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Co-designing carbon label interventions in restaurants: insights from a field experiment in a tourism destination

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ABSTRACT

Food consumption accounts for a third of global greenhouse gas emissions in developed countries, with the hospitality industry, including restaurants, playing a significant role. While behavioural interventions show promise in promoting climate-friendly food choices, their implementation in hospitality operations poses significant challenges. This study integrates the operational perspectives of managers and staff with consumer behaviour insights to provide a more holistic understanding of intervention design in real-world hospitality settings. Through workshops with staff at an à la carte restaurant in a Swedish tourist destination, we co-designed a carbon label intervention and tested it in a field experiment. While the overall effect on consumer choice was limited, a substitution from high – to medium-emission dishes was observed. Moreover, our research offers a framework and practical insights for collaboratively designing behavioural interventions in hospitality. The study underscores the importance of staff engagement, guest satisfaction, and the need for ongoing adaptation in intervention design.

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Carbon labels; food choice; tourism; restaurant; field experiment

Introduction

What we eat significantly affects the environment, with about a third of global greenhouse gas emissions (GHG) linked to food (Crippa et al., 2021; UNEP, 2020). At the same time, consumer demand for environmentally friendly options, like plant-based foods, has been growing (Aschemann-Witzel et al., 2021; Euromonitor, 2020). This trend is particularly relevant for the hospitality and tourism industry, where food service providers like hotels and restaurants contribute significantly to GHG emissions while being central to customer experiences (Andersson et al., 2017; Gössling et al., 2011). In fact, tourism research lists food as a major source of emission, making it critical for climate change mitigations (Gössling et al., 2023).

While restaurants can adopt various practices to reduce their climate impact, such as recycling, introducing meatless options, or minimising food waste (Madanaguli et al.,

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2022; Poore & Nemecek, 2018), global dietary shifts among consumers towards lower carbon-footprint choices are critical (Bujnicki et al., 2020; Moran et al., 2020). For example, Poore and Nemecek (2018) found that adopting plant-based diets on a global scale could halve GHG emissions. Achieving this shift requires food service providers to find effective ways of promoting climate-friendly food options, empowering consumers to make informed choices (Thøgersen, 2021; UNEP, 2020).

Survey and interview studies have identified various drivers of climate-friendly food consumption (Aschemann-Witzel et al., 2021; Bjørndal et al., 2014; Niva et al., 2014; Shin et al., 2019). However, stated attitudes often fail to predict pro-environmental behaviours in restaurants, particularly in tourism contexts, where enjoyment and relaxation tend to take precedence over environmental concerns (Barr et al., 2010; Juvan & Dolnicar, 2014; Miao & Wei, 2013).

Designing effective, context-relevant interventions that guide consumers towards climate-friendly food choices in restaurants remains a key challenge (Filimonau et al., 2017; Greene et al., 2023). While prior research shows that nudge interventions like changing the visibility or framing of climate-friendly choices can be cost-effective and easy to implement (Garnett et al., 2020; Gravert & Kurz, 2021; Greene et al., 2023), labels communicating the environmental impact of food choices, such as carbon dioxide equivalent (CO₂e) emissions, can empower consumers to make informed decisions (Gössling, 2016; Leire & Thidell, 2005). However, excessive or negative information can detract from the dining experience and restaurant evaluation (Acuti et al., 2022; Edenbrandt et al., 2020; Hielkema & Lund, 2022). Therefore, interventions aimed at promoting climate-friendly choices must be carefully designed, credible, and sensitive to the competitive hospitality and tourism environment, where restaurants have limited time to influence consumer choice (Feucht & Zander, 2018; Hartikainen et al., 2014).

This highlights the need for interventions like carbon labels to be co-designed with restaurant managers and staff to integrate their concerns, ensuring practical feasibility, contextual relevance, and sustained adoption. Although existing experiments on behavioural interventions in hospitality provide valuable insight into consumer behaviour (Demeter et al., 2023; Greene et al., 2023), more field experiments in restaurants are required that capture the perspective of managers and staff to provide actionable insights on intervention design (Coghlan et al., 2023). Furthermore, although some field experiments have examined carbon labels in cafeterias (e.g. Kaljonen et al., 2020; Lohmann et al., 2022; Slapø & Karevold, 2019) and, to a lesser extent, in restaurants in tourist destinations (Cozzio et al., 2022; Volgger et al., 2021) to the best of our knowledge, no prior experiments have tested carbon labels across all menu items in an à la carte restaurant at a tourist destination. Testing carbon labels on the entire menu is crucial because it allows consumers to compare emissions across dishes, fostering carbon literacy and helping identify which lower-emission items consumers may choose (Edenbrandt & Nordström, 2023; Thøgersen, 2021). This is especially important in hospitality settings, where consumers are unlikely to fully prioritise environmental attributes over indulgence (Greene et al., 2023; Juvan & Dolnicar, 2014).

This study seeks to address these gaps by examining the impact of carbon labels on food choices in an à la carte restaurant at a tourism destination using a field experiment, with a focus on the collaborative design of the intervention. By integrating both the practical, operational perspectives of managers and staff with consumer behaviour insight,

this approach aims to provide a more holistic understanding of intervention design in real-world hospitality settings. The research addresses two key questions:

What role does manager and staff involvement play in designing behavioural interventions to reduce the carbon footprint of food choices in restaurants? And how do carbon labels, designed and implemented through a collaborative field experiment, affect consumers' food choices in an à la carte restaurant at a tourism destination?

By focusing on the often-overlooked involvement of managers and staff, this study responds to recent calls for closer collaboration in intervention design to foster “procedural knowledge” (Coghlan et al., 2023; Tribe, 1997), offering practical insights into developing contextually relevant and mutually beneficial interventions for promoting climate-friendly choices in hospitality. Methodologically, this research approach offers a framework for others interested in collaboratively designing and testing interventions through field experiments. The study also contributes to the literature on carbon labels and behaviour change in hospitality and tourism by examining their impact across all menu items in an à la carte restaurant within a tourism context.

Literature review

Environmentally friendly food in hospitality

Dining out plays an increasingly important role in food consumption, fulfilling hedonic needs such as enjoyment while contributing significant economic value to the hospitality industry. However, it also has substantial environmental impacts, particularly in global greenhouse gas (GHG) emissions (Gössling et al., 2011). Although production, distribution, and preparation significantly impact emissions (Filimonau et al., 2017; UNEP, 2020), changes in consumer behaviour could reduce the European Union's carbon footprint by about a fourth (Moran et al., 2020). Restaurants are crucial in promoting climate-friendly food choices, given their control over food selection, preparation, and communication of environmental attributes (Filimonau et al., 2017). Thus, making climate-friendly dishes more accessible and appealing is essential for restaurants to contribute to climate change mitigation.

Research highlights how restaurants can benefit from adopting environmental strategies, such as improved resource utilisation and financial performance (Llach et al., 2013), enhanced customer loyalty (Kim, 2020), and positive brand perception (Namkung & Jang, 2013). Adopting environmental initiatives can also foster sustainability awareness, knowledge, and values within hospitality operations (Knežević Cvelbar et al., 2022; Phi & Waldesten, 2021), promoting positive employee emotions and their involvement in decision-making processes (Liu et al., 2021).

Despite growing recognition of these benefits, progress towards sustainable food provision in restaurants has been slow (Filimonau et al., 2017; Mak & Chang, 2019). Several factors contribute to this slow progress, including a lack of in-house knowledge and leadership in implementing sustainability initiatives effectively (Filimonau & Grant, 2017; Mak & Chang, 2019; Schubert et al., 2010). These challenges are exacerbated by limited understanding of consumer attitudes and behaviours regarding climate-friendly food choices in real-life restaurants, including the influence of environmental initiatives on customer satisfaction and business profitability (Futtrup & Grunert, 2023; Gössling et al., 2011).

As a consequence, restaurant managers often prioritise operational concerns like quality and cost over environmental considerations in negotiations about food procurement, preparation and serving (Futtrup & Grunert, 2023; Pratt et al., 2017). Some providers may also exploit environmental responsibility as a marketing tool without genuine commitment (Madanaguli et al., 2022). Non-transparent and exaggerated claims can hinder consumers' ability to assess the true environmental attributes of food products, leading to perceptions of greenwashing, negative employee and consumer reactions, and negative brand evaluations (Acuti et al., 2022; Ettinger et al., 2021; Futtrup & Grunert, 2023; Liu et al., 2021).

Therefore, promoting climate-friendly choices in restaurants requires providing transparent and credible information to customers while maintaining financial performance. Numerous researchers have started to address this challenge by studying consumers' preferences for environmentally friendly food and ways to influence their behaviour (e.g. Bacon & Krpan, 2018; Cozzio et al., 2020, 2022; Filimonau et al., 2017; Lohmann et al., 2022).

Environmentally friendly food choices in restaurants

Survey studies show that consumer interest in environmentally friendly food, such as vegetarian, vegan, organic, local, and carbon-neutral food, is growing (Bjørndal et al., 2014; Hartikainen et al., 2014; Nekmahmud et al., 2022), with many expressing a higher willingness to pay for such options (Feucht & Zander, 2018; Schubert et al., 2010). However, actual food choices are influenced by factors beyond environmental considerations, including sensory preferences and the dining environment (Campbell-Arvai et al., 2014; Cozzio et al., 2020; Niva et al., 2014). Some consumers actively avoid carbon footprint information to avoid guilt (Acuti et al., 2022; Edenbrandt et al., 2020) or experience reactance, resisting recommendations for climate-friendlier options like vegetarian dishes and opting for the opposite, such as more carbon-intense meat options (Bacon & Krpan, 2018; Brehm, 1966). Additionally, consumers may feel morally licensed to indulge in unsustainable choices when dining out if they perceive themselves as generally making environmentally conscious decisions (Bacon & Krpan, 2018; Hielkema & Lund, 2022).

Given these psychological barriers, consumer intention to purchase climate-friendly products does not always translate into action in restaurants, particularly in tourism settings (Greene et al., 2023; Juvan & Dolnicar, 2014). Tourists tend to overconsume food and waste more while on vacation compared to their behaviours at home, exacerbating environmental impacts (Gössling et al., 2011; Liu et al., 2022). Many justify these behaviours by viewing holidays as exceptional circumstances or claiming a lack of information about the environmental consequences (Juvan & Dolnicar, 2021). Indeed, research shows that inadequate sustainability communication by hospitality providers hinders informed pro-environmental choices and reduces the potential to enhance the perceived value of food products and customer satisfaction (Ettinger et al., 2021; Lohmann et al., 2022; Tölkes, 2020).

At the same time, substantial evidence suggests that information alone is insufficient to encourage pro-environmental behaviour in hospitality and tourism (Demeter et al., 2023; Greene et al., 2023). The attitude-behaviour gap largely stems from the hedonistic nature of such contexts, where consumers prioritise enjoyment and escape from everyday responsibilities (Juvan & Dolnicar, 2021; Miao & Wei, 2013).

Processing sustainability information demands cognitive effort and may lead to negative emotions like guilt, detracting from the experience (Acuti et al., 2022; Thunström et al., 2016). This challenge intensifies when information is unclear or conflicts with the provider's brand image, forcing consumers to make perceived trade-offs between their environmental values and traditional criteria like price, quality, or taste (Aschemann-Witzel et al., 2021; Ngan et al., 2022; Rondoni & Grasso, 2021). Consequently, restaurant consumers may disregard sustainability information, underestimate the environmental impacts of their consumption activities and attribute responsibility to providers (Juvan & Dolnicar, 2021; Thunström et al., 2014, 2016). The limitations of traditional information provision, such as environmental leaflets and signage, have prompted a shift in research towards behavioural interventions at the point of consumption (Demeter et al., 2023; Dolnicar, 2020).

Behavioural interventions for environmentally friendly food choices

A growing number of studies have examined behavioural interventions targeting environmentally friendly food choices in settings like supermarkets (e.g. Edenbrandt & Lagerkvist, 2021; Richter et al., 2018) and canteens (e.g. Garnett et al., 2020; Langen et al., 2022; Thunström & Nordström, 2011), with less attention given to restaurants, particularly in tourism contexts (Greene et al., 2023). Many studies employ nudges, which modify the choice architecture to guide consumers towards specific alternatives (Thaler & Sunstein, 2008). For example, field experiments have manipulated the salience, order, or placement of dishes to encourage vegetarian meal choices (e.g. Gravert & Kurz, 2021; Reinholdsson et al., 2023) and studied the effects of reduced plate size on food waste at hotel buffets (Kallbekken & Sælen, 2013). Although experiments generally demonstrate that altering the choice architecture promote environmentally friendly food consumption (Greene et al., 2023), these interventions often do not communicate the external costs of food production and consumption, limiting their potential to foster lasting changes in preferences and behaviour (Lohmann et al., 2022).

To address this shortcoming, researchers and practitioners have increasingly explored how food labels affect consumer attitude and choice (e.g. Cozzio et al., 2022; Hartikainen et al., 2014; Lohmann et al., 2022; Volgger et al., 2021). Labels aim to simplify the environmental attributes of a product, like CO₂e emissions or origin, to reduce information overload and to help consumers compare products more easily (Gössling, 2016; Miller, 2018). When combined with factors like environmental awareness, knowledge, and attitudes, labels can empower consumers to make informed choices aligned with their values (Leire & Thidell, 2005). Research suggests that such pro-environmental behaviour can provide moral benefits and maximises utility from the product (Gravert & Carlsson, 2019; Merle et al., 2016). Several surveys indicate that consumers view environmental labels on food products positively (Filimonau et al., 2017; Sirieix et al., 2013) and that labels can increase purchase likelihood and willingness to pay premium prices (Feucht & Zander, 2018). Therefore, labels not only act as educational tools but can also boost sales of desirable products by enabling informed choices.

However, questions remain about the effectiveness of different food labels in driving actual change towards more climate-friendly food choices in restaurants, especially in tourism (Cozzio et al., 2022; Edenbrandt & Nordström, 2023; Greene et al., 2023).

Carbon labels in restaurants

Numerous labels exist addressing various sustainability dimensions (Janßen & Langen, 2017). While studies demonstrate the influence of local or organic food labels on consumer choices (Cozzio et al., 2022; Merle et al., 2016; Miller, 2018; Sirieix et al., 2013), these labels do not guarantee more environmentally friendly production methods (Futtrup & Grunert, 2023; Gössling et al., 2011). In contrast, carbon labels provide clear CO₂e emission information, helping consumers overcome estimation biases for carbon footprints of food (Panzone et al., 2020). Carbon labels also hold potential to gradually enhance consumer awareness and knowledge of climate-friendly food choices, fostering lasting behavioural changes (Edenbrandt et al., 2020; Gössling, 2016; Thøgersen, 2021). Surveys show positive consumer attitudes towards carbon labels, especially those with concise CO₂e numbers and traffic light scales (Feucht & Zander, 2018; Filimonau et al., 2017; Hartikainen et al., 2014; Leire & Thidell, 2005).

However, field experiments testing carbon labels in hospitality establishments report mixed results. While some observed modest impacts in university cafeterias, such as a 3% (Spaargaren et al., 2013) and a 3.6% decrease in carbon scores (Brunner et al., 2018), others found more substantial effects (Lohmann et al., 2022; Slapø & Karevold, 2019). Additionally, a recent study found that Swedish retail consumers' willingness to substitute high-emission meat products with lower-emission protein sources increases after the introduction of carbon labels (Edenbrandt & Lagerkvist, 2021). Although these studies provide some insight into how carbon labels influence food choice in real-world settings, they were primarily conducted in cafeterias or supermarkets.

Field experiments testing carbon labels in full-service restaurants, particularly in tourism, are rare. Casati et al. (2023) found that carbon labels initially had no impact in a general full-service restaurant, but their impact on climate-friendly choices increased over time. In hotel restaurants, Cozzio et al. (2022) and Volgger et al. (2021) observed that carbon labels had limited impact compared to health or local origin labels, supporting the notion that tourists prioritise self-benefits (Hardeman et al., 2017). However, processing abstract information like CO₂e emissions can also be more challenging compared to local origin or nutrition information (Merle et al., 2016) and by applying carbon labels only to a single buffet item, Cozzio et al.'s (2022) and Volgger et al.'s (2021) experiments limited consumers' ability to compare items and hindered the identification of substitution patterns. Thus, gaps remain in field experimental research testing the impact of carbon labels across all menu items in an à la carte restaurant within a tourism context.

Moreover, although existing theoretically grounded experiments provide valuable insight into consumer psychology, they frequently overlook the management perspective and operational realities of hospitality businesses. Implementing carbon labels in profit-driven restaurants that sell hedonic dining experiences can be challenging, since such interventions can induce consumer guilt and even backlash (Casati et al., 2023), while also imposing implementation costs (Edenbrandt & Nordström, 2023). Some experiments noted tension with menu planning and recipe development due to label interventions (Kaljonen et al., 2020), but few capture the collaborative phases of experiments highlighting managers and staff insights into operational constraints (Coghlan et al., 2023; Mason et al., 2010). This oversight can undermine even well-designed interventions and hinder the development of procedural knowledge (Tribe, 1997) – the professional expertise required for successful implementation and communication of sustainability initiatives.

In this context, involving managers and staff in the design of pro-environmental interventions, such as carbon labels, is not only beneficial but essential to co-create mutually beneficial value (Galvagno & Dalli, 2014; Vargo & Lusch, 2004). By engaging managers and staff in the development of interventions, their insights into operational constraints and priorities can be incorporated, transforming them from mere implementers into co-creators of interventions that meet both business goals and growing expectations for climate-friendly food. Consequently, both industry and consumer perspectives are important in the co-creation process of generating value from pro-environmental interventions (Bogren & Sörensson, 2021).

Given the limited research on managers and staff involvement in behavioural intervention design and the mixed results of carbon label experiments, this study addresses key gaps by first exploring the role of restaurant managers and staff in developing interventions to reduce the carbon footprint of food choices. It then tests the impact of a collaboratively designed carbon labelling intervention on food choices in an à la carte restaurant at a tourist destination.

Materials and methods

Data collection

This study employed workshops to collaboratively design a carbon label intervention with restaurant managers and staff and test their impact in a field experiment. The research was conducted in Sälen, a rural outdoor destination selected for being Sweden's leading winter tourism destination by visitor numbers and due to ongoing research collaborations (Heldt et al., 2021). The operations manager of Sälen's largest hotel, the primary contact for the research project, acted as a gatekeeper by inviting relevant managers and staff to participate in the workshops, including restaurant managers, administrative chefs, head chefs, food & beverage assistants, and wait staff at different restaurants in Sälen. These workshops resulted in the selection of a specific casual à la carte restaurant for the experiment. The restaurant, which seats 50 diners and primarily serves burgers and pizzas, was chosen for its practical serving style and manageable size. Its menu, limited to familiar items typically associated with high emissions, offered a controlled environment to assess the impact of carbon labels on consumer behaviour, reducing variability and increasing the likelihood that any observed changes were attributable to the intervention.

The study's framework, illustrated in [Figure 1](#), involved four stages: (1) Open space workshops with restaurant managers and staff to inform the field experiment (2) Collaborative decision-making with stakeholders on food items, climate labelling, and climate calculus (3) A field experiment, and (4) Data analysis.

Open space workshops

In Stage 1, two workshops were conducted with restaurant managers and staff to explore the opportunities and challenges in offering climate-friendly food at the destination and devise a suitable intervention. Workshop 1 (October 2021) focused on establishing a shared understanding of climate-friendly food, while Workshop 2 (February 2022) centred on practical strategies for developing and testing an intervention in the restaurant.

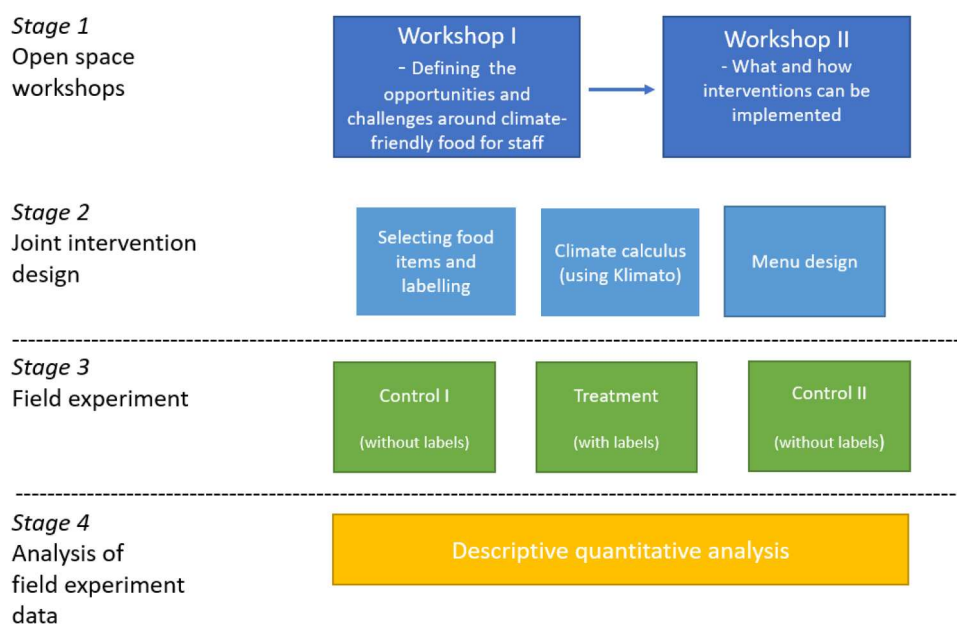


Figure 1. Framework of the study.

Both workshops followed a similar structure, incorporating Open Space and Design Thinking principles. These approaches, which emphasise iterative, human-centered problem-solving, were used to foster the involvement of diverse perspectives and collaborative solution development (Carlgren et al., 2016; Owen, 1995). Researchers facilitated the discussions and participants used tools like sticky notes, posters, and sketches to explore climate-friendly food in the context of the destination. This format, though under-explored in sustainability intervention design within hospitality and tourism, is well-suited for encouraging open dialogue, sharing knowledge, and challenging business-as-usual thinking (Bertella et al., 2021; Hoolohan & Browne, 2020; Lub et al., 2015).

Participants were invited to the workshops via email, distributed by the hotel's operations manager, which provided an overview of the research project and session goals. At the beginning of each workshop, participants were reintroduced to the project and its objectives orally. To foster creativity and avoid preconceived ideas, no detailed information or predefined questions were provided. Researchers informed participants that photos would be taken, and notes recorded for research purposes. Verbal consent was obtained at a group level, and participants were informed they could withdraw at any time without obligation.

Workshop 1 focused on only one broad question: How can a restaurant help reduce the hospitality industry's climate footprint by promoting sustainable food and drink choices? Workshop 2 centred on the theme "Climate-Smart Work in Practice" and addressed the key question: How do you conduct a field study in a restaurant? This question was presented with the specific aim of actively involving staff in the process of conducting the field experiment. Additionally, us researchers identified several specific questions related to the experimental design that needed to be addressed at the end of the workshop to ensure a robust setup for the field experiment

(see Appendix 1). The process began with participants individually noting ideas on post-it notes related to the overall question, followed by two rounds of small group discussions, where notes were clustered into common themes on posters. These posters were then collectively reviewed, with additional input encouraged both during the session and anonymously afterward on the online platform Padlet (see Appendix 2). Using a thematic data-driven analysis approach, researchers manually reconciled the themes after all comments were collected by organising the data on the platform, transferring raw data into an Excel sheet for focus, and consolidating similar ideas and concerns into key recurring themes (Nowell et al., 2017).

The first workshop provided a platform for establishing a shared understanding of the opportunities and challenges around climate-friendly food in Sälen, building commitment, and laying the groundwork for the subsequent workshop and experiment. The second workshop narrowed the focus to the intervention and field experiment design. This approach helped gain insights into the perspectives of manager and staff regarding behavioural interventions to reduce the carbon footprint of food choices while effectively communicating the experimental approach to practitioners. Based on workshop outcomes, detailed in the Results section, and subsequent consultations with restaurant chefs and managers, carbon labels were collaboratively designed as the intervention (Stage 2). This process involved compromises, such as avoiding red labels to prevent inducing guilt among customers. To create the labels, the carbon footprints of each main dish were calculated in grams of CO₂e per dish using detailed ingredient information provided by chefs. The calculations were conducted with Klimato, a Sweden-based carbon calculator for the food sector. Klimato was selected due to its increasing popularity in Europe and transparent methodology, using data from studies that follow Life Cycle Assessment to calculate the food's carbon footprint (Klimato, 2023; see Appendix 3 for details).

Field experiment

Stage 3 involved the field experiment, conducted between July 1 to August 14, 2022, to assess the impact of the collaboratively designed carbon labels on food choices at the restaurant in Sälen. An ABA experimental design was used, consisting of a baseline period without labels (Control 1: 19 days), the intervention with labels (Treatment: 19 days), and a return to the baseline without labels (Control 2: 7 days). This design helps isolate the effects of carbon labels, by comparing behaviour before, during, and after the intervention.

During the Treatment, carbon labels were added to each menu item, showing the dish's carbon footprint as a digit and a green and white circular symbol, adopted from Klimato. The symbols ranged in shading and fill to reflect different carbon emissions: light green (0.1-0.5 kg CO₂e), medium green (0.6-1.5 kg CO₂e), and dark green (1.6 + kg CO₂e) (see Figure 2).

No other changes to the menu or dishes were made before or during the experiment, ensuring that any observed effects could be attributed to the carbon label intervention. To note, Pizzas are recommended for two people and some customers shared one Pizza, according to the restaurant manager. While this does not affect our analysis of orders and average emissions, it is important for understanding deeper behavioural drivers of food choices like social influence and compromises (Peters & Remaud, 2020).

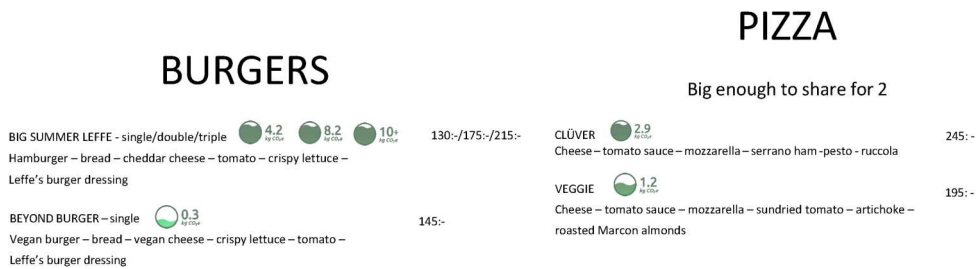


Figure 2. Carbon labels on the menu.

Restaurant customers received physical menus and ordered through waitstaff. All staff were informed about the experiment and able to explain the labels if customers inquired about them. It is important to note that while we initially planned to include an explanation of the labels at the bottom of the menus, this was inadvertently omitted during printing by the restaurant. This oversight may have affected consumers' understanding of the labels, as elaborated on in the discussion section. Orders were automatically recorded in the kitchen system. The orders were analysed using descriptive statistics, focusing on percentage comparisons across the conditions. Control 1 and Control 2 data were combined to increase the sample size and enhance the ability to detect significant changes.

Ideally, survey data would have provided insights into guest characteristics and potential confounding factors, but this was not possible due to managerial concerns about disrupting the guest experience, as discussed in the workshops. Additionally, we aimed to avoid drawing extra attention to the labels or the sustainability of the menu. Considering Sälen's status as an outdoor tourism destination and the experimental period coinciding with Swedish summer holidays, it is likely that visitors were mostly families involved in outdoor activities. No specific events affecting the guest mix or intervention were noted by the manager.

To maintain natural consumer behaviour and enhance validity, customers were not informed about the experiment, minimising preconceptions (Thomlinson, 2018). The potential adverse effects of the interventions were thoroughly evaluated, aligning with the Swedish Ethical Review Act¹, and in close collaboration with stakeholders and fellow researchers. Factors like autonomy, deception, or potential impacts on the customer experience were carefully considered.

Results

Stages 1 and 2 highlighted the important role of managers and staff in designing behavioural interventions aimed at reducing the carbon footprint of restaurant customers' food choices. These stages identified an intervention relevant to the local context and the key factors necessary for the experiment's execution.

Workshop 1 revealed that participants, despite their different roles – ranging from managers to chefs, waitstaff, and other staff – were highly engaged and aligned in their motivation to adopt sustainability practices. They communicated openly and collaboratively, regardless of position, sharing their knowledge and perspectives. This collective

engagement helped foster a collaborative understanding around the challenges and opportunities for climate-friendly food in Sälen. Several broader themes related to sustainable food in Sälen emerged, including: Trends, sustainability, values (e.g. health, organic, how to monitor trends); Staff and Guests (e.g. staff awareness, involving guests); Resources, consumption, routines (e.g. digitalisation, energy, consumption of packaging and goods); and Food and vision (e.g. food waste, seasonal food, long-term vision) (see Appendix 2). Participant particularly noted the need for clear definitions of terms such as “organic” and “climate-friendly” in the local context. Furthermore, as in previous research (Font et al., 2021), we found that they considered the values customers might derive from sustainability, such as positive emotions when choosing climate-friendly options. Noteworthy was also their emphasis on the importance of well-informed staff to effectively implement and communicate pro-environmental practices. Discussions about the importance of sustainability in various aspects of restaurant operations, current trends, visions, and challenges with implementation helped pinpoint potential intervention areas within the restaurant’s food value chain, such as plate waste, menu presentation, and labels.

Workshop 2 built on these insights, resulting in the development of an actionable intervention. Discussions focused on practical ways to modify work practices and dishes to reduce carbon impacts, considering staff’s customer insights and the costs and benefits of implementation. Clear ideas and concerns emerged around practicalities (e.g. restaurant choice, timing, and measurement tools), possible interventions (e.g. new menus, local food sourcing, labelling, and food waste management), and considerations to customer experience and staff knowledge (see Appendix 2). There was consensus on the need for transparent communication about environmental sustainability, with customer satisfaction remaining central to intervention design. Through several rounds of discussion, carbon labelling was considered more thoroughly, leading to decisions about which dishes to label, how pricing would affect these choices, and how to communicate carbon footprints without negatively impacting customer experiences. For example, the participants chose to use only green labels instead of traffic-light colours to avoid triggering negative emotions in consumers. This workshop ultimately led to a collaboratively designed carbon label intervention and experimental plan.

Stage 3 and 4, the field experiment testing the impact of the carbon label intervention on consumers’ food choices at the restaurant, resulted in a final data set of 1449 burger and pizza orders (Control 1: $n = 532$; Treatment: $n = 638$; Control 2: $n = 289$). Table 1 displays the CO₂e per dish, the number of orders for each dish per condition, the percentage of each dish relative to total orders per condition, and the average revenue generated per condition. The difference in percentage units across condition shows no significant change from high – to low – emission items within product categories (Burgers and Pizzas) between Control 1 + 2 and the treatment. Notably, sales of the lowest carbon footprint items (0.3-1.2 CO₂e), the vegan Beyond burger and Veggie pizza, decreased. Conversely, sales of the highest-emission triple burger increased, and the highest-emission pizza (Ronja) remained unaffected. The largest carbon emission reduction occurred with the double burger, indicating a shift to medium-emission plain burgers. Mid-range carbon footprint pizzas (Clüwer, Capricciosa, Maggan) also saw an increase in sales.

Across product categories, there was a 3% reduction in burger orders, with a corresponding increase in pizza orders during the treatment, suggesting a substitution effect from high-emission burgers to medium-emission pizzas.

Table 1. Orders of the dishes across experimental conditions.

Product	CO ₂ e	Number total orders		Percentage of orders			Average revenue (in sek)	
		Control 1 and 2	Treatment	Control 1 and 2	Treatment	Difference percentage units	Control 1 and 2	Treatment
Burger		366	263	45	42	-3	152,14	150,34
Big Summer	10	11	13	1	2	1		
Leffe triple								
Big Summer	8.2	153	90	19	14	-4		
Leffe double								
Big Summer	4.2	180	147	22	23	1		
Leffe plain								
Beyond	0.3	22	13	3	2	-1		
Pizza		455	365	55	58	3	225,73	226,93
Ronja	3.8	48	39	6	6	0		
Clüwer	2.9	171	144	21	23	2		
Capricciosa	2.7	106	89	13	14	1		
Maggan	2.6	77	69	9	11	2		
Veggie	1.2	53	24	6	4	-3		
Total		821	628				192,92	194,86

Revenue analysis showed a slight decrease in average revenue for burgers and an increase for pizzas, resulting in a small overall revenue increase, although costs were not factored into this calculation.

The results remained consistent whether Control 1 and Control 2 were combined or analysed separately. Appendix 4, comparing Control 1 to the Treatment period, shows a similar pattern, although the substitution from burgers to pizza is more pronounced. Notably, burger consumption increases by 4% rather than 3%, and there is no increase in plain burger consumption.

Table 2 presents the total carbon emissions for each dish across conditions, the average emissions within product categories, and the percentage contribution of each dish to total emissions per condition. The difference in percentage units between Control 1 + 2 and the treatment period reveals a 4% decrease in CO₂e emissions from burgers, mainly driven by fewer double burger orders, which resulted in an 8% reduction

Table 2. Carbon footprint of the dishes across experimental conditions/

Product	CO ₂ e	CO ₂ e Total			Percentage of CO ₂ e			
		Control 1+ Control 2	Average CO ₂ e/order	Treatment	Average CO ₂ e/order	Control 1+ Control 2	Treatment	Difference percentage units
Burger		2127	5.8	1489	5.7	63	59	-4
Big Summer	10	110		130		3	5	2
Leffe triple								
Big Summer	8.2	1255		738		37	29	-8
Leffe double								
Big Summer	4.2	756		617		23	25	2
Leffe plain								
Beyond	0.3	7		4		0	0	0
Pizza		1228	2.7	1014	2.8	37	41	4
Ronja	3.8	182		148		5	6	0
Clüwer	2.9	496		418		15	17	2
Capricciosa	2.7	286		240		9	10	1
Maggan	2.6	200		179		6	7	1
Veggie	1.2	64		29		2	1	-1
Total		3356	4.1	2504	4.0			

in CO₂e emissions for this dish. However, the increase in triple and plain burger orders partially offsets this reduction.

The shift from burgers to pizza resulted in a rise in the pizza category's emissions from 37% to 41%, with medium-emission pizzas (Clüwer, Capricciosa and Maggan) contributing to a 1-2% rise.

Overall, the average carbon footprint of visitors' food choices slightly decreased during the treatment (4.0 CO₂e) compared to the control periods (4.1 CO₂e). Specifically, the average carbon footprint in the burger category decreased from 5.8 CO₂e during the control to 5.7 CO₂e during the treatment period, while the pizza category saw an increase from 2.7 CO₂e to 2.8 CO₂e.

Discussion

This study explores the impact of carbon labels on consumers' food choices in an à la carte restaurant at a tourism destination through a field experiment, with a focus on the collaborative design of behavioural interventions. By providing insights into the role of manager and staff involvement in intervention development, alongside evaluating the effectiveness of collaboratively designed carbon labels in a field experiment, the research provides a more comprehensive understanding of intervention design in real-world hospitality settings.

Climate-friendly food consumption in hospitality and tourism presents a complex issue involving diverse stakeholders and commercial pressures, making it challenging to test and implement interventions effectively alongside regular operation (Post & Mikkola, 2012). Despite acknowledgement of these challenges, previous studies in hospitality and tourism have narrowly focused on the execution of experiments and measuring direct behavioural outcomes, often overlooking the exploratory, collaborative phase that contributes to co-creating interventions (Coghlan et al., 2023; Demeter et al., 2023; Mason et al., 2010; Thomas & Ormerod, 2017). Our findings emphasise the importance of involving restaurant managers and staff in developing sustainability interventions, as their practical insights ensure that interventions are contextually relevant and in line with business goals, increasing the commitment necessary for successful implementation.

This research contributes to the growing body of literature on behavioural interventions by offering a general framework for collaboratively designing and testing such interventions in hospitality settings. The initial exploratory phase, specifically workshops inspired by Design Thinking and Open Space methods, were key in engaging managers and staff in the cocreation of interventions and aligning the experiment with restaurant operations. Staff demonstrated high levels of engagement during the workshops and, in a follow-up meeting after the experiment, management expressed continued interest in adopting the carbon-calculator tool and exploring further sustainability-oriented interventions. Despite the limited impact of carbon labels in this experiment, they were keen to consider strategies such as replacing high-carbon dishes with lower-carbon options like different vegetarian alternatives. This commitment aligns with previous research suggesting that staff involvement enhances sustainability awareness, values, and innovation capabilities (Font et al., 2021; Knežević Cvelbar et al., 2022; Liu et al., 2021; Phi & Waldesten, 2021) and emphasises the need to incorporate the providers' perspective for a more comprehensive understanding of intervention impact. Such

involvement is critical, since meaningful sustainability intervention require ongoing commitment, with financial and marketing benefits typically realised in the medium to long term (Bogren & Sörensson, 2021; Bohdanowicz & Zientara, 2008).

The collaborative approach also highlighted the need for iterative, adaptive approaches to intervention design in dynamic commercial environments (Coghlan et al., 2023; Mason et al., 2010). Unforeseen challenges and compromises, such as staffing changes, adjustments to label designs, and the need to adapt data collection methods to restaurant operations, may compromise the effectiveness of theory-based experimental designs and impact the initial impact of interventions and internal validity, a challenge often understated in the literature (Coghlan et al., 2023; Kaljonen et al., 2020). Thus, methods like workshops and follow-up studies become crucial to bridge the gap between practitioner and researchers (Thomas & Ormerod, 2017), allowing for reciprocal learning and iterative adaption of interventions in line with contextual changes and evolving knowledge on consumer behaviour and pro-environmental practices.

The field experiment adds to existing research on carbon labelling and behaviour change in hospitality and tourism by testing the labels in an underexplored tourism context and across the entire menu in contrast to prior buffet-based studies (Cozzio et al., 2022; Volgger et al., 2021). Despite allowing consumers to compare options and being set in a country with a generally high interest in carbon-labelled food (BCG, 2021; Edenbrandt et al., 2020), carbon labels appear to have limited effectiveness in altering food choices and reducing CO₂e emissions in this context. While the observed substitution between product categories indicates some responsiveness to the labels, consumers appeared to make compromises instead of opting for the lowest-emission options.

This result aligns with research suggesting that environmental appeals alone may not drive significant behaviour change in hospitality and tourism due to its hedonic nature (Cozzio et al., 2020; Demeter et al., 2023; Dolnicar et al., 2017). Specifically, in the context of a burger restaurant at an outdoor tourism destination, consumers are likely to prioritise convenience and comfort food over environmental considerations. Restaurant staff also noted in the workshops that tourists at this destination are mostly self-catering and dine out for indulgence, which may further explain the limited impact of the labels compared to experiments in cafeterias (Brunner et al., 2018; Lohmann et al., 2022; Slapø & Karevold, 2019; Spaargaren et al., 2013). The unchanged popularity of high-emission items and slight decrease in vegetarian orders even suggests that a small segment of consumers increase their carbon footprint when presented with carbon information, a potential result of reactance and moral licensing effects (Bacon & Krpan, 2018; Brehm, 1966).

Along with the restaurant's context, the type of food served, and the availability of low-emission substitutes are critical factors influencing consumer responses to carbon labels (Carlsson-Kanyama & González, 2009; Poore & Nemecek, 2018). In this study, the restaurant focused on burgers and pizzas, both typically associated with high carbon footprints. Additionally, the lowest-emission burger, a vegan option, offered a novel alternative for many consumers and may deter those with strong meat preferences (Carlsson-Kanyama & González, 2009; Garnett et al., 2021; Poore & Nemecek, 2018). Thus, carbon labels might highlight the low emissions of such choices, but not resonate with specific consumer preferences in the restaurant (Lorenz & Langen, 2018; Rös & Tjärnemo,

2011). This emphasises the importance of better understanding not only how carbon labels might negatively impact dining experiences, as discussed in the workshops, but how they can be adapted to add value for consumers in the specific contexts (Font et al., 2021). Integrating further consumer studies, staff feedback, and iterative testing into the intervention development framework would help optimise interventions and climate-friendly alternatives to better meet consumer expectations, especially in this underexplored tourism setting.

Notably, the unforeseen lack of detailed explanations on the menu, the novelty of carbon labels, and the temporary nature of the tourist clientele likely also affected their impact, hindering consumer comprehension and trust in the restaurant's labelling scheme – factors critical for effective labelling (Casati et al., 2023; Feucht & Zander, 2018; Gössling, 2016; Rondoni & Grasso, 2021). Additionally, the higher cost of the vegan burger compared to medium-emission options may have deterred consumers from choosing the most climate-friendly option, especially given the experiment's timing during peak holiday season, attracting families who are likely to be price-sensitive (Røkenes, 2007). This emphasises the need for conducting studies over several seasons (Coghlan et al., 2023) and aligning climate-friendly options, including pricing strategies, with consumer preferences to ensure that they are competitive with less climate-friendly choices (Garnett et al., 2021; Thøgersen, 2021).

Despite these challenges, the observed substitution effect between product categories is promising, suggesting that carbon labels have the potential to influence behaviour, even if the effect is not observed across all food choices. This finding extends research on carbon labelling in a tourism context, where only a single food items were labelled, limiting comparisons across product categories (Cozzio et al., 2022; Volgger et al., 2021). Moreover, carbon labels, in particular those allowing comparison across products, may have long-term impacts on consumer behaviour and restaurant operations. Over time, these labels can help build carbon literacy among consumers, encouraging more informed food choices while also prompting adjustments in menu offerings and dish compositions to align with sustainability goals (Casati et al., 2023; Edenbrandt et al., 2020). Given the broad range of possible intervention points identified in both the workshops and the literature (Demeter et al., 2023; Greene et al., 2023), further collaborative exploration of alternative label designs and combinations with other behavioural interventions is needed to optimise the effectiveness of interventions across diverse consumer segments and settings.

Conclusion

This study investigated the impact of collaboratively designed carbon labels in an à la carte restaurant at a tourism destination, focusing on the involvement of managers and staff in developing behavioural interventions to reduce the carbon footprint of meals.

The research provides novel insights into designing and implementing sustainability interventions in hospitality and tourism, emphasising the significance of co-creating interventions with managers and staff. Workshops facilitated knowledge exchange, ensuring contextually relevant and operationally feasible solutions while fostering staff engagement in sustainability efforts. Although the resulting carbon label intervention had limited impact, the collaborative approach was crucial in generating commitment and

procedural knowledge for designing behavioural interventions within restaurant operations. Engaging staff and integrating the business context is essential not only for leveraging insights but also for capturing provider-side changes that can lead to incremental sustainability improvements.

The field experiment adds the literature on carbon labels, highlighting their limitations in indulgent, temporary consumption settings like tourism dining. Although a substitution effect across product categories was observed, the overall reduction in carbon emissions was minimal. Considering the growing importance of carbon literacy, this emphasises the need for a more nuanced understanding of climate-related choices in different dining settings and how to adapt carbon labels accordingly.

Methodologically, the study offers a replicable framework for co-designing interventions in dynamic, real-world hospitality environments. The collaborative approach, involving workshops to integrate stakeholder input in interventions design, shows how experiments can be aligned with industry realities. It underscores the need for iterative experimentation to bridge academic inquiry with actionable interventions that can be refined in response to business needs and consumer behaviour patterns.

It is important to acknowledge this study's limitations for consideration in future research. First, the limited number of restaurants at the destination precluded the inclusion of a control restaurant. To improve validity and reliability, we recommend conducting similar experiments at larger tourist destinations with multiple comparable restaurants. Additionally, the experiment was conducted in an outdoor tourism destination in Sweden during peak family holidays. To enhance generalizability, future research should replicate the study in restaurants catering to different tourist demographics. The lack of data on demographic and socio-psychological characteristics prevented an in-depth analysis of influences on food choices. Investigating factors such as price sensitivity, environmental awareness, and dietary preferences in similar tourism settings would be valuable. Future research should also explore different label designs and the combined effects of carbon labels and other nudges in diverse contexts. Considering the potential of social influence in behaviour change initiatives, we recommend, for example, exploring the impact of expert endorsement or personal recommendations on consumers' choices. Finally, further research is necessary to assess whether carbon labels affect consumer behaviour in the long-term and across contexts.

Note

1. See What the Act says – Etikprövningsmyndigheten (etikprovning.se) for details on the Ethical Review Act in Sweden.

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References

- Acuti, D., Pizzetti, M., & Dolnicar, S. (2022). When sustainability backfires: A review on the unintended negative side-effects of product and service sustainability on consumer behavior. *Psychology & Marketing*, 39(20), 1933–1945. <https://doi.org/10.1002/mar.21709>
- Andersson, T. D., Mossberg, L., & Therkelsen, A. (2017). Food and tourism synergies: Perspectives on consumption, production and destination development. *Scandinavian Journal of Hospitality and Tourism*, 17(1), 1–8. <https://doi.org/10.1080/15022250.2016.1275290>
- Aschemann-Witzel, J., Futtrup Gantriis, R., Fraga, P., & Perez-Cueto, F. J. A. (2021). Plant-based food and protein trend from a business perspective: Markets, consumers, and the challenges and opportunities in the future. *Critical Reviews in Food Science and Nutrition*, 61(18), 3119–3128. <https://doi.org/10.1080/10408398.2020.1793730>
- Bacon, L., & Krpan, D. (2018). (Not) eating for the environment: The impact of restaurant menu design on vegetarian food choice. *Appetite*, 125, 190–200. <https://doi.org/10.1016/j.appet.2018.02.006>
- Barr, S., Shaw, G., Coles, T., & Prillwitz, J. (2010). ‘A holiday is a holiday’: Practicing sustainability, home and away. *Journal of Transport Geography*, 18(3), 474–481. <https://doi.org/10.1016/j.jtrangeo.2009.08.007>
- BCG (Boston Consulting Group). (2021). Swedish consumer sentiment 2021. Retrieved September 10, 2024, from <https://www.bcg.com/publications/2021/swedish-consumer-sentiment-report>.
- Bertella, G., Lupini, S., Romanelli, C. R., & Font, X. (2021). Workshop methodology design: Innovation-oriented participatory processes for sustainability. *Annals of Tourism Research*, 89(1), 103251. <https://doi.org/10.1016/j.annals.2021.103251>
- Bjørndal, T., Fernandez-Polanco, J., Lappo, A., & Lem, A. (2014). *Consumer trends and preferences in the demand for food*. (Working Paper No. 17/14). <http://hdl.handle.net/11250/225387>.
- Bogren, M., & Sörensson, A. (2021). Tourism companies’ sustainability communication – creating legitimacy and value. *Scandinavian Journal of Hospitality and Tourism*, 21(5), 475–493. <https://doi.org/10.1080/15022250.2021.1974542>
- Bohdanowicz, P., & Zientara, P. (2008). Corporate social responsibility in hospitality: Issues and implications. A case study of Scandic. *Scandinavian Journal of Hospitality and Tourism*, 8(4), 271–293. <https://doi.org/10.1080/15022250802504814>
- Brehm, J. W. (1966). *A theory of psychological reactance*. Academic Press.
- Brunner, F., Kurz, V., Bryngelsson, D., & Hedenus, F. (2018). Carbon label at a university restaurant – label implementation and evaluation. *Ecological Economics*, 146, 658–667. <https://doi.org/10.1016/j.ecolecon.2017.12.012>
- Bujnicki, J., Dykstra, P., Fortunato, E., Grobert, N., Heuer, R., Keskitalo, C., & Nurse, P. (2020). *Towards a sustainable food system: Moving from food as a commodity to food as more of a common good*. (Scientific Opinion No.8). European Commission.
- Campbell-Arvai, V., Arvai, J., & Kalof, L. (2014). Motivating sustainable food choices: The role of nudges, value orientation, and information provision. *Environment and Behavior*, 46(4), 453–475. <https://doi.org/10.1177/0013916512469099>
- Carlgren, L., Rauth, I., & Elmquist, M. (2016). Framing design thinking: The concept in idea and enactment. *Creativity and Innovation Management*, 25(1), 38–57. <https://doi.org/10.1111/caim.12153>
- Carlsson-Kanyama, A., & González, A. D. (2009). Potential contributions of food consumption patterns to climate change. *The American Journal of Clinical Nutrition*, 89(5), 1704S–1709S. <https://doi.org/10.3945/ajcn.2009.26736AA>
- Casati, M., Soregaroli, C., Rommel, J., Luzzani, G., & Stranieri, S. (2023). Please keep ordering! A natural field experiment assessing a carbon label introduction. *Food Policy*, 120, 102523. <https://doi.org/10.1016/j.foodpol.2023.102523>

- Coghlan, A., Becken, S., & MacAskill, S. (2023). Designing sustainability changes in a tourist accommodation context from a systems perspective. *Frontiers in Sustainable Tourism*, 2, 1289009. <https://doi.org/10.3389/frsut.2023.1289009>
- Cozzio, C., Volgger, M., & Taplin, R. (2022). Point-of-consumption interventions to promote virtuous food choices of tourists with self-benefit or other-benefit appeals: A randomised field experiment. *Journal of Sustainable Tourism*, 30(6), 1301–1319. <https://doi.org/10.1080/09669582.2021.1932936>
- Cozzio, C., Volgger, M., Taplin, R., & Woodside, A. (2020). Nurturing tourists' ethical food consumption: Testing the persuasive strengths of alternative messages in a natural hotel setting. *Journal of Business Research*, 117, 268–279. <https://doi.org/10.1016/j.jbusres.2020.05.050>
- Crippa, M., Solazzo, E., Guizzardi, D., Monforti-Ferrario, F., Tubiello, F. N., & Leip, A. (2021). Food systems are responsible for a third of global anthropogenic GHG emissions. *Nature Food*, 2(3), 198–209. <https://doi.org/10.1038/s43016-021-00225-9>
- Demeter, C., Fechner, D., & Dolnicar, S. (2023). Progress in field experimentation for environmentally sustainable tourism – A knowledge map and research agenda. *Tourism Management*, 94, 104633. <https://doi.org/10.1016/j.tourman.2022.104633>
- Dolnicar, S. (2020). Designing for more environmentally friendly tourism. *Annals of Tourism Research*, 84, 102933. <https://doi.org/10.1016/j.annals.2020.102933>
- Dolnicar, S., Knežević Cvelbar, L., & Grün, B. (2017). Do pro-environmental appeals trigger pro-environmental behavior in hotel guests? *Journal of Travel Research*, 56(8), 988–997. <https://doi.org/10.1177/0047287516678089>
- Edenbrandt, A. K., & Lagerkvist, C. (2021). Is food labelling effective in reducing climate impact by encouraging the substitution of protein sources? *Food Policy*, 101, 102097. <https://doi.org/10.1016/j.foodpol.2021.102097>
- Edenbrandt, A., Lagerkvist, C. L., & Nordström, J. (2020). Interested, indifferent or active information avoider of carbon labels: Cognitive dissonance and ascription of responsibility as motivating factors. *Food Policy*, 101, 102036. <https://doi.org/10.1016/j.foodpol.2021.102036>
- Edenbrandt, A., & Nordström, J. (2023). The future of carbon labelling – factors to consider. *Agricultural and Resource Economics Review*, 52(1), 151–167. <https://doi.org/10.1017/age.2022.29>
- Ettinger, A., Grabner-Kräuter, S., Okazaki, S., & Terlutter, R. (2021). The desirability of CSR communication versus greenhushing in the hospitality industry: The customers' perspective. *Journal of Travel Research*, 60(3), 618–638. <https://doi.org/10.1177/0047287520930087>
- Euromonitor. (2020). *The rise of vegan and vegetarian food*. <https://www.euromonitor.com/the-rise-of-vegan-and-vegetarian-food/report>.
- Feucht, Y., & Zander, K. (2018). Consumers' preferences for carbon labels and the underlying reasoning. A mixed methods approach in 6 European countries. *Journal of Cleaner Production*, 178, 740–748. <https://doi.org/10.1016/j.jclepro.2017.12.236>
- Filimonau, V., & Grant, M. (2017). Exploring the concept of dining out organically: A managerial perspective. *Anatolia*, 28(1), 80–92. <https://doi.org/10.1080/13032917.2016.1265566>
- Filimonau, V., Lemmer, C., Marshall, D., & Bejjani, G. (2017). 'Nudging' as an architect of more responsible consumer choice in food service provision: The role of restaurant menu design. *Journal of Cleaner Production*, 144(2017), 161–170. <https://doi.org/10.1016/j.jclepro.2017.01.010>
- Font, X., English, R., Gkritzali, A., & Tian, W. (2021). Value Co-creation in sustainable tourism: A service-dominant logic approach. *Tourism Management*, 82, 104200. <https://doi.org/10.1016/j.tourman.2020.104200>
- Futtrup, R., & Grunert, K. G. (2023). Does organic labelling affect restaurant choice? A study on the Danish Organic Cuisine Label. *Scandinavian Journal of Hospitality and Tourism*, 23(1), 29–50. <https://doi.org/10.1080/15022250.2023.2174180>
- Galvagno, M., & Dalli, D. (2014). Theory of value co-creation: A systematic literature review. *Managing Service Quality*, 24(6), 643–683. <https://doi.org/10.1108/MSQ-09-2013-0187>
- Garnett, E. E., Balmford, A., Marteau, T. M., Pilling, M. A., & Sandbrook, C. (2021). Price of change: Does a small alteration to the price of meat and vegetarian options affect their sales? *Journal of Environmental Psychology*, 75, 101589. <https://doi.org/10.1016/j.jenvp.2021.101589>

- Garnett, E. E., Theresa, M. M., Sandbrook, C., Pilling, M. A., & Balmford, A. (2020). Order of meals at the counter and distance between options affect student cafeteria vegetarian sales. *Nature Food*, 1(8), 485–488. <https://doi.org/10.1038/s43016-020-0132-8>
- Gössling, B. (2016). Carbon labels in tourism: Persuasive communication? *Journal of Cleaner Production*, 111, 358–369. <https://doi.org/10.1016/j.jclepro.2014.08.067>
- Gössling, S., Balas, M., Mayer, M., & Sun, Y. Y. (2023). A review of tourism and climate change mitigation: The scales, scopes, stakeholders and strategies of carbon management. *Tourism Management*, 95, 104681. <https://doi.org/10.1016/j.tourman.2022.104681>
- Gössling, S., Garrod, B., Aall, C., Hille, J., & Peeters, P. (2011). Food management in tourism: Reducing tourism's carbon 'foodprint'. *Tourism Management*, 32(3), 534–543. <https://doi.org/10.1016/j.tourman.2010.04.006>
- Gravert, C., & Carlsson, F. (2019). *Nudge som miljöekonomiskt styrmedel - Att designa och utvärdera (Rapport 6900)*. Naturvårdsverket. <https://www.naturvardsverket.se/4a4382/globalassets/media/publikationer-pdf/6900/978-91-620-6900-1.pdf>.
- Gravert, C., & Kurz, V. (2021). Nudging a la carte: A field experiment on climate-friendly food choice. *Behavioural Public Policy*, 5(3), 378–395. <https://doi.org/10.1017/bpp.2019.11>
- Greene, D., Nguyen, M., & Dolnicar, S. (2023). How to entice restaurant patrons to order low-emission meals? A meta-analysis and research agenda. *Appetite*, 188, 106612. <https://doi.org/10.1016/j.appet.2023.106612>
- Hardeman, G., Font, X., & Nawijn, J. (2017). The power of persuasive communication to influence sustainable holiday choices: Appealing to self-benefits and norms. *Tourism Management*, 59, 484–493. <https://doi.org/10.1016/j.tourman.2016.09.011>
- Hartikainen, H., Roininen, T., Katajajuuri, J. M., & Pulkkinen, H. (2014). Finnish consumer perceptions of carbon footprints and carbon labelling of food products. *Journal of Cleaner Production*, 73, 285–293. <https://doi.org/10.1016/j.jclepro.2013.09.018>
- Heldt, T., Waleghwa, B., & Brandt, D. (2021). Planning for mobility and accessibility in rural touristic areas: A report on the Swedish case in InterReg MARA project (Nr: 2021). <https://www.diva-portal.org/smash/get/diva2:1643338/FULLTEXT01.pdf>.
- Hielkema, M. H., & Lund, T. B. (2022). A “vegetarian curry stew” or just a “curry stew”? - The effect of neutral labeling of vegetarian dishes on food choice among meat-reducers and non-reducers. *Journal of Environmental Psychology*, 84, 101877. <https://doi.org/10.1016/j.jenvp.2022.101877>
- Hoolohan, C., & Browne, A. L. (2020). Design thinking for practice-based intervention: Co-producing the change points toolkit to unlock (un)sustainable practices. *Design Studies*, 67, 102–132. <https://doi.org/10.1016/j.destud.2019.12.002>
- Janßen, D., & Langen, N. (2017). The bunch of sustainability labels – Do consumers differentiate? *Journal of Cleaner Production*, 143, 1233–1245. <https://doi.org/10.1016/j.jclepro.2016.11.171>
- Juvan, E., & Dolnicar, S. (2014). The attitude – behaviour gap in sustainable tourism. *Annals of Tourism Research*, 48, 76–95. <https://doi.org/10.1016/j.annals.2014.05.012>
- Juvan, E., & Dolnicar, S. (2021). The excuses tourists use to justify environmentally unfriendly behaviours. *Tourism Management*, 83(3), 104253. <https://doi.org/10.1016/j.tourman.2020.104253>
- Kaljonen, M., Salo, M., Lyytimäki, J., & Furman, E. (2020). From isolated labels and nudges to sustained tinkering: Assessing long-term changes in sustainable eating at a lunch restaurant. *British Food Journal*, 122(11), 3313–3329. <https://doi.org/10.1108/BFJ-10-2019-0816>
- Kallbekken, S., & Sælen, H. (2013). ‘Nudging’ hotel guests to reduce food waste as a win–win environmental measure. *Economics Letters*, 119(3), 325–327. <https://doi.org/10.1016/j.econlet.2013.03.019>
- Kim, H. (2020). Can sustainable restaurant practices enhance customer loyalty? The roles of value theory and environmental concerns. *Journal of Hospitality and Tourism Management*, 43, 127–138. <https://doi.org/10.1016/j.jhtm.2020.03.004>
- Klimato. (2023). *The climate data*. Retrieved June 27, 2023, from <https://www.klimato.co/about/the-climate-data>.
- Knežević Cvelbar, L., Grün, B., & Dolnicar, S. (2022). Do employees hold the key to environmental sustainability in tourism businesses? Empirical evidence from a field study. *Journal of Sustainable Tourism*, 3, 1–14. <https://doi.org/10.1080/09669582.2022.2131796>

- Langen, N., Ohlhausen, P., Steinmeier, F., Friedrich, S., Engelmann, T., Speck, M., Damerau, K., Bienge, K., Rohn, H., & Teitscheid, P. (2022). Nudges for more sustainable food choices in the out-of-home catering sector applied in real-world labs. *Resources, Conservation and Recycling*, 180, 106167. <https://doi.org/10.1016/j.resconrec.2022.106167>
- Leire, C., & Thidell, Å. (2005). Product-related environmental information to guide consumer purchases - a review and analysis of research on perceptions, understanding and use among Nordic consumers. *Journal of Cleaner Production*, 13(10-11), 1061–1070. <https://doi.org/10.1016/j.jclepro.2004.12.004>
- Liu, T., Juvan, E., Qiu, H., & Dolnicar, S. (2022). Context- and culture-dependent behaviors for the greater good: A comparative analysis of plate waste generation. *Journal of Sustainable Tourism*, 30(6), 1200–1218. <https://doi.org/10.1080/09669582.2021.1918132>
- Liu, Y., Liu, S., Zhang, Q., & Hu, L. (2021). Does perceived corporate social responsibility motivate hotel employees to voice? The role of felt obligation and positive emotions. *Journal of Hospitality and Tourism Management*, 48, 182–190. <https://doi.org/10.1016/j.jhtm.2021.06.006>
- Llach, J., Perramon, J., Alonso-Almeida, M., & Bagur-Femenías, L. (2013). Joint impact of quality and environmental practices on firm performance in small service businesses: An empirical study of restaurants. *Journal of Cleaner Production*, 44, 96–104. <https://doi.org/10.1016/j.jclepro.2012.10.046>
- Lohmann, P. M., Gsottbauer, E., Doherty, A., & Kontoleon, A. (2022). Do carbon footprint labels promote climatarian diets? Evidence from a large-scale field experiment. *Journal of Environmental Economics and Management*, 114, 102693. <https://doi.org/10.1016/j.jeem.2022.102693>
- Lorenz, B., & Langen, N. (2018). Determinants of how individuals choose, eat and waste: Providing common ground to enhance sustainable food consumption out-of-home. *International Journal of Consumer Studies*, 42(1), 35–75. <https://doi.org/10.1111/ijcs.12392>
- Lub, X. D., Rijnders, R., Caceres, L. N., & Bosman, J. (2015). The future of hotels: The lifestyle Hub. A design thinking approach for developing future hospitality concepts. *Journal of Vacation Marketing*, 22(3), 249–264. <https://doi.org/10.1177/1356766715623829>
- Madanaguli, A., Dhir, A., Kaur, P., Srivastava, S., & Singh, G. (2022). Environmental sustainability in restaurants. A systematic review and future research agenda on restaurant adoption of green practices. *Scandinavian Journal of Hospitality and Tourism*, 22(4-5), 303–330. <https://doi.org/10.1080/15022250.2022.2134203>
- Mak, A., & Chang, R. (2019). The driving and restraining forces for environmental strategy adoption in the hotel industry: A force field analysis approach. *Tourism Management*, 73(1), 48–60. <https://doi.org/10.1016/j.tourman.2019.01.012>
- Mason, P., Augustyn, M., & Seakhoa-King, A. (2010). Exploratory study in tourism: Designing an initial, qualitative phase of sequenced, mixed methods research. *International Journal of Tourism Research*, 12(5), 432–448. <https://doi.org/10.1002/jtr.763>
- Merle, A., Herault-Fournier, C., & Werle, C. O. C. (2016). The effects of indication of local geographical origin on food perceptions. *Recherche et Applications en Marketing*, 31(1), 26–42. <https://doi.org/10.1177/2051570715626367>
- Miao, L., & Wei, W. (2013). Consumers' pro-environmental behavior and the underlying motivations: A comparison between household and hotel settings. *International Journal of Hospitality Management*, 32, 102–112. <https://doi.org/10.1016/j.ijhm.2012.04.008>
- Miller, C. (2018). Local economies on their minds: Explaining European preferences for geographic origin food labels. *International Social Science Review*, 94(1), 1–23. <https://www.jstor.org/stable/90020979>
- Moran, D., Wood, R., Hertwich, E., Mattson, K., Rodriguez, J. F. D., Schanes, K., & Barrett, J. (2020). Quantifying the potential for consumer-oriented policy to reduce European and foreign carbon emissions. *Climate Policy*, 20(sup1), S28–S38. <https://doi.org/10.1080/14693062.2018.1551186>
- Namkung, J., & Jang, S. (2013). Effects of restaurant green practices on brand equity formation: Do green practices really matter? *International Journal of Hospitality Management*, 33(1), 85–95. <https://doi.org/10.1016/j.ijhm.2012.06.006>
- Nekmahmud, M., Ramkissoon, H., & Fekete-Farkas, M. (2022). Green Purchase and Sustainable Consumption: A comparative study between European and non-European tourists. *Tourism Management Perspectives*, 43, 100980. <https://doi.org/10.1016/j.tmp.2022.100980>

- Ngan, H. F. B., Bavik, A., Kuo, C. F., & Yu, C. E. (2022). Where you look depends on what you are willing to afford: Eye tracking in menus. *Journal of Hospitality & Tourism Research*, 46(1), 100–124. <https://doi.org/10.1177/1096348020951226>
- Niva, M., - Mäkelä, J., Kahma, N., & Kjærnes, U. (2014). Eating sustainably? Practices and background factors of ecological food consumption in four nordic countries. *Journal of Consumer Policy*, 37(4), 465–484. <https://doi.org/10.1007/s10603-014-9270-4>
- Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, 16(1), <https://doi.org/10.1177/1609406917733847>
- Owen, H. (1995). *Tales from open space*. Abott Publishing.
- Panzone, L. A., Sniehotta, F. F., Comber, R., & Lemke, F. (2020). The effect of traffic-light labels and time pressure on estimating kilocalories and carbon footprint of food. *Appetite*, 155, 104794. <https://doi.org/10.1016/j.appet.2020.104794>
- Peters, K., & Remaud, P. (2020). Factors influencing consumer menu-item selection in a restaurant context. *Food Quality and Preference*, 82, 103887. <https://doi.org/10.1016/j.foodqual.2020.103887>
- Phi, G. T., & Waldesten, T. (2021). Educating sustainability through hackathons in the hospitality industry: A case study of Scandic hotels. *Scandinavian Journal of Hospitality and Tourism*, 21(2), 212–228. <https://doi.org/10.1080/15022250.2021.1879669>
- Poore, J., & Nemecek, T. (2018). Reducing food's environmental impacts through producers and consumers. *Science*, 360(6392), 987–992. <https://doi.org/10.1126/science.aag0216>
- Post, A., & Mikkola, M. (2012). Nordic stakeholders in catering for sustainability: Chasm between ideology and practice? *British Food Journal*, 114(5), 743–761. <https://doi.org/10.1108/00070701211230015>
- Pratt, S., Mackenzie, M., & Lockwood Sutton, J. (2017). Food miles and food choices: The case of an upscale urban hotel in Hong Kong. *Journal of Sustainable Tourism*, 25(6), 779–795. <https://doi.org/10.1080/09669582.2016.1247848>
- Reinholdsson, T., Hedesström, M., Ejelöv, E., Hansla, A., Bergquist, M., Svenfelt, Å., & Nilsson, A. (2023). Nudging green food: The effects of a hedonic cue, menu position, a warm-glow cue, and a descriptive norm. *Journal of Consumer Behaviour*, 22(3), 557–568. <https://doi.org/10.1002/cb.2129>
- Richter, I., Thøgersen, J., & Klöckner, C. (2018). A social norms intervention going wrong: Boomerang effects from descriptive norms information. *Sustainability*, 10(8), 2848. <https://doi.org/10.3390/su10082848>
- Røkenes, A. (2007). Price differences at European restaurants and possible implications for tourism. *Scandinavian Journal of Hospitality and Tourism*, 7(2), 81–103. <https://doi.org/10.1080/15022250701374426>
- Rondoni, A., & Grasso, S. (2021). Consumers behaviour towards carbon footprint labels on food: A review of the literature and discussion of industry implications. *Journal of Cleaner Production*, 301, 127031. <https://doi.org/10.1016/j.jclepro.2021.127031>
- Röös, E., & Tjärnemo, H. (2011). Challenges of carbon labelling of food products: A consumer research perspective. *British Food Journal*, 113(8), 982–996. <https://doi.org/10.1108/00070701111153742>
- Schubert, F., Kandampully, J., Solnet, D., & Kralj, A. (2010). Exploring consumer perceptions of green restaurants in the US. *Tourism and Hospitality Research*, 10(4), 286–300. <https://doi.org/10.1057/thr.2010.17>
- Shin, Y., Im, J., Jung, S., & Severt, K. (2019). Motivations behind consumers' organic menu choices: The role of environmental concern, social value, and health consciousness. *Journal of Quality Assurance in Hospitality & Tourism*, 20(1), 107–122. <https://doi.org/10.1080/1528008X.2018.1483288>
- Sirieux, L., Delanchy, M., Remaud, H., Zepeda, L., & Gurviez, P. (2013). Consumers' perceptions of individual and combined sustainable food labels: A UK pilot investigation. *International Journal of Consumer Studies*, 37(2), 143–151. <https://doi.org/10.1111/j.1470-6431.2012.01109.x>
- Slapø, H. B., & Karevold, K. I. (2019). Simple eco-labels to nudge customers toward the most environmentally friendly warm dishes: An empirical study in a cafeteria setting. *Frontiers in Sustainable Food Systems*, 3, 1–9. <https://doi.org/10.3389/fsufs.2019.00040>
- Spaargaren, G., van Koppen, C. S. A., Janssen, A. M., Hendriksen, A., & Kolfschoten, C. J. (2013). Consumer responses to the carbon labelling of food: A real life experiment in a canteen practice. *Sociologia Ruralis*, 53(4), 432–453. <https://doi.org/10.1111/soru.12009>

- Thaler, R., & Sunstein, C. (2008). *Nudge: Improving decisions about health, wealth and happiness*. Yale University Press.
- Thøgersen, J. (2021). Consumer behaviour and climate change: Consumers need considerable assistance. *Current Opinion in Behavioral Sciences*, 42, 9–14. <https://doi.org/10.1016/j.cobeha.2021.02.008>
- Thomas, R., & Ormerod, N. (2017). The (almost) imperceptible impact of tourism research on policy and practice. *Tourism Management*, 62, 379–389. <https://doi.org/10.1016/j.tourman.2017.02.009>
- Thomlinson, E. (2018). Experimental research in tourism: Examining changes to destination perception with film-induced tourism. In R. Nunkoo (Ed.), *Handbook of research methods for tourism and hospitality management* (pp. 317–326). Edward Elgar Publishing. <https://doi.org/10.4337/9781785366284.00034>
- Thunström, L., & Nordström, J. (2011). Does easily accessible nutritional labelling increase consumption of healthy meals away from home? A field experiment measuring the impact of a point-of-purchase healthy symbol on lunch sales. *Food Economics - Acta Agriculturae Scandinavica, Section C*, 8, 200–207. <https://doi.org/10.1080/16507541.2012.678582>
- Thunström, L., Nordström, J., Shogren, J. F., Ehmke, M., & Van't Veld, K. (2016). Strategic self-ignorance. *Journal of Risk and Uncertainty*, 52(2), 117–136. <https://doi.org/10.1007/s11166-016-9236-9>
- Thunström, L., Van't Veld, K., Shogren, J. F., & Nordström, J. (2014). On strategic ignorance of environmental harm and social norms. *Revue d'économie Politique*, 124(2), 195–214. <https://doi.org/10.3917/redp.242.0195>
- Tölkes, C. (2020). The role of sustainability communication in the attitude – behaviour gap of sustainable tourism. *Tourism and Hospitality Research*, 20(1), 117–128. <https://doi.org/10.1177/1467358418820085>
- Tribe, J. (1997). The indiscipline of tourism. *Annals of Tourism Research*, 24(3), 638–657. [https://doi.org/10.1016/S0160-7383\(97\)00020-0](https://doi.org/10.1016/S0160-7383(97)00020-0)
- United Nations Environment Programme (UNEP). (2020). *Consumer information tools and climate change facilitating low-carbon choices in tourism, buildings and food systems*. https://www.oneplanetnetwork.org/sites/default/files/consumer_information_tools_and_climate_change.pdf.
- Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, 68(1), 1–17. <https://doi.org/10.1509/jmkg.68.1.1.24036>
- Volgger, M., Cozzio, C., & Taplin, R. (2021). What drives persuasion to choose healthy and ecological food at hotel buffets: Message, receiver or sender? *Asia Pacific Journal of Marketing and Logistics*, 34(5), 865–886. <https://doi.org/10.1108/APJML-01-2021-0016>

Appendices

Appendix 1: Workshop 2 Questions

Restaurant

- What restaurant?
- How many seats does it have? How many seats per table?
- What is the usual turnover?

Menu

- How many menu items are there?
- How often do they change the menu?
- Is it possible to implement a treatment every second week?
- What foods do they focus on (e.g. different meats, veg-fish-meat, meals with many or few components, local food)?
- Is the menu also available online and/or via QR codes?
- What are the prices of menu items?

Consumers

- What is usually the external vs hotel guest ratio?
- Is it possible to link tables to guest records i.e. do guests charge back to the room?
- Is it possible to send follow up surveys via email?
- What do they know about their customer segment(s)? e.g. families, business guests,

Other practicalities

- How often does the staff change?
- Is it possible to record dietary requirements in the kitchen system?
- Is the serving style always the same?
- How are the tables and staff organized?

Labels

- Is it possible to label three items (low, medium, high carbon footprint)?
- What is possible design wise? (e.g. how big can it be, can colours be included etc.)
- How much detail should be included in the label?
- How can we include an explanation of the labels? e.g. on the menu, posters, table cards.
- Do they know of a carbon calculator that many other restaurants use/they have used?

Appendix 2: Workshop Photos and Padlet Boards

Workshop Photos



Workshop 1 Padlet Board (Translated)

To "Boost" sustainable food & drink choices

Summary Workshop 20 Oct 2021, Särens Högfjällshotell

Theme 1: Trends, sustainability, values

Demand

- Anonymous 3yr**
How do you know the guests' needs/demands?
- Anonymous 3yr**
Watered: Record guests' purchasing behavior. The guest, do we know what they also over the years?
- Anonymous 3yr**
Tasting menu. Can you go back to the way things were before?

Health

- Anonymous 3yr**
Health data: E.g. Protein, Carbohydrate

Sustainability

Sustainability data type: "This right reduces climate footprint by X%"

- Anonymous 3yr**
Supplier's goods

Market advantage?

- Anonymous 3yr**
Is the guest willing to pay for the environmental label?
- Anonymous 3yr**
Knowledge of drinks - how to convey?

Ecological

Is Argentinian organic honey better than Swedish organic honey?
Climate footprint

- Anonymous 3yr**
What does Eko mean in each country?
- Anonymous 3yr**
Dare to control guest. Is the guest always right?

Trends

How do we monitor the trend?

- Anonymous 3yr**
Health
- Anonymous 3yr**
Animal rights
- Anonymous 3yr**
Environmental impact
- Anonymous 3yr**
Emotionality

Theme 2: The staff and the guest

Awareness

- Anonymous 3yr**
Important! That we know what we are doing and are sure of our cause!
- Anonymous 3yr**
Provide knowledge to staff about our various resources and what they are for
- Anonymous 3yr**
Update staff on Sustainability how we are working and how we are progressing or what needs to be prepared
- Anonymous 3yr**
Information about our raw materials, where
- Anonymous 3yr**
Not too hard
- Anonymous 3yr**
Questionable: Don't be afraid to question if there's something you don't agree with/ don't understand
- Anonymous 3yr**
Live like you learn! Stand straight. The staff accommodate: Everyone sorts at work, but outside?

Involve the guest

- Anonymous 3yr**
When serving, ask the guest about our organic products
- Anonymous 3yr**
Information video on social media. What happens to the waste? View composter
- Anonymous 3yr**
Food handling: Education, knowledge
- Anonymous 3yr**
Enthusiasm
- Anonymous 3yr**
Knowledge of what we work with
- Anonymous 3yr**
Bring up & capture interest
- Anonymous 3yr**
Involve the guests in our work. Encouragement
- Anonymous 3yr**
Use of social media
- Anonymous 3yr**
See the positive in food still on the plate -> compost -> new soil to grow with -> food on the plate again :)

Transport

- Anonymous 3yr**
Personnel - Transport in Sälen, Till The seat
- Anonymous 3yr**
Fast charging from electric cars
- Anonymous 3yr**
Transport for the guest: How do they get here?
- Anonymous 3yr**
Availability for carpooling

Theme 3: Resources, consumption, routines:

Digitization

- Anonymous 3yr**
Digitize paper handling via our systems
- Anonymous 3yr**
Economy
- Anonymous 3yr**
Away with key cards and pointers in front of digital read hotels/Lght
- Anonymous 3yr**
Less paper
- Anonymous 3yr**
Remove physical bongs and reduce paper consumption
- Anonymous 3yr**
The possibility of a digital receipt such as Kiva

Consumption

- Anonymous 3yr**
Financial question longevity, the years payment period

Energy/ burned/consumption

- Anonymous 3yr**
Handling of compost machine
- Anonymous 3yr**
Less water use
- Anonymous 3yr**
Induction hob
- Anonymous 3yr**
Use of a digital lighting system
- Anonymous 3yr**
Energy-saving equipment
- Anonymous 3yr**
Company cars are changed to electric cars
- Anonymous 3yr**
Less/fewer transports

Consumption

- Anonymous 3yr**
- Packaging Goods
- Anonymous 3yr**
Sorting at the hotel: Simple
- Anonymous 3yr**
Disposable packaging: Take remove/reduce
- Anonymous 3yr**
Sorting at the hotel: Simple
- Anonymous 3yr**
Disposable packaging: Take remove/reduce
- Anonymous 3yr**
composted

Theme 4: Food and vision

Food waste

- Anonymous 3yr**
Pre-order = reduce food waste
- Anonymous 3yr**
Pre-cook food for breakfast
- Anonymous 3yr**
Portion sizes vs waste
- Anonymous 3yr**
Smaller plates
- Anonymous 3yr**
Smaller menu adapted to the restaurant
- Anonymous 3yr**
Less supply
- Anonymous 3yr**
Get information about what offered at the restaurant to avoid misunderstandings. For example, at lunchtime, the old farm is a waffle house
- Anonymous 3yr**
Clear recipes
- Anonymous 3yr**
Making use of all the products in the kitchen can create a lunch for the day for example
- Anonymous 3yr**
Composting
- Anonymous 3yr**
Nutrient-enriched soil for farmers
- Anonymous 3yr**
Gas vaccmaskin
- Anonymous 3yr**
Not buffet

Seasonal food

- Anonymous 3yr**
Company culture
- Anonymous 3yr**
Own grown herbs/salad, locally grown products
- Anonymous 3yr**
Locally grown
- Anonymous 3yr**
Collaborate with local farmers and butchers
- Anonymous 3yr**
More green, less protein

Long term

- Anonymous 3yr**
It may not give anything today or tomorrow but in 1-2 years what will happen when?
- Anonymous 3yr**
Reducing the encouragement to overconsumption gives in the long run to better quality of life
- Anonymous 3yr**
To have a vision but to reduce it to smaller goals and work step by step

Workshop 2 Padlet Board (Translated)

Experiment: To "Boost" sustainable food & drink choices
 Summary Workshop 9 Feb 2022, Sälen's Högfjällshotel

Food waste 1

Anonymous 3yr
Can we grow with the soil from the composter?

Mark out or inform about the composter. Example of the TV sets inside the hotel.

+ Add comment

New menu 5

Anonymous 3yr
Pop-up menu: More free

Anonymous 3yr
3-course entree menu: Super climate smart

Anonymous 3yr
Today's climate-smart dish?

Anonymous 3yr
Burger of the week: Super eco burger

Anonymous 3yr
Lefles: Beyond burgers

+ Add comment

Local food

Why climate smart: shorter transportation

+ Add comment

Label

Anonymous 3yr
Oysters, children's menu same course but & without Eco/climate

Anonymous 3yr
E.g.
2 oysters: Sweden, France
Oysters: 1.60sec
Oyster climate smart: 2.80 sec

Meatballs (Beef)
Meatballs Climate smart

Anonymous 3yr
How do you calculate CO2 emissions?
Climate

Explain carbon labeling

+ Add comment

Data collection 2

Anonymous 3yr The experiment: Needs to be logically measurable

-Food orders before and after

Guest survey?

Anonymous 3yr
Gluten, Lactose no problem

+ Add comment

Restaurant 2

Anonymous 3yr
TB Grill room

Anonymous 3yr
Lefles hamburger

+ Add comment

Time 1

Anonymous 3yr
V. 8-9 (Sportslov)

+ Add comment

Wine 2

Anonymous 3yr
Comparing an eco-labelled and an unlabelled wine price difference

Anonymous 3yr
Klimatsmart bottle!

+ Add comment

Guests 2

Anonymous 3yr
Complaining Customers

Anonymous 3yr
Don't want to come to a restaurant and feel bad about your choice of food

+ Add comment

Personal 1

Anonymous 3yr
Knowledge of service personnel. They must know the difference between the dishes

+ Add comment

Appendix 3: Climate Data Klimato

The carbon footprint calculator used in this study allows to calculate the climate impact of the food by feeding information about the country of origin, ingredients, and production method. Information about the data and methodology can be found here:

The Climate Data | Carbon footprint of food | Klimato

Appendix 4

Table A1. Orders of the dishes (Control 1 vs. Treatment).

Product	CO ₂ e	Number total orders		Percentage of orders		Difference percentage units
		Control 1	Treatment	Contro 1	Treatment	
Burger		245	263	46	42	-4
Big Summer Leffe triple	10	7	13	1	2	1
Big Summer Leffe double	8.2	96	90	18	14	-4
Big Summer Leffe plain	4.2	124	147	23	23	0
Beyond	0.3	18	13	3	2	-1
Pizza		287	365	54	58	4
Ronja	3.8	32	39	6	6	0
Clüwer	2.9	103	144	19	23	4
Capricciosa	2.7	59	89	11	14	3
Maggan	2.6	55	69	10	11	1
Veggie	1.2	38	24	7	4	-3
Total		531	628	100	100	