with the variability between groups being only slightly greater than that within groups (residual standard error 2.25).

Figure 1 shows the mean ratings for each of the 19 decarbonization options by type of establishment (bar, restaurant and hotel restaurant). Among bar owners, the decarbonization option ranked as most important was waste separation (mean rating of 9.57 out of 10). Next came measures to reduce food waste (8.95), followed in third place by energy efficiency measures in the establishment and energy saving measures in dining rooms, bar areas, kitchens, toilets, etc. (both with mean rating of 8.86). Fourth in the ranking was water saving measures (8.62), followed in fifth place by the use of produce that is organic or from integrated farming (8.48).

In the restaurant group, the decarbonization options ranked first and second in terms of importance were the same as for bar owners, namely waste separation (9.80) and measures to reduce food waste (9.70). In third place came energy saving measures in dining rooms, bar areas, kitchens, toilets, etc. (9.60), followed by energy efficiency measures in the establishment (9.50) and, in fifth place, water saving measures (9.47).

Finally, the results for the hotel restaurant group were the same in terms of the first and second ranked decarbonization options: waste separation (9.86) and measures to reduce food waste (9.31). As in the case of bars, energy efficiency measures in the establishment and energy saving measures in dining rooms, bar areas, kitchens, toilets, etc. were tied for third place (both 9.06). Fourth came the use of seasonal produce (8.75), followed in fifth place by the use of local produce (8.69).

In terms of overall rankings, the use of local produce came seventh out of the 19 decarbonization options and was perceived by the bar and restaurant owners we surveyed as less important than other measures more directly related to the everyday management of their establishments. This is unsurprising if one considers that recent campaigns by various government agencies have focused particularly on energy saving and recycling. Indeed, the Catalan government has for the past twenty years been seeking to communicate to both individuals and businesses the importance of separating waste and saving energy. Furthermore, and especially over the past five years, various agencies have sought to raise awareness in Catalan society about food waste. This topic has also been explored by researchers in other geographical contexts, specifically in relation to short food supply chains (BENIS & FERRÃO 2017).

6 Conclusions

Mountain regions are especially vulnerable to the impacts of climate change. In addition to their ecological sensitivity, as reservoirs of biodiversity, their geography has meant that they have also served as cultural reserves. More recently, their undeniable appeal in terms of landscape and opportunities for a wide range of outdoor activities (skiing, canoeing, rafting, etc.) has seen them become popular tourist destinations. In this context, and from a socio-natural perspective, local agri-food produce has emerged as a key component of rural development strategies in regions across Spain. The preservation in these rural areas of traditional production methods that gave rise to a wide range of local and regional cuisine has been one of the drivers that has helped to put these singular regions on the global tourist map.

This research offers a reflection on the multidimensional nature of local produce and explores the views of bar and restaurant owners regarding the environmental dimension of these products, as well as their potential contribution to decarbonization strategies in areas impacted by tourism. A number of

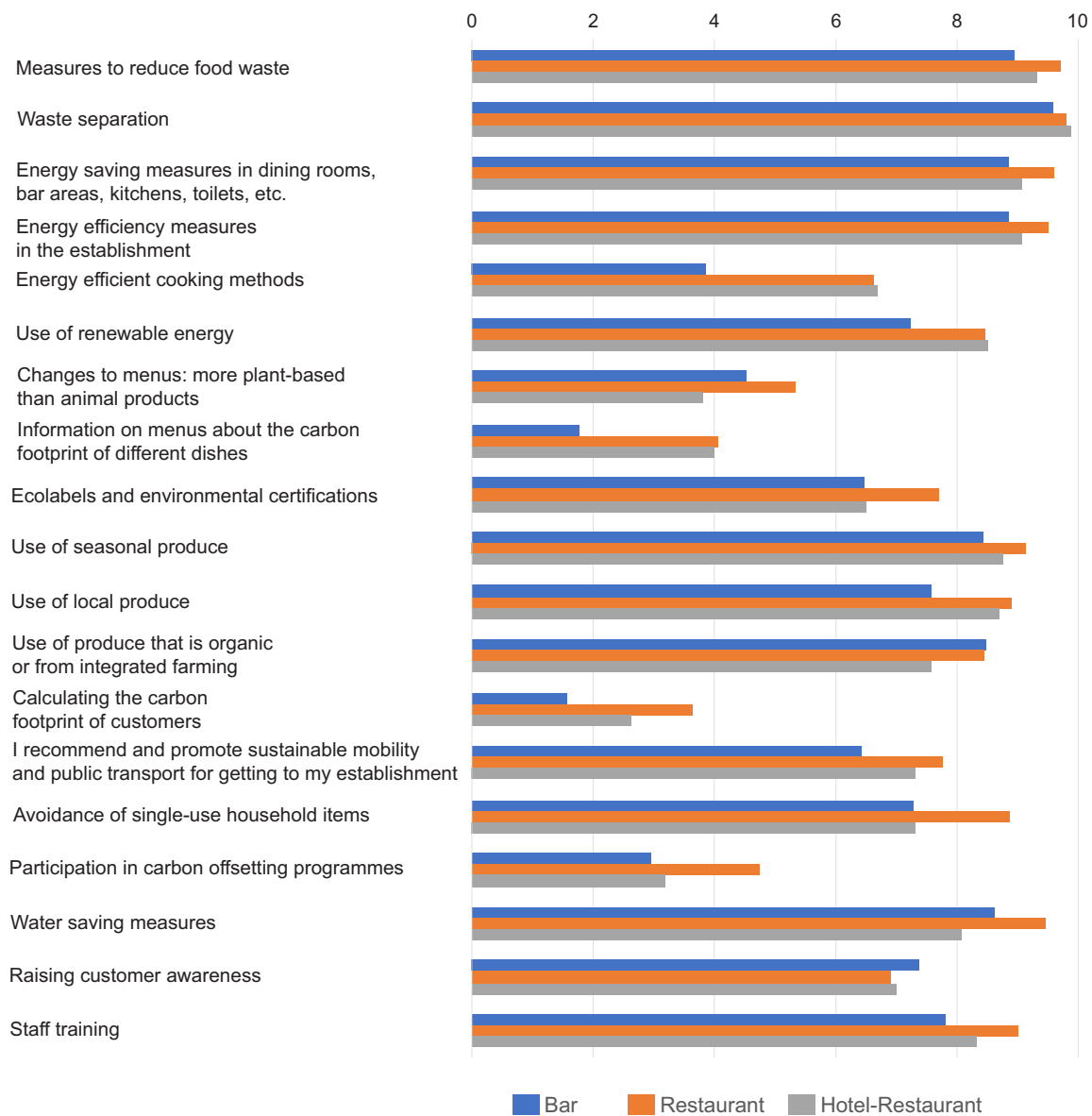


Fig. 1: Ratings by type of establishment of the importance of different decarbonization options (scale: 1 to 10)

general conclusions can be drawn from the findings. First, the environmental dimension of local produce is not the one to which bar and restaurant owners ascribe greatest importance. Furthermore, when asked to consider potential benefits of using local produce, the contribution to climate change mitigation was not seen as the most relevant, and some of those surveyed did not even contemplate this possibility. In line with this, the decarbonization options ranked as most important by the majority of bar and restaurant owners were those that have been actively promoted by various government agencies, with the use of local produce being seen as less crucial.

These results suggest that the relevant government agencies need to begin considering agri-food production as a cluster of related activities and services rather than simply a sector of the economy with certain links to the environment. In other words, agriculture and food production should be regarded as an interconnected system in which the environmental, economic, social and cultural dimensions must be treated as an integrated whole. With respect to the environmental dimension, and specifically decarbonization, government agencies should undertake campaigns (similar to those that have successfully raised awareness about the importance of waste re-

duction and energy saving) to promote the use of local produce by both domestic consumers and restaurants. These campaigns would need to address all of the dimensions of local produce considered in this research (environmental, cultural, economic and social), while also seeking to communicate the relevance of these products to the phenomenon of climate change. The information which bars and restaurants provide to their customers may also serve to raise awareness about new strategies of climate change mitigation.

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