

Research Paper

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Consumers' associations, knowledge, and willingness to pay for products from traditional orchard meadows

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Abstract

Traditional cultural landscapes play an important role in providing environmental, economic, social, and cultural values. These sustainable landscapes originate from extensive agricultural activities and need regular maintenance for preservation. They often lack economic viability and are threatened by the huge pressure of agricultural intensification. This study follows the idea of a market-based way of compensation for the cultivation of multifunctional agricultural landscapes by marketing the products of these landscapes. In order to increase consumer demand for products from traditional cultural landscapes, this article aims to identify appropriate communication measures by assessing consumers' associations and knowledge of juice from orchard meadows (OM). Willingness to pay (WTP) was measured by using the contingent valuation method. The results show that specific product attributes of products from traditional cultural landscapes result in an additional WTP of consumers. In communication of a traditional cultural landscape product like OM juice, it is important to highlight especially three product attributes to consumers: the local origin, the environmentally friendly and organic production, and the naturalness of the landscape.

Introduction

Traditional cultural landscapes have great importance in providing environmental, economic, social, and cultural services for human and are a sustainable way of food production (Bieling, Eser and Plieninger, 2020; Moreno et al., 2018; Plieninger et al., 2019; Tieskens et al., 2017). These landscapes originate from different forms of agricultural activities and are characterized by a traditional knowledge of cultivation and a low level of external input. Due to low yields of varying product quality, they usually lack economic viability and competitiveness compared to more intensive agricultural systems (Fischer, Hartel and Kuemmerle, 2012; García-Martín et al., 2022; Tieskens et al., 2017).

Orchard meadows (OM) are one example of traditional cultural landscapes and represent the traditional form of tree fruit production in central Europe (Forejt and Syrbe, 2019; Herzog, 1998; Špulerová et al., 2015). It is estimated that approximately 617,500 acre of OM in Germany and 3.7 million acres in Europe exist (NABU, 2018). Large areas of OM can be found in Southern and Central Germany, Austria, and the western Carpathians (Forejt and Syrbe, 2019). Baden-Württemberg, the south-western federal state of Germany, is particularly rich in OM trees. A total of 7.1 million trees, corresponding to approximately 89,000 hectares, has been reported (Borngräber, Krismann and Schmieder, 2020). The share of OM on all fruit tree plantations in Central Europe is estimated to be between 12.6% in Poland and more than 50% in Germany and Austria (Forejt and Syrbe, 2019).

As an agroforestry system, OM typically combines fruit tree growing with permanent pasture or, in rare cases, with arable land. Large-crowned fruit trees with only 20–100 trees per hectare are typical for OM. They are mostly high-trunked, strong-growing, and of different ages and sizes, as well as of different fruit varieties and species (Herzog, 1998; Herzog and Oetmann, 2001). As multifunctional agricultural landscapes, OM provide many different ecosystem services, such as genetic diversity, soil protection, and microclimate regulation (Forejt and Syrbe, 2019; Herzog, 1998; Horak et al., 2013; Špulerová et al., 2015; Zander, 2003). The cultivation of OM is largely practiced in a way that fulfils the standards of organic farming, for example, without the use of synthetic pesticides and fertilizers. However, many farmers and OM associations avoid the effort and costs associated with organic certification (NABU, 2018). OM fruit provides raw material for juice, cider, and dried fruit production, used by the fruit juice industry and local OM associations, farms, and cideries (Tojanko et al., 2011).

Economic factors, such as low profitability and high opportunity costs, create incentives to convert OM into more intensive land uses, which require less labor and have lower production costs (Borngräber, Krismann and Schmieder, 2020; Forejt and Syrbe, 2019; Plieninger et al., 2015; Špulerová et al., 2015). Aging orchard farmers and a lack of generational succession, coupled with

rural depopulation and declining agricultural interest, are leading to poorly maintained OM (Borngräber, Krismann and Schmieder, 2020; Forejt and Syrbe, 2019; Špulerová et al., 2015), and the OM area is significantly declining (Borngräber, Krismann and Schmieder, 2020; Dorresteyn et al., 2015; Forejt and Syrbe, 2019; Plieninger et al., 2015; Špulerová et al., 2015; Tojnko et al., 2011). In Baden-Württemberg, for example, there was a decline of 17% of OM trees in only 10 years, between 2008 and 2018 (Borngräber, Krismann and Schmieder, 2020).

In line with other traditional agricultural systems, OM offer numerous external benefits. These include enhanced biodiversity, carbon sequestration, and the preservation of cultural landscapes and local heritage. These benefits demonstrably exceed those provided by intensive land management practices. Therefore, long-term conservation of OM systems requires financial incentives for farmers. These incentives can take the form of public subsidies which directly compensate farmers for the ecosystem services they provide. Alternatively, market-based mechanisms, such as premiums on OM-derived products, can create a sustainable economic model (Forejt and Syrbe, 2019; Herzog, 1998; Plieninger et al., 2013; Schaich, Bieling and Plieninger, 2010; Tojnko et al., 2011; Wolpert, Quintas-Soriano and Plieninger, 2020).

A precondition for remuneration via markets is consumer interest in buying and their willingness to pay (WTP) higher prices for products from these landscapes. Consumers need to appreciate the specific product attributes, which refer to process characteristics such as traditional agricultural production, less or no use of pesticides, or minimal processing of, for example, fruit juice (Escribano, Gaspar and Mesias, 2020; Philipp and Zander, 2023). In marketing, these process characteristics are referred to as added value. Added values are the intangible qualities of a product or service that provide extra benefits to consumers. The benefits can arise from attributes like origin from specific production systems, which generate positive external impacts, such as environmental protection or support of local communities. When consumers deliberately base their purchasing decisions on these added values, it is termed ethical consumer behavior (Carrington, Neville and Whitwell, 2014; Zander, Stolz and Hamm, 2013). An example where positive external effects of production are at least partly internalized and remunerated to farmers is organic food. Consumers are willing to pay higher prices for the added values, such as environmental protection (Katt and Meixner, 2020; Lee and Hwang, 2016; Li and Kallas, 2021).

According to the qualitative research by Philipp and Zander (2023), many consumers have a positive connotation of OM, even though they do not exactly know which properties are typical for the OM system and its products. Naturalness, intense taste, local origin, and biodiversity preservation are ethical product attributes appreciated by German consumers (Philipp and Zander, 2023).

To the best of the authors' knowledge, based on several literature searches using various combinations of relevant terms, no quantitative research specifically on consumers' associations, knowledge, and their WTP for products from OM exists. Against this background, and in order to increase consumer demand for products from traditional cultural landscapes, this study aims to identify the aspects particularly important in the communication of traditional cultural landscapes and the products to consumers by analyzing consumers' associations, knowledge, and WTP. This helps to identify appropriate communication measures for products from traditional cultural landscapes. The following main research questions are addressed:

- What do consumers associate with and know about OM?
- What is consumers' WTP for OM juice?
- How should OM juice be communicated to consumers?

This article is structured in five sections. Following the introduction, the 'Theoretical background' section explores previous findings on ethical consumer behavior. This serves as a basis for the analytical framework of this study. The 'Methods' section describes the quantitative study design with the contingent valuation method (CVM) for analyzing consumers' WTP, the questionnaire, and the sample. Results on consumers' associations with and knowledge about OM, as well as WTP for OM juice, are described in the 'Results' section. The article closes with a discussion and conclusions on the communication of traditional landscape products in the 'Discussion and conclusion' section.

Theoretical background

Ethical consumerism refers to a consumption behavior that takes ethical or moral considerations into account when making buying decisions. Previous studies indicate that there are consumer segments that are guided by various ethical motives (e.g., environmental and social) when purchasing products and that ethical consumerism is also gaining importance in food purchases (Carrington, Neville and Whitwell, 2014; Miele and Evans, 2010; Newholm and Shaw, 2007; Untarini, 2020; Vermeir and Verbeke, 2006).

Several theoretical concepts exist to explain and predict (ethical) consumers' buying behavior and can provide insights into drivers of purchasing products from traditional cultural landscapes such as OM. They all have in common that individual internal processes and constructs, such as preferences, knowledge, attitudes, perceptions, involvement, learning, intentions, valuations, motivations, values, and emotions, may explain consumer behavior (Kroeber-Riel and Gröppel-Klein, 2019; Solomon et al., 2019). Attitudes are relatively enduring, overarching judgements of people, objects, or facts (Solomon et al., 2019). They are of crucial relevance for buying behavior. In this line, environmental attitudes are important drivers of WTP for ethical and sustainable products (Ammann et al., 2023; Barbu et al., 2022; Haws, Winterich and Naylor, 2013; Hueppe and Zander, 2023).

Preferences for local food are increasing and influence the consumption behavior of locally produced food (Hempel and Hamm, 2015; Zander and Feucht, 2018). There are different reasons why consumers are buying local. For example, consumers choose local food because it is seen as more environmentally friendly due to the shorter transportation distances. Furthermore, some consumers want to support the local economy and farmers by purchasing local food (Hasanzade, Elsihewy and Toporowski, 2022) and appreciate that the product represents a local culture (Fernández-Ferrín et al., 2018). Consumers may also prefer local food because they perceive it to be fresher, safer, and healthier than other products (Hempel and Hamm, 2016). With regard to juice from OM, local origin was found to be an important purchasing argument for OM juice (Philipp and Zander, 2023).

Knowledge is one of the preconditions for translating attitudes into behavior. Kollmuss and Agyeman (2002) put knowledge at the top of the list of variables impacting ethical behavior. Without knowing about production processes and product properties and the specific relevance for the individual purchase decision, consumers will not be able to change their buying behavior in favor of ethical products and according to their individual ethical preferences (Carrington, Neville and Whitwell, 2014). Philipp and Zander (2023) have shown that consumers' knowledge about OM led to greater interest in buying OM juice and that the term OM was positively connoted. The positive effect of the landscape's name on consumers' interest in these traditional cultural landscapes'

products was also found for the Spanish ‘Dehesas’, which are another example of traditional cultural landscapes (Escribano, Gaspar and Mesias, 2020; Villanueva et al., 2021).

Higher product involvement is associated with a higher perceived relevance of the product with regard to satisfying individual needs, interests, or values (Solomon et al., 2019). Consumers with higher involvement are supposed to process more information on the product and to become more knowledgeable, so higher involvement often increases knowledge (Zander and Hamm, 2010). In addition, stronger social and cultural ties of consumers with traditional cultural landscapes imply greater knowledge of and higher involvement with products and positively influenced respondents’ WTP (Granado-Díaz, Villanueva and Gómez-Limón, 2022; Villanueva et al., 2021).

According to Román, Sánchez-Siles and Siegrist (2017), naturalness is a crucial component in food choice for many consumers. Different categories of naturalness exist. Naturalness refers to the ways of agricultural production, to the method of processing, and to the final product that consumers purchase (Román, Sánchez-Siles and Siegrist, 2017). Perceived food naturalness goes along with a positive reputation and higher WTP (Berry, Burton and Howlett, 2017). The naturalness of the extensive production system, such as OM, should reflect the naturalness of the product, for example, cloudy direct apple juice that is minimally processed (Borghoff and Strassner, 2023; Philipp and Zander, 2023).

The conceptual model in this study illustrates which independent variables are expected to influence consumer choices and WTP of OM juice (Fig. 1).

Methods

This study consisted of a quantitative online survey that contained two parts: A contingent valuation experiment (CVM) eliciting German respondents’ WTP for orchard meadow (OM) juice was

followed by a questionnaire on psychographic and sociodemographic variables to identify associations, knowledge, and attitudes.

Contingent valuation method and analysis of willingness to pay

Preferences are frequently analyzed by examining consumers’ WTP either by relying on sales data or by asking consumers directly or indirectly. The CVM is a method for measuring consumer preferences and their WTP (Kallas and Gil, 2011). It is often employed not only to estimate the values of nonmarket goods (McFadden, 2017) but also of private goods, for example, food (Ali, Ang and Van Der Fels-Klerx, 2021; Brugarolas Mollá-Bauzá et al., 2005; Zander and Feucht, 2018). The CVM is a direct method in which consumers are directly asked about their individual WTP for specific product attributes. In doing this, consumers focus more strongly on the product value and the budget restrictions than when using choice experiments (Kallas and Gil, 2011). Compared with choice experiments, results from CVM were often presumed to be prone to hypothetical bias. This might result in overestimation of WTP due to the fact that the design is less close to real market situations (List and Gallet, 2001). Comparisons of the results of CVM and choice experiments indicated that this hypothetical bias is not any higher than when using indirect instruments such as choice experiments (Grunert et al., 2009; List and Gallet, 2001; Schmidt and Bijmolt, 2020).

Reliability and validity of CVM results highly depend on the design of the study and on how individuals are asked about their WTP (Boccaletti and Nardella, 2000). To create a realistic purchase situation, WTP questions are typically embedded in a scenario that explains the nature of the surveyed good and the situation of purchasing (McFadden, 2017). The payment card format, as one type of elicitation technique, is widely used in practice. Here, respondents are requested to choose their maximum WTP value from a range of offered WTP values (Kallas and Gil, 2011; Zander and Feucht, 2018).

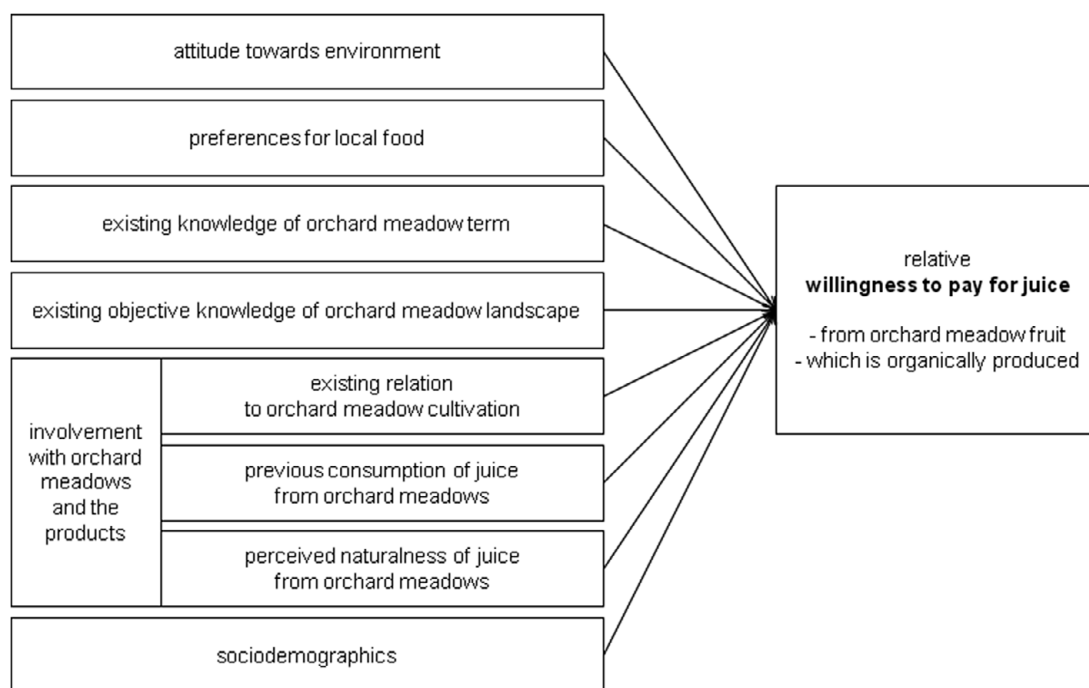


Figure 1. Overview of the analytical framework.

Table 1. Payment scenario of the CVM exercise

Please describe the apple juice that you usually buy:							
I usually buy the following brand: _____ I do not know							
Packaging		Organic production		Cloudiness			
<input type="checkbox"/> Glass bottle		<input type="checkbox"/> Yes		<input type="checkbox"/> Naturally cloudy			
<input type="checkbox"/> Tetrapack		<input type="checkbox"/> No		<input type="checkbox"/> Clear			
<input type="checkbox"/> Others _____				<input type="checkbox"/> I do not know			
<input type="checkbox"/> I do not know							
Bottle size		Type					
<input type="checkbox"/> 0.5 liter		<input type="checkbox"/> Direct juice					
<input type="checkbox"/> 0.75 liter		<input type="checkbox"/> Concentrate					
<input type="checkbox"/> Other size		<input type="checkbox"/> I do not know					
How much do you approximately pay for your apple juice as described above?							

How much would you pay for 1 liter of apple juice with the following characteristics: glass bottle, 100% fruit content, direct juice, and naturally cloudy?							

How much would you be willing to pay on top of this price if this juice also offers the following characteristics?							
	0.00 €/L	0.05 €/L	0.10 €/L	...	1.90 €/L	1.95 €/L	2.00 €/L
Organically produced							
Minimal use of pesticides							
Enhancing biodiversity							
Preserving landscape							
From old fruit varieties							
From orchard meadow fruit							

The contingent valuation scenario of this study is illustrated in Table 1 and involves four questions. First, the respondents were introduced to the CVM experiment by asking for typical characteristics of the apple juice that participants usually buy, such as brand, cloudiness, type, packaging, bottle size, and organic certification. Second, in the following open question, respondents had to give the price they commonly pay for this juice. Third, respondents were asked for a reference price for apple juice with four defined product attributes ‘How much would you pay for 1 liter of apple juice with the following characteristics (glass bottle, 100% fruit

for the different added values allows us to come up with recommendations on how to most effectively communicate the added value of OM juice.

The analyses of the WTP were done with relative numbers (%). This facilitated the consideration of individual reference prices and the explanation of differences in WTP between the tested product attributes.

The relative WTP (%) for OM juice with different additional product attributes was calculated based on the reference price for the defined juice according to Equation (1):

$$\left(\frac{\text{WTP for a defined apple juice} \left(\frac{\text{€}}{\text{L}} \right) + \text{additional WTP for a product attribute} \left(\frac{\text{€}}{\text{L}} \right)}{\text{WTP for defined apple juice} \left(\frac{\text{€}}{\text{L}} \right)} \right) \times 100. \quad (1)$$

content, direct juice, and naturally cloudy)? Fourth, by means of the question ‘How much would you be willing to pay on top of this price if this juice also offered the following characteristics?’ respondents were asked for their additional WTP for selected product attributes. These attributes were chosen based on findings by Philipp and Zander (2023) and on a previous inventory of OM juice in different grocery stores. The response options ranged from 0.00 to 2.00 €/L in 0.05 €/L steps. Participants entered their WTP separately for each product attribute. Comparing consumers’ WTP

When eliciting WTP data, usually there is a peak of frequencies of WTP values at ‘0’ (no WTP). In this study, two binary logistic regression models were calculated to identify the drivers of a positive WTP, independent of the extent of WTP (0/1) (i) for apple juice from OM fruit and (ii) for organically produced juice. The attribute ‘from OM fruit’ was chosen because it is most prominent in the communication of OM juice. ‘Organically produced’ is rather well known in Germany, and consistently ensuring organic certification for OM juice products might be a way for producers to increase demand.

Questionnaire

The questionnaire consisted of several parts in which associations, knowledge, involvement, all in relation to OM, attitudes, preferences, and sociodemographics were queried. Examining respondents' associations with the term OM aimed at getting insights into respondents' perceptions and knowledge of OM, and can give indications as to which information is important in the communication of OM products. The associations were coded using the MAXQDA 11 software. Concept-driven categories based on characteristics of OM described in the literature (e.g., Philipp and Zander, 2023) were completed by data-driven categories (Kuckartz and Rädiker, 2019).

In order to gain a deeper insight into consumers' knowledge of OM, two questions were integrated. First, respondents were asked whether they had heard the term before. The variable 'existing knowledge of OM term' was set to '1' if the respondents agreed. Second, photographs were used to measure objective knowledge of OM (Fig. 2). Participants were asked to select the photographs representing OM from a total of four pictures: two for OM and two for intensive fruit growing. The binary variable 'existing

objective knowledge of OM landscape' was set at '1' when all pictures were correctly assigned. Otherwise, it was set to '0'.

In a further step, several questions were integrated in order to get an understanding of consumers' involvement with OM meadows and the products. First, participants were asked whether they had a relation to OM cultivation, resulting in the variable 'existing relation to OM' (0/1). The second question referred to their 'previous consumption of OM juice' (0/1). Third, participants' perception of the naturalness of OM apple juice was asked by their agreement with the statement 'OM juice is more natural than other juice' in a 7-point scale ('1—fully disagree' and '7—fully agree').

Environmental attitudes were measured with eight items also via a 7-point Likert scale (see Table A1 in the Appendix). The Cronbach alpha was 0.837. A scale on 'attitude toward the environment' was built by calculating the mean of the eight items. For identifying participants' preferences for local food, six statements according to Hempel and Hamm (2015) were measured, also via a 7-point Likert scale. They showed a Cronbach's alpha of 0.820. Finally, socio-demographic data on gender, age, income, and place of residence (federal state) were elicited.

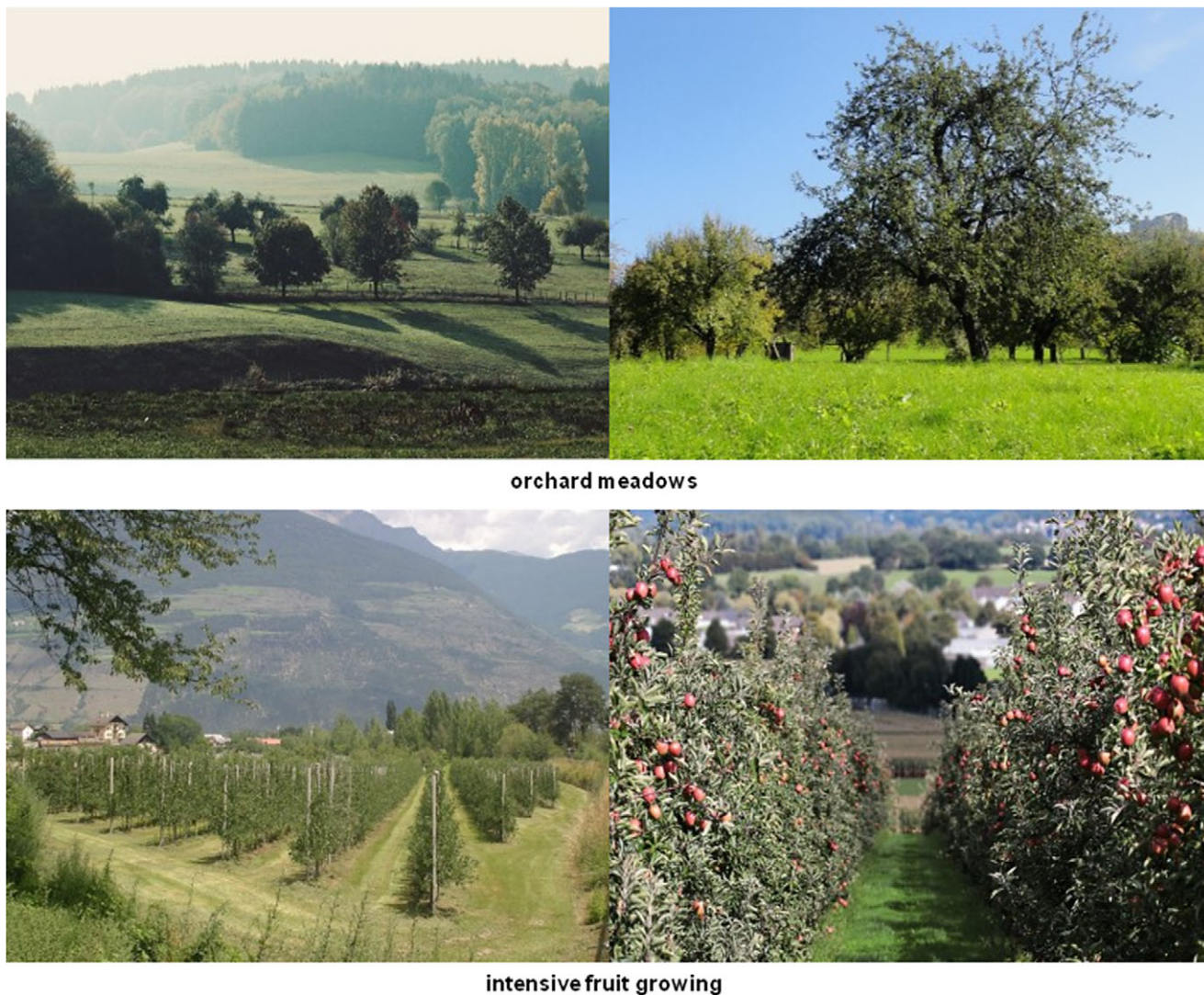


Figure 2. Elicitation of objective knowledge of the participants regarding orchard meadows in comparison with intensive fruit growing by typical pictures of the systems. *Photo Source:* Hospiz- und Palliativverband Baden-Württemberg, Katrin Zander, Pixabay (Dieter Ludwig Scharnagl), Pixabay.

Table 2. Sociodemographic characteristics of the participants in the final sample ($N = 963$)

		% of the participants	% of German population ¹
Gender	Women	59	51
	Men	41	49
Age (years) • Mean: 47 years	18–24	4	13
	25–34	18	17
	35–44	22	17
	45–54	24	18
	55–64	22	21
	65–74	11	15
Income (Euro/month)	<1.300	13	13
Household net	1.300 to <2.600	30	30
income per month	2.600 to <3.600	26	18
	3.600 to <5.000	22	17
	>5.000	9	22

¹Figures for gender and age are from 2022; figures for income are from 2018.

Sample description

The survey was performed online in November 2022 in Germany. A private online access panel was used for purposive quota sampling. Participants were selected to represent the German population in terms of age and place of residence. Quotas were set for gender relations (at least one-third men), considering that even today, more women than men are responsible for shopping (Max Rubner-Institut, 2008). Respondents had to drink apple juice at least occasionally.

The survey was pretested with 45 participants to improve clarity and understanding of the questionnaire before conducting the main survey with 1,524 respondents. After data cleaning and the exclusion of several cases due to overly rapid completion of the total survey, straightlining (no answer variance in the questionnaire), and uncompleted data, the final sample consisted of 963 consumers (Table 2). In the final data set, young people from 18 to 24 years are under-represented compared to the general German population. The highest income category (>5.000 €/month net household income) was also under-represented (Ziebach et al., 2022).

Results

Orchard meadows and their products: consumers' associations, knowledge, and involvement

The starting point was to get to know respondents' free associations with OM. This allows to gain an initial insight into how consumers perceive OM. Most frequent association was a tree or fruit trees (29%). The second most frequent association was 'naturalness' stated by 26% of the respondents. Naturalness was associated with a more natural form of fruit cultivation. Several participants perceived OM as a system that is without human influence. This was evident by associations like that there is no general or agricultural use ('trees are not purposely planted') and wilderness ('fruit trees growing wild'). This notion goes hand in hand with the assumption that there is open access to the fruit for all people ('fruit is free to use') and people are allowed to pick fruit. Only 2% of the respondents associated any food product, such as juice with the term OM.

Participants' knowledge of the term OM was elicited by asking if they had heard the term before. Seventy-six percent of the respondents

have heard the OM before. By presenting several photographs, some with OM and some with intensive fruit plantations, objective knowledge of OM landscape was assessed. Only 27% were able to correctly assign the different photographs to OM landscape or intensive fruit orcharding (see Fig. 2).

In order to get an understanding of consumers' involvement with OM and the products, their personal relationship, OM juice consumption, and perceived naturalness of the juice were elicited. Eighteen percent of the respondents stated that they had a personal relation to OM, for example, by cultivating their own plots or helping family or friends with their OM plots. Forty percent of the respondents stated that they previously had consumed OM juice, whereas 41% were not sure about it. Regarding OM juice, 58% of the respondents perceived it as more natural than other juices.

Willingness to pay for OM juice

In order to better understand which ethical product attributes may induce an additional WTP and should be prioritized in communication, several product attributes of OM fruit juice were selected and tested (Table 3). The WTP is given in relation to the reference price stated by each participant for a defined apple juice (glass bottle, 100% fruit content, direct juice, naturally cloudy; mean = 1.90 €/l; 100%) (for the calculation, see the 'Contingent valuation method and analysis of willingness to pay' section).

For all respondents, WTP for 'organically produced' and 'minimal use of pesticides' was significantly higher than for juice that was explicitly declared 'with OM fruit'. Seventy percent of the respondents were willing to pay a higher price for these two attributes. The lowest share of respondents (48%) was willing to pay more for juice from OM fruit. However, the average amount of additional WTP (15%–17%) for the respondents willing to pay more did not vary significantly between the different product attributes.

Table 3. Average relative willingness to pay (WTP) for different product attributes compared to reference price (100%) of all respondents ($N = 963$) and respondents with WTP > 100%

	All respondents ($N = 963$)	WTP > 100%	
	Ø WTP (%) ¹	% of respondents of all respondents	Ø WTP (%) ²
Organically produced	112 ^a	70	117 ^a
Minimal use of pesticides	112 ^{ab}	70	116 ^a
Enhancing biodiversity	110 ^{abc}	66	115 ^a
Preserving landscape	109 ^{bc}	58	116 ^a
From old fruit varieties	109 ^c	53	117 ^a
From orchard meadow fruit	108 ^c	48	116 ^a

Note: Superscript lowercase letters ('a', 'b', and 'c') indicate homogeneous groups among the mean relative WTP values for different product attributes within each column. Product attributes sharing the same letter within a column do not differ statistically significantly from each other ($p < 0.05$). Conversely, product attributes with different letters in the same column are statistically significantly different ($p < 0.05$).

¹ANOVA between the Ø WTP (%) for the different product attributes of all respondents: ($F(5,5772) = 7.095$, $p < 0.000$).

²ANOVA between the Ø WTP (%) for the different product attributes of respondents with WTP > 100%: ($F(5,412) = p = 0.841$).

Table 4. Influencing variables on the existence of additional willingness to pay for juice that is organically produced or from orchard meadow fruit

	Organically produced			From OM fruit		
	B		Exp(B)	B		Exp(B)
Attitude toward environment (metric, high values = positive attitude)	.531	<.001	1.701	.147	.095	1.158
Preference for local food (metric, high values = high preference)	.259	.005	1.295	.297	<.001	1.346
Stated price for defined apple juice (metric)	.393	.004	1.481	.253	.024	1.288
Existing knowledge of OM term (0 = term not heard before; 1 = term heard before)	-.088	.649	.915	.005	.975	1.005
Existing objective knowledge of OM landscape (0 = no knowledge existing; 1 = knowledge existing)	.002	.993	1.002	-.288	.077	.749
Existing relation to OM cultivation (0 = no; 1 = yes)	.219	.367	1.245	.606	.003	1.833
Previous consumption of OM juice (0 = not consumed yet; 1 = already consumed)	.157	.419	1.170	.385	.022	1.469
Perceived naturalness of OM juice (metric)	.115	.036	1.122	.146	.004	1.157
Age (years)	-.023	<.001	.977	-.019	<.001	.982
Gender (0 = male, 1 = female)	.045	.778	1.046	-.145	.316	.865
Income (€/month; <1.300 = reference)		.719			.714	
1.300 ≤ 2.600	.185	.470	1.203	-.054	.815	.947
2.600 ≤ 3.600	.094	.719	1.099	-.064	.789	.938
3.600 ≤ 5.000	-.111	.686	.895	-.230	.356	.794
>5.000	.175	.625	1.192	.145	.641	1.156
Constant	-3.005	<.001	.047	-2.583	<.001	.076
Nagelkerke's R^2		.236			.177	

Note: Dependent variable: additional WTP for juice (WTP > 100%) compared to reference price for defined apple juice = 100%. Reference category: no additional WTP (WTP = 100%) compared to reference price for defined apple juice = 100%. B: parameter estimates; Exp(B): odds.

In order to further explain relative WTP OM juice, two binary logistic regression models were calculated (Table 4) using the product attributes with the highest (organically produced) and lowest shares (from OM juice) of respondents showing additional WTP (see Table 3). The dependent variable of both binary logistic regressions was the existence of a relative WTP for juice labeled as 'from OM' or 'organically produced'. Independent variables were included in line with the theoretical considerations and the model presented above (see Fig. 1). The binomial logistic regression models were statistically significant, $\chi^2(13) = 188.28$, $p < .001$ for organically produced juice and $\chi^2(13) = 142.29$, $p < .001$ for juice with OM fruit, resulting in acceptable amount of explained variance (Backhaus et al., 2021), as shown by Nagelkerke's $R^2 = .236$ and $R^2 = .177$.

Several driving factors for the WTP for organic juice and for juice from OM fruit could be identified. A positive attitude toward the environment had a significant positive effect on the WTP for organic juice, whereas it was less significant for juice from OM fruit. High preference for local food showed a positive effect on the additional WTP for both product attributes. Knowledge of the OM term and landscape did not influence the WTP for juice with OM fruit. The high subjective knowledge of the term and the positive and higher objective knowledge of the system was also not translated into preferences and WTP for OM products. The two variables indicating a higher involvement with juice from OM (relation to OM and previous consumption of OM juice) had a significant positive effect on the WTP for juice from OM fruit. Perceived naturalness of OM juice had a significant positive effect on the WTP for juice from OM fruit. Younger age had a significant positive influence on WTP for both organic juice and OM fruit juice.

Discussion and conclusion

This study aimed to fill the gap in research on consumers' associations, knowledge, and WTP for products from the traditional cultural landscape of OM. The results of this study allow delineating some implications on how the preservation of traditional cultural landscapes can be enhanced by increased consumption of the products and better communication, using OM juice as an example.

This study's findings indicate two important factors that need to be considered when developing communication measures for products from the traditional cultural landscapes. First, consumers' relationship with the traditional cultural landscapes of OM in Germany is low, and an existing relationship results in higher WTP. A missing relationship between consumers, traditional cultural landscapes, and the landscape products was also observed in other studies (Cosmina et al., 2016; Wezel, Chazoule and Vallod, 2013) and might be due to the increasing alienation of consumers with agriculture and food production (Vicente-Vicente, Quintas-Soriano and López-Rodríguez, 2022). Other studies have shown that when consumers have a strong relation to agricultural production, local identity, and commitment to the region, the demand for products from traditional cultural landscape is likely to be greater (Escribano, Gaspar and Mesias, 2020; Hasanzade, Elsihewy and Toporowski, 2022) and can result in higher WTP (Escribano, Gaspar and Mesias, 2020; Fernández-Ferrín et al., 2018; Granado-Díaz, Villanueva and Gómez-Limón, 2022; Hasanzade, Elsihewy and Toporowski, 2022; Villanueva et al., 2021).

Second, a lack of consumers' relation to traditional cultural landscapes can also be a reason for low knowledge about traditional cultural landscapes. However, existing knowledge of the system characteristics has little influence on WTP for products from the

traditional cultural landscapes. This finding is particularly surprising. Other studies concerning sustainable products have shown that knowledge is a crucial factor in consumers' choice (Peschel et al., 2016; Yiridoe, Bonti-Ankomah and Martin, 2005). One reason why knowledge of the landscape term OM and typical visual characteristics has no influence on WTP for the products might be that consumers lack specific knowledge of the positive product attributes and personal benefits of purchasing these products (Cosmina et al., 2016; Wezel, Chazoule and Vallo, 2013). To conclude, these two findings indicate that communication efforts aimed at strengthening consumers' relationships with traditional cultural landscapes and their products, and/or enhancing knowledge of the positive product attributes and personal advantages of buying these products, can result in higher demand and WTP.

Three product attributes are particularly promising in the communication of OM juice as an example of a product from traditional cultural landscapes: (1) the local origin, (2) the environmentally friendly and organic production, and (3) the naturalness of the landscape. It is important that marketers of OM juice emphasize 'local origin'. As other studies show, this product attribute often results in high WTP because of high preferences among consumers for local food (Hempel and Hamm, 2015; Hempel and Hamm, 2016; Schäufele and Janssen, 2021; Smith et al., 2021). Local production can be communicated directly on the product, for example, by referencing a specific geographical area for production and processing (e.g., a district) or by indicating the local producer (e.g., the cidery, the farmer, and a non-profit OM association).

It is useful to highlight the environmentally friendly production of OM juice. In several studies, a pro-environmental attitude was mentioned as an important reason to buy ethical products (Arya, Chaturvedi and Singh, 2024; Padel and Foster, 2005; Puteri, Buttler and Jahnke, 2022). A strategy to make this product attribute of OM products apparent to consumers is organic certification. Consumers' higher WTP for organic certification compared to other ethical product attributes was also found in previous studies (De-Magistris and Gracia, 2016; Katt and Meixner, 2020; Tempesta and Vecchiato, 2019). A reason for this higher WTP might be better knowledge of and trust in organic agriculture due to the well-introduced concept of organic farming in EU food markets (Zander, Padel, and Zanolli, 2015). Organic products are also considered to be healthier and safer than conventional foods, which can also cause higher WTP (Katt and Meixner, 2020).

The higher naturalness of the cultivation system should be consistently retained and communicated through the whole value chain from fruit production to the product itself (e.g., minimal processing into direct juice or traditional production methods) and via retailers to the consumers. Perceived naturalness has a significant positive effect on the WTP for juice from OM fruit. Naturalness of agricultural production, processing, and of the product itself is an important attribute for consumers of products from traditional cultural landscapes (Escribano, Gaspar and Mesias, 2020; Philipp and Zander, 2023) and other products with ethical product attributes (Hemmerling, Canavari and Spiller, 2016; Hueppe and Zander, 2023; Onken, Bernard and Pesek, 2011). To conclude, the combination of these three main characteristics in the communication of products from traditional cultural landscapes helps to increase the relationship with, and knowledge of, products from traditional cultural landscapes and thus finally demand.

The research question and design asked for only German participants who consumed apple juice at least occasionally to be included in the study. Hence, results can only be generalized for

apple juice consumers in Germany. This means that the findings may differ significantly if this study is repeated in other countries and with other traditional cultural landscapes. Nevertheless, other traditional cultural landscapes have similar characteristics to OM (e.g., extensive cultivation and traditional production methods) (García-Martín et al., 2021). An overarching comparison of studies on products from different traditional cultural landscapes in Europe would provide insight into whether the importance of different product attributes differs. It would also allow researchers to take a step further and investigate how marketing tools can help to effectively link the product with consumers' needs and preferences.

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Data availability statement. The data that support the findings of this study are available from the corresponding author upon reasonable request.

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References

- Ali, B.M., Ang, F. and Van Der Fels-Klerx, H.J. (2021) 'Consumer willingness to pay for plant-based foods produced using microbial applications to replace synthetic chemical inputs', *PLoS One*, **16**(12), pp.1–24. <https://doi.org/10.1371/journal.pone.0260488>.
- Amann, J., Arbenz, A., Mack, G., Nemecek, T. and El, N. (2023) 'A review on policy instruments for sustainable food consumption', *Sustainable Production and Consumption*, **36**, pp.338–353. <https://doi.org/10.1016/j.spc.2023.01.012>.
- Arya, B., Chaturvedi, S. and Singh, N. (2024) 'Extending the theory of planned behaviour to predict sustainable food consumption', *Environment, Development and Sustainability*, **26**, pp.31277–31300. <https://doi.org/10.1007/s10668-024-04466-z>.
- Backhaus, K., Erichson, B., Gensler, S., Weiber, R. and Weiber, T. (2021) *Multivariate analysis: an application-oriented introduction*. Wiesbaden: Springer Gabler Verlag.
- Barbu, A., Catană, Ș.A., Deselnicu, D.C., Cioca, L.I. and Ioanid, A. (2022) 'Factors influencing consumer behavior toward green products: a systematic literature review', *International Journal of Environmental Research and Public Health*, **19**(24), 16568. <https://doi.org/10.3390/ijerph192416568>.
- Berry, C., Burton, S. and Howlett, E. (2017) 'It's only natural: the mediating impact of consumers' attribute inferences on the relationships between product claims, perceived product healthfulness, and purchase intentions', *Journal of the Academy of Marketing Science*, **45**(5), pp.698–719. <https://doi.org/10.1007/s11747-016-0511-8>.
- Bieling, C., Eser, U. and Plieninger, T. (2020) 'Towards a better understanding of values in sustainability transformations: ethical perspectives on landscape stewardship', *Ecosystems and People*, **16**(1), pp.188–196. <https://doi.org/10.1080/26395916.2020.1786165>.

- Boccaletti, S. and Nardella, M. (2000) 'Consumer willingness to pay for pesticide-free fresh fruit and vegetables in Italy', *International Food and Agribusiness Management Review*, 3(3), pp.297–310. [https://doi.org/10.1016/S1096-7508\(01\)00049-0](https://doi.org/10.1016/S1096-7508(01)00049-0).
- Borghoff, L.M. and Strassner, C. (2023) 'Organic juice processing quality from the processors' perspective: a qualitative study', *Food*, 12(377), pp.1–18. <https://doi.org/10.3390/foods12020377>.
- Borngräber, S., Krismann, A. and Schmieder, K. (2020) 'Ermittlung der Streuobstbestände Baden- Württembergs durch automatisierte Fernerkundungsverfahren', *Naturschutz und Landschaftspflege Baden-Württemberg*, 81, pp.1–17. Available at: https://pudi.lubw.de/detailseite/-/publication/10128-Borngraeber_2020_Streuobsterhebung.pdf (Accessed: 19 March 2021).
- Brugarolas Mollá-Bauzá, M.M., Martínez-Carrasco, L., Martínez-Poveda, A. and Rico Pérez, M. (2005) 'Determination of the surplus that consumers are willing to pay for an organic wine', *Spanish Journal of Agricultural Research*, 3(1), pp.43–51. <https://doi.org/10.5424/sjar/2005031-123>.
- Carrington, M., Neville, B. and Whitwell, G. (2014) 'Lost in translation: exploring the ethical consumer intention-behavior gap', *Journal of Business Research*, 67(1), pp.2759–2767. <https://doi.org/10.1016/j.jbusres.2012.09.022>.
- Cosmina, M., Galletti, G., Marangon, F. and Troiano, S. (2016) 'Attitudes towards honey among Italian consumers: a choice experiment approach', *Appetite*, 99(5), pp.52–58. <https://doi.org/10.1016/j.appet.2015.12.018>.
- De-Magistris, T. and Gracia, A. (2016) 'Consumers' willingness-to-pay for sustainable food products: the case of organically and locally grown almonds in Spain', *Journal of Cleaner Production*, 118, pp.97–104. <https://doi.org/10.1016/j.jclepro.2016.01.050>.
- Dorresteijn, I., Loos, J., Hanspach, J. and Fischer, J. (2015) 'Socioecological drivers facilitating biodiversity conservation in traditional farming landscapes', *Ecosystem Health and Sustainability*, 1(9), pp.1–9. <https://doi.org/10.1890/EHS15-0021.1>.
- Escribano, M., Gaspar, P. and Mesias, F.J. (2020) 'Creating market opportunities in rural areas through the development of a brand that conveys sustainable and environmental values', *Journal of Rural Studies*, 75, pp.206–215. <https://doi.org/10.1016/j.jrurstud.2020.02.002>.
- Fernández-Ferrín, P., Calvo-Turrientes, A., Bande, B., Artaraz-Miñón, M. and Galán-Ladero, M.M. (2018) 'The valuation and purchase of food products that combine local, regional and traditional features: the influence of consumer ethnocentrism', *Food Quality and Preference*, 64, pp.138–147. <https://doi.org/10.1016/j.foodqual.2017.09.015>.
- Fischer, J., Hartel, T. and Kuemmerle, T. (2012) 'Conservation policy in traditional farming landscapes', *Conservation Letters*, 5(3), pp.167–175. <https://doi.org/10.1111/j.1755-263X.2012.00227.x>.
- Forejt, M. and Syrbe, R.U. (2019) 'The current status of orchard meadows in Central Europe: multi-source area estimation in Saxony (Germany) and the Czech Republic', *Moravian Geographical Reports*, 27(4), pp.217–228. <https://doi.org/10.2478/mgr-2019-0017>.
- García-Martín, M., Huntsinger, L., Ibarrola-Rivas, M.J., Penker, M., D'Ambrosio, U., Dimopoulos, T., Fernández-Giménez, M.E., Kizos, T., Muñoz-Rojas, J., Saito, O., Zimmerer, K.S., Abson, D.J., Liu, J., Quintas-Soriano, C., Sørensen, I.H., Verburg, P.H. and Plieninger, T. (2022) 'Landscape products for sustainable agricultural landscapes', *Nature Food*, 3(10), pp.814–821. <https://doi.org/10.1038/s43016-022-00612-w>.
- García-Martín, M., Torralba, M., Quintas-Soriano, C., Kahl, J. and Plieninger, T. (2021) 'Linking food systems and landscape sustainability in the Mediterranean region', *Landscape Ecology*, 36(8), pp.2259–2275. <https://doi.org/10.1007/s10980-020-01168-5>.
- Granado-Díaz, R., Villanueva, A.J. and Gómez-Limón, J.A. (2022) 'Spatial discounting in food products from high natural value agroecosystems', *Spanish Journal of Agricultural Research*, 20(4), p.e0106. <https://doi.org/10.5424/sjar/2022204-18480>.
- Grunert, K.G., Juhl, H.J., Esbjerg, L., Jensen, B.B., Bech-Larsen, T., Brunso, K. and Madsen, C. (2009) 'Comparing methods for measuring consumer willingness to pay for a basic and an improved ready-made soup product', *Food Quality and Preference*, 20(8), pp.607–619. <https://doi.org/10.1016/j.foodqual.2009.07.006>.
- Hasanzade, Y., Elsihew, O. and Toporowski, W. (2022) 'Is it just the distance? Consumer preference for geographical and social proximity of food production', *Ecological Economics*, 200, p.107533. <https://doi.org/10.1016/j.ecolecon.2022.107533>.
- Haws, K.L., Winterich, K.P. and Naylor, R.W. (2013) 'Seeing the world through GREEN-tinted glasses: green consumption values and responses to environmentally friendly products', *Journal of Consumer Psychology*, 24(3), pp.336–354. <https://doi.org/10.1016/j.jcps.2013.11.002>.
- Hemmerling, S., Canavari, M. and Spiller, A. (2016) 'Preference for naturalness of European organic consumers: first evidence of an attitude-liking gap', *British Food Journal*, 118(9), pp.2287–2307. <https://doi.org/10.1108/BFJ-11-2015-0457>.
- Hempel, C. and Hamm, U. (2015) 'How important is local food to organic-minded consumers?' *Appetite*, 96, pp.309–318. <https://doi.org/10.1016/j.appet.2015.09.036>.
- Hempel, C. and Hamm, U. (2016) 'Local and/or organic: a study on consumer preferences for organic food and food from different origins', *International Journal of Consumer Studies*, 40(6), pp.732–741. <https://doi.org/10.1111/ijcs.12288>.
- Herzog, F. (1998) 'Streuobst: a traditional agroforestry system as a model for agroforestry development in temperate Europe', *Agroforestry Systems*, 42, pp.61–80. <https://doi.org/10.1023/A:1006152127824>.
- Herzog, F. and Oetmann, A. (2001) 'Communities of interest and agroecosystem restoration: Streuobst in Europe' in Flora, C. (ed.) *Interactions between agroecosystems and rural communities*. London: CRC Press, pp.85–99. Available at: <https://www.taylorfrancis.com/chapters/edit/10.1201/9781420041385-11/communities-interest-agro-ecosystem-restoration-streuobst-europe-felix-herzog-anja-oetmann>.
- Horak, J., Peltanova, A., Podavkova, A., Safarova, L., Bogusch, P., Romportl, D. and Zasadil, P. (2013) 'Biodiversity responses to land use in traditional fruit orchards of a rural agricultural landscape', *Agriculture, Ecosystems and Environment*, 178, pp.71–77. <https://doi.org/10.1016/j.agee.2013.06.020>.
- Hueppe, R. and Zander, K. (2023) 'Perfect apples or sustainable production? Consumer perspectives from Germany', *Journal of Consumer Behaviour*, 23(2), pp.1–13. <https://doi.org/10.1002/cb.2236>.
- Kallas, Z. and Gil, J.M. (2011) 'Combining contingent valuation with the analytical hierarchy process to decompose the value of rabbit meat', *Food Quality and Preference*, 24(2), pp.251–259. <https://doi.org/10.1016/j.foodqual.2011.11.006>.
- Katt, F. and Meixner, O. (2020) 'A systematic review of drivers influencing consumer willingness to pay for organic food', *Trends in Food Science and Technology*, 100(6), pp.374–388. <https://doi.org/10.1016/j.tifs.2020.04.029>.
- Kollmuss, A. and Agyeman, J. (2002) 'Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior?' *Environmental Education Research*, 8(3), pp.239–260. <https://doi.org/10.1080/13504620220145401>.
- Kroeber-Riel, W. and Gröppel-Klein, A. (2019) 'Psychische Determinanten des Konsumentenverhaltens' in Kroeber-Riel W. and Gröppel-Klein A. (eds.) *Konsumentenverhalten*. Munich: Verlag C.H. BECK oHG, pp.49–416. <https://doi.org/10.15358/9783800660346-49>.
- Kuckartz, U. and Rädiker, S. (2019) *Analyzing qualitative data with MAXQDA*. London, Berlin, and New York: Springer Nature.
- Lee, H.J. and Hwang, J. (2016) 'The driving role of consumers' perceived credence attributes in organic food purchase decisions: a comparison of two groups of consumers', *Food Quality and Preference*, 54, pp.141–151. <https://doi.org/10.1016/j.foodqual.2016.07.011>.
- Li, S. and Kallas, Z. (2021) 'Meta-analysis of consumers' willingness to pay for sustainable food products', *Appetite*, 163(9), pp.105–239. <https://doi.org/10.1016/j.appet.2021.105239>.
- List, J.A. and Gallet, C.A. (2001) 'What experimental protocol influence disparities between actual and hypothetical stated values?' *Environmental and Resource Economics*, 20(3), pp.241–254. <https://doi.org/10.1023/A:1012791822804>.
- Max Rubner-Institut. (2008) Nationale Verzehrsstudie II. Die bundesweite Befragung zur Ernährung von Jugendlichen und Erwachsenen. Ergebnisbericht teil 1. Karlsruhe: Max Rubner-Institut. Available at: https://www.bmel.de/SharedDocs/Downloads/DE/Ernaehrung/NVS_Ergebnisbericht.pdf?__blob=publicationFile&v=2 (Accessed 30 January, 2024).
- McFadden, D. (2017) 'Stated preference methods and their applicability to environmental use and non-use valuations' in McFadden K. and Train D.

- (eds.) *Contingent valuation of environmental goods a comprehensive critique*. Cheltenham: Edward Elgar Publishing, pp.153–187. <https://doi.org/10.4337/9781786434692>.
- Miele, M. and Evans, A. (2010) 'When foods become animals: ruminations on ethics and responsibility in care-full practices of consumption', *Ethics, Place & Environment*, 13(2), pp.171–190. <https://doi.org/10.1080/13668791003778842>.
- Moreno, G., Aviron, S., Berg, S., Crous-Duran, J., Franca, A., de Jalón, S.G., Hartel, T., Mirck, J., Pantera, A., Palma, J.H.N., Paulo, J.A., Re, G.A., Sanna, F., Thenail, C., Varga, A., Viaud, V. and Burgess, P.J. (2018) 'Agroforestry systems of high nature and cultural value in Europe: provision of commercial goods and other ecosystem services', *Agroforestry Systems*, 92(4), pp.877–891. <https://doi.org/10.1007/s10457-017-0126-1>.
- Naturschutzbund Deutschland (NABU). (2018) Studie zur Aufpreisvermarktung von Streuobstprodukten in—Kurzfassung. Stuttgart: Ministerium für Ländlichen Raum und Verbraucherschutz. Available at: https://streuobst.landwirtschaft-bw.de/site/pbs-bw-mlr-root/get/documents_E2041849007/MLR.LEL/PB5Documents/mlr/Streuobst/2018-08-02%20B1_Kurzfassung%20Streuobststudie_web.pdf (Accessed: 30 January 2021).
- Newholm, T. and Shaw, D. (2007) 'Studying the ethical consumer: a review of research', *Journal of Consumer Behaviour*, 6, pp.253–270. <https://doi.org/10.1002/cb>.
- Onken, K.A., Bernard, J.C. and Pesek, J.D. (2011) 'Comparing willingness to pay for organic, natural, locally grown, and state marketing program promoted foods in the mid-Atlantic region', *Agricultural and Resource Economics Review*, 40(1), pp.33–47. <https://doi.org/10.1017/S1068280500004500>.
- Padel, S. and Foster, C. (2005) 'Exploring the gap between attitudes and behaviour: understanding why consumers buy or do not buy organic food', *British Food Journal*, 107(8), pp.606–625. <https://doi.org/10.1108/00070700510611002>.
- Peschel, A.O., Grebitus, C., Steiner, B. and Veeman, M. (2016) 'How does consumer knowledge affect environmentally sustainable choices? Evidence from a cross-country latent class analysis of food labels', *Appetite*, 106, pp.78–91. <https://doi.org/10.1016/j.appet.2016.02.162>.
- Philipp, S.M. and Zander, K. (2023) 'Orchard meadows: consumer perception and communication of a traditional agroforestry system in Germany', *Agroforestry Systems*, 97, pp.939–951. <https://doi.org/10.1007/s10457-023-00840-4>.
- Plieninger, T., Bieling, C., Ohnesorge, B., Schaich, H., Schleyer, C. and Wolff, F. (2013) 'Exploring futures of ecosystem services in cultural landscapes through participatory scenario development in the Swabian Alb, Germany', *Ecology and Society*, 18(3), p.39. <https://doi.org/10.5751/ES-05802-180339>.
- Plieninger, T., Levers, C., Mantel, M., Costa, A., Schaich, H. and Kuemmerle, T. (2015) 'Patterns and drivers of scattered tree loss in agricultural landscapes: orchard meadows in Germany (1968–2009)', *PLoS One*, 10(5), pp.1–19. <https://doi.org/10.1371/journal.pone.0126178>.
- Plieninger, T., Torralba, M., Hartel, T. and Fagerholm, N. (2019) 'Perceived ecosystem services synergies, trade-offs, and bundles in European high nature value farming landscapes', *Landscape Ecology*, 34(7), pp.1565–1581. <https://doi.org/10.1007/s10980-019-00775-1>.
- Puteri, B., Buttler, B. and Jahnke, B. (2022) 'Take it or leave it? Investigating the ambivalence and willingness to pay for suboptimal fruits and vegetables among organic consumers in Germany', *Frontiers in Sustainable Food Systems*, 6, pp.934–954. <https://doi.org/10.3389/fsufs.2022.934954>.
- Román, S., Sánchez-Siles, L.M. and Siegrist, M. (2017) 'The importance of food naturalness for consumers: results of a systematic review', *Trends in Food Science and Technology*, 67, pp.44–57. <https://doi.org/10.1016/j.tifs.2017.06.010>.
- Schaich, H., Bieling, C. and Plieninger, T. (2010) 'Linking ecosystem services with cultural landscape research', *GAI—Ecological Perspectives for Science and Society*, 19(4), pp.269–277. <https://doi.org/10.14512/gaia.19.4.9>.
- Schäufele, I. and Janssen, M. (2021) 'How and why does the attitude–behavior gap differ between product categories of sustainable food? Analysis of organic food purchases based on household panel data', *Frontiers in Psychology*, 12(2), pp.1–13. <https://doi.org/10.3389/fpsyg.2021.595636>.
- Schmidt, J. and Bijmolt, T.H.A. (2020) 'Accurately measuring willingness to pay for consumer goods: a meta-analysis of the hypothetical bias', *Journal of the Academy of Marketing Science*, 48(3), pp.499–518. <https://doi.org/10.1007/s11747-019-00666-6>.
- Smith, M., Lal, P., Oluoch, S., Vedwan, N. and Smith, A. (2021) 'Valuation of sustainable attributes of hard apple cider: a best–worst choice approach', *Journal of Cleaner Production*, 318(10), p.128478. <https://doi.org/10.1016/j.jclepro.2021.128478>.
- Solomon, M., Askegaard, S., Hoog, M. and Bamossy, G. (2019) *Consumer behaviour: a European perspective*. 7th edition. Harlow: Pearson.
- Špulerová, J., Piscová, V., Gerhátová, K., Bača, A., Kalivoda, H. and Kanka, R. (2015) 'Orchards as traces of traditional agricultural landscape in Slovakia', *Agriculture, Ecosystems and Environment*, 199, pp.67–76. <https://doi.org/10.1016/j.agee.2014.08.021>.
- Tempesta, T. and Vecchiato, D. (2019) 'Analysis of the factors that influence olive oil demand in the Veneto region (Italy)', *Agriculture*, 9(7), p.154. <https://doi.org/10.3390/agriculture9070154>.
- Tieskens, K., Schulp, C., Levers, C., Lieskovský, J., Kuemmerle, T., Plieninger, T. and Verburg, P. (2017) 'Characterizing European cultural landscapes: accounting for structure, management intensity and value of agricultural and forest landscapes', *Land Use Policy*, 62, pp.29–39. <https://doi.org/10.1016/j.landusepol.2016.12.001>.
- Tojnko, S., Rozman, Č., Unuk, T., Pažek, K. and Pamič, S. (2011) 'A qualitative multi-attribute model for the multifunctional assessment of "Streuobst stands" in NE Slovenia', *Erwerbs-obstbau*, 53(4), pp.157–166. <https://doi.org/10.1007/s10341-011-0149-0>.
- Untarini, N. (2020) 'Studying the attitudes–behavior gap in ethical consumerism: a review of research', *Jurnal Administrasi Bisnis*, 9(2), pp.112–128. <https://doi.org/10.14710/jab.v9i2.31058>.
- Vermeir, I. and Verbeke, W. (2006) 'Sustainable food consumption: exploring the consumer "attitude–behavioral intention" gap', *Journal of Agricultural and Environmental Ethics*, 19(2), pp.169–194. <https://doi.org/10.1007/s10806-005-5485-3>.
- Vicente-Vicente, J.L., Quintas-Soriano, C. and López-Rodríguez, M.D. (2022) 'A transformative (r)evolution of the research on agriculture through fostering human-nature connectedness—a special issue editorial', *Agriculture*, 12, pp.1–7. <https://doi.org/10.3390/agriculture12040522>.
- Villanueva, A.J., Salazar-Ordoñez, M., Granado-Díaz, R. and Rodríguez-Entrena, M. (2021) 'Consumers' preferences for traditional meat products: production system and objective quality cues in Iberian ham', *Italian Journal of Animal Science*, 20(1), pp.1987–2001. <https://doi.org/10.1080/1828051X.2021.1982419>.
- Wezel, A., Chazoule, C. and Vallo, D. (2013) 'Using biodiversity to valorise local food products: the case of fish ponds in a cultural landscape, their biodiversity, and carp production', *Aquaculture International*, 21(6), pp.1395–1408.
- Wolpert, F., Quintas-Soriano, C. and Plieninger, T. (2020) 'Exploring land-use histories of tree-crop landscapes: a cross-site comparison in the Mediterranean Basin', *Sustainability Science*, 15(5), pp.1267–1283. <https://doi.org/10.1007/s11625-020-00806-w>.
- Yiridoe, E.K., Bonti-Ankomah, S. and Martin, R.C. (2005) 'Comparison of consumer perceptions and preference toward organic versus conventionally produced foods: a review and update of the literature', *Renewable Agriculture and Food Systems*, 20(4), pp.193–205. <https://doi.org/10.1079/raf2005113>.
- Zander, K. (2003) 'Ökonomische Bewertung des Streuobstbaus aus einzelbetrieblicher und gesellschaftlicher Sicht' in Weingarten, P. (ed.) *Landwirtschaft und Umwelt: Schriften zur Umweltökonomie*, Vol. 20. Kiel: Wissenschaftsverlag Vauk Kiel KG.
- Zander, K. and Feucht, Y. (2018) 'Consumers' willingness to pay for sustainable seafood made in Europe', *Journal of International Food and Agribusiness Marketing*, 30(3), pp.251–275. <https://doi.org/10.1080/08974438.2017.1413611>.
- Zander, K. and Hamm, U. (2010) 'Consumer preferences for additional ethical attributes of organic food', *Food Quality and Preference*, 21(5), pp.495–503. <https://doi.org/10.1016/j.foodqual.2010.01.006>.
- Zander, K., Padel, S. and Zanoli, R. (2015) 'EU organic logo and its perception by consumers', *British Food Journal*, 117(5), pp.1506–1526. <https://doi.org/10.1108/BFJ-08-2014-0298>.
- Zander, K., Stolz, H. and Hamm, U. (2013) 'Promising ethical arguments for product differentiation in the organic food sector: a mixed-methods research approach', *Appetite*, 62, pp.133–142. <https://doi.org/10.1016/j.appet.2012.11.015>.
- Ziebach, M., Kott, K., Geisler, S. and Behrends, S. (2022) 'Nettoeinkommen privater Haushalte', Datenreport 2021. Statistisches Bundesamt. Available at: <https://www.destatis.de/DE/Service/Statistik-Campus/Datenreport/Downloads/datenreport-2021-kap-6.pdf?blob=publicationFile&v=3> (Accessed: 25 May 2023).

Appendix

Table A1. Item statistics of attitude toward the environment and preference for local food queried using a 7-point Likert scale

Attitude toward environment	Mean	Standard deviation	Cronbach's alpha
It is important to me that the products I consume do not harm the environment.	5.62	1.405	.837
My purchase habits are affected by my concern for our environment.	4.37	1.604	
Low prices are more important to me than environmentally friendly products (reversed in the analysis).	4.70	1.686	
I am concerned about wasting the natural resources of our planet.	5.34	1.474	
I am willing to be inconvenienced in order to take actions that are more environmentally friendly.	4.52	1.571	
I would describe myself as environmentally responsible.	4.95	1.383	
Environmental protection should not be at the expense of economic development (revers).	3.45	1.680	
There are issues which are more important than environment (revers).	4.44	1.728	
Preference for local food	Mean	Standard deviation	Cronbach's alpha
The origin of a product is not important to me (reverse).	4.82	1.794	.820
Local food is better for the environment.	4.57	1.743	
Local food is of a higher quality.	5.04	1.574	
By buying local food, I help to preserve the landscape.	5.67	1.386	
Whenever possible, I make sure to buy local food.	4.36	1.470	
I am willing to pay more for locally produced food.	5.36	1.418	