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BEATLES
BEHAVIOURAL CHANGE TOWARDS
Climate-Smart Agriculture

Co-creating Behavioural Change Towards Climate-Smart Food Systems

D2.1 Lab experiments v1

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Executive Summary

This deliverable D2.1 reports on the methodology and findings from the first three lab experiments in work package (WP) 2. The three experiments and their documentation in this deliverable are conducted by independent researchers engaged in task 2.2 in WP2 with valuable input and engagement from the use cases. Thereby, the deliverable contributes to the BEATLES project outcomes.

Based on the findings in BEATLES WP1, a number of levers have been identified that could potentially promote a more climate friendly food consumption behaviour of consumers. In WP2, we conduct three consumer online experiments investigating the potential effect of three of these levers identified in WP1 and their combinations on consumers' willingness to pay (WTP).

The main objectives of all three behavioural experiments were to test the effect of identified interventions on consumers' WTP a price premium for climate-friendly produced food products. The WTP for carrots, beef and bread was investigated to represent a diversity of products. Secondly, we assessed how the interventions influenced consumers' awareness of the climate impact of food production and their willingness to shift their behavior towards purchasing climate-friendly food products.

All three consumer behavioral experiments in WP2 were carried out in March 2024 as online surveys.

The first consumer lab experiment in WP2 investigated the individual and combined effects of the interventions 'information about CSA production methods' and 'social norm information stating that more people become interested in climate-friendly food products' on WTP extra for climate-friendly food. The first experiment was carried out as an online survey in the company Norstat's consumer panel in Denmark, Spain and Lithuania with 1568 respondents.

The second consumer lab experiment focused on investigating the individual and combined effects of the interventions 'information about CSA production methods' and 'information about fairness in the supply chain' on consumers' WTP extra for climate-friendly food. The second experiment was carried out as an online survey in the company Norstat's consumer panel in Germany and the Netherlands with 1084 respondents.

The third consumer lab experiment took up the challenge and investigated the potential importance of triple nudges. More specifically, the third consumer lab experiment analysed the effects of three interventions individually and the combined effect of the three interventions (information about CSA production methods, social norm information stating that more people become interested in climate-friendly food products, and information about fairness in the supply chain) on WTP for climate-friendly food. The third experiment was carried out as an online survey in ZPS consumer panel in Slovenia with 954 respondents.

Overall, the results from the three experiments highlight that more than half of the consumers in the investigated countries show a positive WTP for climate-friendly products – and the WTP for climate-friendly products seemed to increase slightly when CSA information was provided – in particular in combination with social norm information or fairness information. Furthermore, across all three experiments, we found that more than half of the respondents did not trust the labelling of climate-friendly food in the experiments.

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List of Terms and Definitions

Abbreviation	Definition
CSA	Climate smart Agriculture
WTP	Willingness to Pay
UC	Use cases
DK	Denmark
ES	Spain
LT	Lithuania
DE	Germany
NL	The Netherlands
SL	Slovenia

Table 1: Terms and Definitions

1. Introduction

1.1 Background for the 3 consumer lab experiments

Sustainable consumption and behavior by individuals or households can be an essential part of larger efforts to make more sustainable use of available resources (Campbell-Arvai et al., 2014). As sustainability is a credence good (not visible), labelling of climate friendly food and other sustainability traits through certification is necessary to signal the sustainability of the products for food consumption (Janßen & Langen, 2017; Rihn et al., 2019; Song et al., 2019). At the same time though, a growing amount of research on labeling has suggested the effectiveness of labelling in promoting sustainable choices is very mixed (Ammann et al., 2023; Aprile & Punzo, 2022; De Canio et al., 2021; De-loyde et al., 2022). Thereby, labels alone do not necessarily give indicative information to change the behavior of consumers.

Recently a study by Neuhofer et al. (2023), found that including sustainability facts on labels displaying quantitative environmental information, land use, and energy use of the product had significant effect in changing consumers behavior to pay extra for organic milk. In this regard, an alternative way to promote climate-friendly food product consumption would be to utilize insights from behavioral economics (De-loyde et al., 2022; Gravert & Kurz, 2021; Morone et al., 2021; Predieri et al., 2023; Rihn et al., 2019). Thus, using labels in combination with other interventions was suggested as tools to shift consumer consumption behavior (Schruff-Lim et al., 2023). Ammann et al. (2023) suggest that consumers rely on information-based instruments to make sustainable food choices e.g. to decide on the price premium they are willing to pay for sustainable products. These general findings have inspired the design of the three consumer lab experiments in work package 2 (WP2).

Moreover, in BEATLES WP1, a number of different levers have been identified that could potentially promote a more climate friendly food consumption behaviour of consumers. They are documented in the BEATLES deliverables D1.1. In WP2, we conduct three consumer online experiments investigating the potential effect of the three of the identified levers from WP1 and their combination according to experimental design presented in methodology section on consumers' willingness to pay (WTP).

The first consumer lab experiment in WP2 investigates whether additional information provision about production methods will increase consumers' WTP extra for food produced with lower climate impact. Furthermore, the first experiment investigates whether a descriptive social norm will increase WTP for food produced with lower climate impact. Thereby, the first consumer lab experiment analyses the individual and combined effects of the interventions 'CSA information provision' and 'social norm' on WTP extra for climate-friendly food.

The second consumer lab experiment focuses on investigating the effect of information-based fairness intervention on consumers' WTP extra for climate-friendly food. The importance of perceived fairness was found to be important in the reviews performed in WP1 as well as in the consumer survey conducted in WP1. As information provision about CSA production practices is central for the BEATLES project, this intervention is replicated in consumer lab experiment two. Thereby, the second consumer lab experiment analyses the individual and combined effects of the intervention 'CSA information provision' and 'fairness in the supply chain' on WTP extra for climate-friendly food.

The third consumer lab experiment takes up the challenge and investigated the potential importance of triple nudges. More specifically, the third consumer lab experiment analyses the individual the combined effect of CSA with social norm and fairness information and combined effects of three interventions 'CSA information provision', 'social norm' and 'fairness in the supply chain' on WTP for climate-friendly food.

1.2. Main objectives of the 3 consumer lab experiments

Consumer experiment 1 has the main objective to test:

1) the effect of two information-based interventions (CSA information and social norm) and their combination on consumers' WTP a price premium for selected climate-friendly produced food products.

Consumer experiment 2 has the main objective to test:

2) the effect of two information-based interventions (CSA information and fairness in the supply chain) and their combination on consumers' WTP a price premium for selected climate-friendly produced food products.

Consumer experiment 3 has the main objective to test:

3) the effect of three information-based interventions (CSA information and/or social norm and/or fairness in the supply chain) on consumers' WTP a price premium for selected climate-friendly produced food products.

2. Methodology

2.1. Experimental data collection method for all three consumer experiments

Three online survey experiments were conducted to collect data for the three lab experiments. The literature review suggests that online experiments offer viable alternatives when it is challenging to find consumers in person to conduct lab and field experiments and have witnessed significant expansion in recent years (Charness et al., 2013; De-loyde et al., 2022; Gangadharan et al., 2022; Gneezy & Imas, 2017; Reiley, 2015). We distinguish between lab experiments where hypothetical choice situations and field experiments with real life choice situations.

For experiment 1, the recruitment of consumers and data collection was handled by the company Norstat from the consumer panel list for three countries (Denmark, Lithuania and Spain). Between 400 and 630 participants were recruited per country for experiment 1. In each of the three countries, participants were randomly allocated to one of four experimental groups. Participant were recruited from the Norstat panel and randomly allocated in each experimental group (see Table 6). The participants in each experimental groups were between 18 years and 64 years old aiming at representativeness across gender, age groups and region. Slight differences in the number of participants were due to different price levels in the countries (Denmark being the most expensive country to collect consumer data in).

For experiment 2, the recruitment of consumers and data collection was also handled by the company Norstat from the consumer panel list for two countries (Germany and the Netherlands). Around 540 participants were recruited per country for experiment 2. Participant were recruited from the Norstat panel and randomly allocated in each experimental group (see Table 7). The participants in each experimental groups were between 18 years and 64 years old aiming at representativeness across gender, age groups and region.

For experiment 3, data collection was done in Slovenia and was handled by Slovenian consumer association (ZPS) through its consumer panel. The participants (with recruitment of at least 900 in Slovenia) were randomly allocated in each experimental group (see Table 8). The participants in each experimental groups were between 18 years and 64 years old aiming at representativeness across gender, age groups and region.

An ethical approval was obtained from University of Copenhagen and approved by its ethics committee DK (reference number 504-0483/24-5000).

2.2. Descriptions of experimental design and questionnaires for experiment 1

Reisch et al., 2021 suggested to test individual interventions to obtain more clarity on the effectiveness of intervention on changing sustainable consumption behaviour. On the other hand, it was also suggested that testing a combined intervention is effective in changing consumers' behaviour toward sustainable consumption (Jacobs et al., 2018; Marleen et al., 2021). A recent review on behavioral change levers also suggested that combination of two or more potential behavioral interventions or levers will bring more behavioral change towards sustainable consumption than single interventions or levers

(Bujold et al., 2020). Thus, the chosen experimental designs follow the structure of testing the effect of each individual intervention as well as their combined effect on changing consumer behaviors towards purchase of climate friendly food products. Thus, a 2x2 factorial experimental design was adopted as indicated in table 2 below.

Table 2: General overview a 2x2 experimental design followed by the experiments

		Intervention 1	
		No	**Yes**
Intervention 2	**No**	Control	Intervention 1
	Yes	Intervention 2	Combined of intervention 1 & 2

The experimental design for experiment 1 is presented in Table 3. To test the effect of informational interventions on WTP extra for experiment 1, we are interested in testing the effect of CSA information provision, dynamic social norm priming, and their combination on consumers' WTP extra for climate-friendly food products (Table 3).

Table 3: Experimental design for the experiment one

Experimental group 1	**Experimental group 2**	**Experimental group 3**	**Experimental group 4**
Label	**CSA information**	**Dynamic social norm priming (SocialN)**	**Combination of CSA information and dynamic social norm**

Note: label is control that refers to 'Produced climate-friendly' without any additional information

For experiment 1, the questionnaire consisted of three parts. Part 1 included sociodemographic questions. Part II, the main experimental part, used a 2x2 experimental design, such that 4 versions were created: control group without information, group with information about CSA, group with information about social norms and a group with information about both CSA and social norm. The information-based intervention was followed by question related to WTP for the three food products with a reduced climate footprint. Additionally, part II included follow-up questions to assess the certainty of the stated WTP, as well as an evaluation of the provided interventions influence on sampled consumers awareness of the climate impact of food production and future food choices towards more climate-friendly food consumption. Part III included control behavioural factors that capture attitudinal questions (e.g. what is important when buying food, perceived climate impact of food production), habits (e.g. to what extent they eat meat, organic food) and trust.

The four versions of the questionnaires in experiment 1 were identical except for the information-based intervention in part II and apart from the standard prices for conventional food in the WTP exercise. The questionnaires differed across the countries regarding the price vectors for standard food versions of food for the WTP elicitation, which were country-specific to reflect differences in price levels across the countries. Furthermore, the last question in the questionnaire was country-specific in order to accommodate different interests of the use cases.

The original questionnaire was prepared in English and discussed by BEATLES partners. Hereafter, the final questionnaire was translated into each country's languages.

The questionnaires were pre-tested by 14 BEATLES partners in January 2024. A number of changes were initiated based on the testing with the main ones being: Shortening the questionnaire, reformulating the interventions, changing the income question from asking the respondents to place their monthly income in intervals to asking them whether their income was lower, on or above average income in their country.

An important issue in the design of the questionnaire was whether to introduce climate smart agriculture as a term (CSA) versus formulating climate impact as part of the broader term environmental impact or use climate impact to describe the changed product.

- First, it was decided to avoid CSA as a term. The argument for not introducing CSA as a term was that CSA is far from the everyday consumers' vocabulary and the purpose of the experiment was not to test the knowledge about the specific term CSA. Instead, the purpose of the experiments was to test to what extent the selected interventions could increase consumers WTP extra for the product that produced by using CSA, namely a product with lower climate footprint.

- Secondly, it was chosen to focus on using the term climate impact rather than the broader term environmental impact. Only in one follow-up question regarding, *what is important in a shopping situation?* have we used environmental impact as the broader term. This choice was made to avoid having to include 'climate impact' and 'other environmental impacts than climate impact' as two possible categories in the questions – thereby we sought to keep the number of characteristics low. In addition to this, the questionnaire does not elicit potential differences in what the participants associate with 'environmental impact' versus 'climate impact' which would have been of general interest to shed further light on. However, we consider this to be beyond the scope of the study.

Another important part of the experiment was how to elicit WTP premium price for climate-friendly food products. WTP extra was assessed based on the payment card for each of the three food products included. Eliciting WTP using payment cards involves that the respondents are asked to choose a value, which represents their maximum WTP from a number of intervals (see e.g. Yu et al 2014).

We compared the percentage increase with the reference standard market price for three selected food commodities. Product specific reference prices were obtained using a combination of searching websites and using local network. Alternative methods to identify a reference market price for standard products include using the general purchasing power index for a combination of goods or using one country as a reference. However, such purchasing power indices capture the general buying power and are by construction not product-specific. Instead, we chose to take advantage of having access to local experts in terms of the use case (UC) partners to choose a realistic standard price for a realistic product-size. Using UC input to set country-specific standard prices provides a more realistic basis for assessing WTP compared to other alternatives. Here, we used UC input to vary prices across countries for the three products, enabling additional WTP comparisons among various climate friedly produced-based food categories. The extra WTP ranges from WTP=0 to WTP of more than 50%' with smaller intervals in the lower range because they are more likely to be chosen (Denver et al., 2023). We have

incorporated two options into the WTP choice: "I don't know" and "I never buy these products."

A further important decision in the experiments related to choice of products. In the original version of the questionnaire, the food categories were formulated as dairy, vegetables and meat. However, based on feed-back we changed the products categories to specific products within three categories (carrots, bread and beef). More specifically, we chose to include three specific products in the experiments in order to make the experiments relevant for the use cases and at the same time investigate the same products across all countries to increase number of repetitions. By including three products, one of them (to some degree) would be relevant for each UC (loaf of bread, package of minced beef, bag of carrots). Another advantage of including three products was the ability to test for potential differences in WTP and in the effect of the interventions across product types.

The WTP eliciting situation was introduced with a description of the shopping situation they were put in with the headline 'The shopping situation'.

Furthermore, to reduce hypothetical bias, we included a short "cheap talk" inspired by Cummings and Taylor (1999). In the experiments, the cheap talk was presented under the heading of 'Be realistic'

> ***The shopping situation*** *Suppose that you are shopping for an everyday meal. Suppose that in addition to the standard products, the supermarkets also sell new versions which are produced with a much lower climate footprint. These are labelled 'Produced climate-friendly'. In all other aspects, the two versions of the products are the same.*
>
> ***Be realistic*** *Please note that people often overestimate their willingness to pay in surveys. Consider your answers carefully and respond as if you were shopping in a supermarket. Remember: If you spend more money on food, then you have less to spend on other things.*

These descriptions of the shopping situation and cheap talk were presented to all four experimental groups. The descriptions were followed by the experimental group four specific information. Below we present the formulations of the experimental groups: control and the single interventions

> ***Control****:*
> *Produced climate friendly label without an additional information*
>
> ***Descriptions of the interventions employed for experiment 1***
> *In accordance with the experimental design of experiment 1, we considered the following three pieces of information as a single and combined intervention.*
>
> ***Produced climate-friendly information (CSA information)***
> *Farmers can produce crops, vegetables and fruit more climate-friendly by investments in precision technologies that can reduce the use of chemical fertilizers, pesticides and irrigation water. Farmers can also produce meat and dairy products more climate-friendly by optimizing the feed (such as using legumes as feed instead of imported soy) and by improving manure handling. For*

all types of farming, using renewable energy is part of climate-friendly production.

Dynamic social norm (SocialN)

More and more people think about the climate impact of their food, and many have changed their consumption behaviour towards more climate-friendly food products. Many people also state that they want to pay a higher price for food that is produced with climate-friendly agricultural practices.

2.3. Description of experimental design and questionnaires for experiment 2

Experiment 2 was carried out in Germany and the Netherlands also as online surveys. For experiment 2, the questionnaire consisted of three parts where part I and part III were identical to experiment 1 but part II differed. As in experiment 1, a 2x2 experimental design was chosen.

In experiment 2, we are interested in examining the effect of CSA information, fairness information across the value chain, and the combined CSA and fairness information provisions on consumers' WTP extra for climate-friendly food products. An overview for the random allocation of the sampled respondents is shown in table 4.

Table 4: Experimental design for experiment two

Experimental group 1	Experimental group 2	Experimental group 3	Experimental group 4
Label	**CSA information**	**Fairness information**	**Combination of CSA and fairness information**

Note: label is control that refers to 'Produced climate-friendly' without any additional information

The four versions of the questionnaires in experiment 2 were identical to the questionnaires in experiment 1 except for Part II, for which different types of interventions were tested in three different experiments, and different standard prices were used for the conventional varieties of carrots, beef and bread.

In addition to the descriptions of the shopping situation and cheap talk as presented in section 2.2, the participants in the four experimental groups in experiment 2 were presented to the following formulations of the experimental groups: control and single interventions.

Control:

Produced climate friendly label without an additional information

Descriptions of the interventions employed for experiment 2
In accordance with the experimental design of experiment 2, we considered the following three pieces of information as a single and combined intervention.

Produced climate-friendly information (CSA information)
Farmers can produce crops, vegetables and fruit more climate-friendly by investments in precision technologies that can reduce the use of chemical fertilizers, pesticides and irrigation water. Farmers can also produce meat and dairy products more climate-friendly by optimizing the feed (such as using

legumes as feed instead of imported soy) and by improving manure handling. For all types of farming, using renewable energy is part of climate-friendly production.

Fairness idea along value chain (Fairness)

Imagine a situation where the major supermarkets collectively enhance the accessibility of 'climate friendly' food. In this collaborative effort, supermarkets commit to provide farmers with the additional required compensation for climate-friendly products, and do not capitalize on the higher prices for the products.

2.4. Descriptions of experimental design and questionnaires for experiment 3

Experiment 3 was carried out in Slovenia, also as online surveys, involving a 3x3 experimental design and thereby involving 8 versions of the questionnaires (control, CSA information, social norm information, CSA information and social norm information, fairness information, CSA information and fairness information and finally, the combination of CSA information, social norm information and fairness information). See Table 5.

Table 5: Experimental design for the experiment three

Control	**Interventions**						
Label	**CSA information**	**SocialN**	**CSA information + SocialN**	**Fairness information**	**CSA information + Fairness information**	**Fairness + SocialN**	**CSA+Fairness + SocialN**

Note: label is control that refers to 'Produced climate-friendly' without any additional information

In addition to the descriptions of the shopping situation and cheap talk as presented in section 2.2, the participants in the four experimental groups in experiment 3 were presented to the following formulations of the experimental groups: control and single interventions.

Control:
Produced climate friendly label without an additional information

Descriptions of the interventions employed for the three consumer experiments
In accordance with the experimental design of each experiment, we considered the following three pieces of information as a single and combined intervention.

Produced climate-friendly information (CSA information)
Farmers can produce crops, vegetables and fruit more climate-friendly by investments in precision technologies that can reduce the use of chemical fertilizers, pesticides and irrigation water. Farmers can also produce meat and dairy products more climate-friendly by optimizing the feed (such as using legumes as feed instead of imported soy) and by improving manure handling. For all types of farming, using renewable energy is part of climate-friendly production.

Dynamic social norm (SocialN)

More and more people think about the climate impact of their food, and many have changed their consumption behaviour towards more climate-friendly food products. Many people also state that they want to pay a higher price for food that is produced with climate-friendly agricultural practices.

Fairness idea along value chain (Fairness)

Imagine a situation where the major supermarkets collectively enhance the accessibility of 'climate friendly' food. In this collaborative effort, supermarkets commit to provide farmers with the additional required compensation for climate-friendly products, and do not capitalize on the higher prices for the products.

2.5. Overview of the 3 experiments respondents' allocation

Experiment 1 was conducted across three countries—Denmark, Lithuania, and Spain—(Table 6). The respondents were randomly allocated across four experimental groups: a control group (V1) and three treatment groups (V2, V3, and V4). The control group received a product label stating, "produced climate-friendly," while the treatment groups received additional information about climate-friendly production practices (V2), dynamic social norms (V3), or a combination of both (V4).

Table 6: Randomized allocation of respondents across the experimental groups and countries for experiment 1

Country	Control and intervention groups				Total sample size per country	Total sample
	V1	V2	V3	V4		
Denmark (DK)	101	101	103	99	404	1,568
Spain (ES)	133	133	133	133	532	
Lithuania (LT)	158	159	158	157	632	

Note: Definition of V1-V4

Version	***Definition***
V1=Control	*Label 'produced climate-friendly'*
V2=CSA information	*Information about climate-friendly production practices*
V3=SocialN	*Information about dynamic social norm*
V4=CSA_SocialN,	*Information about climate-friendly production practices + information about dynamic social norm*

The experiment 2 was tested in two countries (NL and DE). Experiment 2 was conducted in two countries - Germany and the Netherlands. Like Experiment 1, the respondents were randomly allocated across four experimental groups (Table 7): a control group (V1) and three treatment groups (V2, V5, V6). The control group received a product label stating "produced climate-friendly", while the treatment groups received additional information about climate-friendly production practices (V2), fairness along the food value chain (V5), or a combination of both (V6). The total sample sizes for the experiment were 536 participants in Germany and 548 in the Netherlands.

Table 7: Randomized allocation of respondents across the experimental groups and countries for experiment 2

Country	Control and intervention groups				Total sample size per country	Total sample size
	V1	V2	V5	V6		
Germany (DE)	134	135	134	133	536	1,084
Netherlands (NL)	136	138	138	136	548	

Note: Definition of V1, V2, V5 and V6

Version	***Definition***
V1=Control	*Label 'produced climate-friendly'*
V2=CSA information	*Information about climate-friendly production practices*
V5=Fairness	*Information about fairness along food value chain (VC)*
V6=CSA+Fairness	*Information about climate-friendly production practices + information about fairness along food VC*

Finally, experiment 3, which has a triple combination of CSA information, SocialN and Fairness was tested in Slovenia (SL). The experiment involved eight experimental groups, including the control group (V1) and seven treatment groups (V2-V8) (Table 8) that received various combinations of information about climate-friendly production practices, social norms, and fairness along the food value chain. The total sample size for this experiment was 954 participants in Slovenia, with each experimental group containing between 111 and 134 individuals.

Table 8: *Randomized allocation of respondents across the experimental groups for experiment 3*

Country	Control and intervention groups								Total sample size
	V1	V2	V3	V4	V5	V6	V7	V8	
Slovenia (SL)	113	115	111	123	123	124	111	134	954

Note: Definition of V1-V8

Version	***Definition***
V1=Control	*Label 'produced climate-friendly'*
V2=CSA information	*Information about climate-friendly production practices*
V3=SocialN	*Information about dynamic social norm*
V4=CSA_SocialN,	*Information about climate-friendly production practices + information about dynamic social norm*
V5=Fairness	*Information about fairness along food value chain (VC)*
V6=CSA+Fairness	*Information about climate-friendly production practices + information about fairness along food VC*
V7=Fairness+SocialN	*Information about fairness along food VC + information about dynamic social norm*
V8=CSA+Fairness+SocialN	*Information about climate-friendly production practices + information about fairness along food VC + dynamic social norm*

2.6. Data analysis

Descriptive statistics and non-parametric analysis were used to analyze the collected data. For each of the three experiments, we carried out the descriptive analysis of sociodemographic and behavioural control variables at both the country and experimental groups.

The questions related to the main experimental interventions hypothesized as levers for WTP extra for each experiment were analysed according to its design. The percentage of respondents willing to pay for different levels of premium price were presented in

cumulative percentage distribution for each of the three commodities per experiment, which capture, e.g. not only x percent of the sample stated that they are willing to pay 3-5% extra for a product produced climate-friendly way but also the cumulative distribution in terms of y percent of the sample stated that they are willing to pay at least 3% extra. By presenting the cumulative distribution of WTP, it resembles the demand curve from economic micro-theory where higher prices typically are linked to fewer people being willing to pay the extra price.

Because our main outcome variable (WTP extra) has ordinal nature and data is likely to have a non-normal distribution, with many participants reporting a WTP of 0 and the remaining values potentially skewed, we chose the non-parametric Kruskal-Wallis test over the ANOVA test. This because of non-parametric tests, such as the Kruskal-Wallis test, do not make assumptions about the underlying distribution of the data and can handle the ordinal nature of the outcome variable, in contrast to parametric tests such as ANOVA, which require continuous outcome variables and assume normality (Vickers, 2005). Kruskal-Wallis test is used to determine if there are statistically significant differences in the rank median values across three or more independent groups. The significant Kruskal-Wallis test indicates that at least one pair of groups is different, but it does not specify which pairs are different (Dinno, 2015). Thus, the Dunn's test which is a post-hoc test that is used after a Kruskal-Wallis test to perform a pairwise comparisons between all possible pairs of groups to determine which specific pairs of groups are significantly different from each other (Dinno, 2015). Therefore, the non-parametric Dunn's test was used to show whether there is an overall difference in the distributions of WTP extra across control and intervention groups for the part of the sample that stated a WTP (either 0 or positive WTP).

Even though we employed Dunn's pairwise comparison test on experimental groups for the three experiments, we did not take country and other differences into account; it simply tests the median rank of the ordered extra WTP percentage level for the three experiments. We use the 10% significance level here. Therefore, it is crucial for the reader to interpret the non-parametric results cautiously, as they solely disclose differences in the overall difference, excluding countries and other control variables that could potentially influence the significance level of the intervention effect on WTP extra if taken into account. In this regard, a parametric regression analysis will detect the issues, considering the country's heterogeneity and other possible explanatory control variables, therefore will be employed for papers writing for journal publication. We included in the non-parametric tests only respondents who stated their WTP extra level of percentage (i.e., 0% extra to more than 50% extra) for climate-friendly food products compared to standard food products, while we excluded responses indicating 'don't know' and 'I never buy this product'. Finally, to assess whether there is a statistically significant difference between the observed frequency of sets of categorical responses regarding assessment of interventions influence on awareness and future food chooses with respect to experimental group of each of the three experiments, Pearson's chi-squared test is used.

3. Results and discussion from experiment 1

3.1. Descriptive statistics

To give an overview of the respondents based on some observed socio-demographic characteristics, we presented the distributions of age, gender, educational level, income, and family size across countries in Table 9, and their variation test across the experimental groups in Appendix Table 1. Regarding age distribution, except for Spain, the remaining two countries, exhibit a relatively even age distribution for the sampled respondents, with proportionate representation in each age group (Table 9). Regarding the variation in age, the test result was insignificant across the experimental groups, suggesting relatively evenly distributed samples across the experimental groups (Appendix Table 1).

Table 9: *Percentage distribution of socioeconomic variables for the respondents in experiment 1*

Socio-economic variables and their categories	DK	ES	LT	Total
Age group (in years)				
18-24	19.80	32.33	16.46	22.70
25-34	17.33	42.29	32.75	32.02
35-44	18.56	25.38	21.52	22.07
45-54	25.00	0.00	29.27	18.24
55-64	19.31	0.00	0.00	4.97
Gender				
Male	50.99	49.06	49.68	49.81
Female	49.01	50.56	50.32	50.06
Other	0.00	0.38	0.00	0.13
Education level				
No completed education	0.99	0.38	0.00	0.38
Still under education	3.71	8.83	0.63	4.21
Primary school	4.21	16.35	10.92	11.03
Up to A levels or equivalent (Advanced level)	19.31	25.19	18.35	20.92
Other qualifications/apprenticeships	24.26	33.46	12.66	22.70
Undergraduate (not a Bachelor's degree)	7.92	14.66	30.85	19.45
Graduate (Bachelor's degree)	21.53	1.13	26.11	16.45
Postgraduate (master, doctorate, PHD etc.)	17.08	0.00	0.47	4.59
Income level				
Below average income in my country	25.74	19.92	20.57	21.68
Average income in my country	36.88	57.89	37.50	44.26
Above average income in my country	20.54	17.11	22.31	20.09
More than twice average income in my country	1.98	1.69	3.64	2.55
Do not know or do not want to reveal	14.85	3.38	15.98	11.42
Household size				
one	22.28	8.46	14.72	14.54
two	36.63	24.06	37.03	32.53
three	16.34	32.71	23.10	24.62
four and more	24.50	34.77	24.68	28.06
donot want reveal	0.25	0.00	0.47	0.26

Respondents in experiment 1 were relatively equally distributed by gender across the three countries, and the variation in distributions across the experimental group was insignificant, indicating an even distribution of respondents. Also, Table 9 shows that respondents' education level, income level, and household size were spread out fairly evenly across three countries. There was no significant difference in these variables for the experimental groups, which also shows a fairly even distribution (Appendix Table 1).

3.2. Distribution of consumers WTP extra for climate-friendly foods by experimental groups

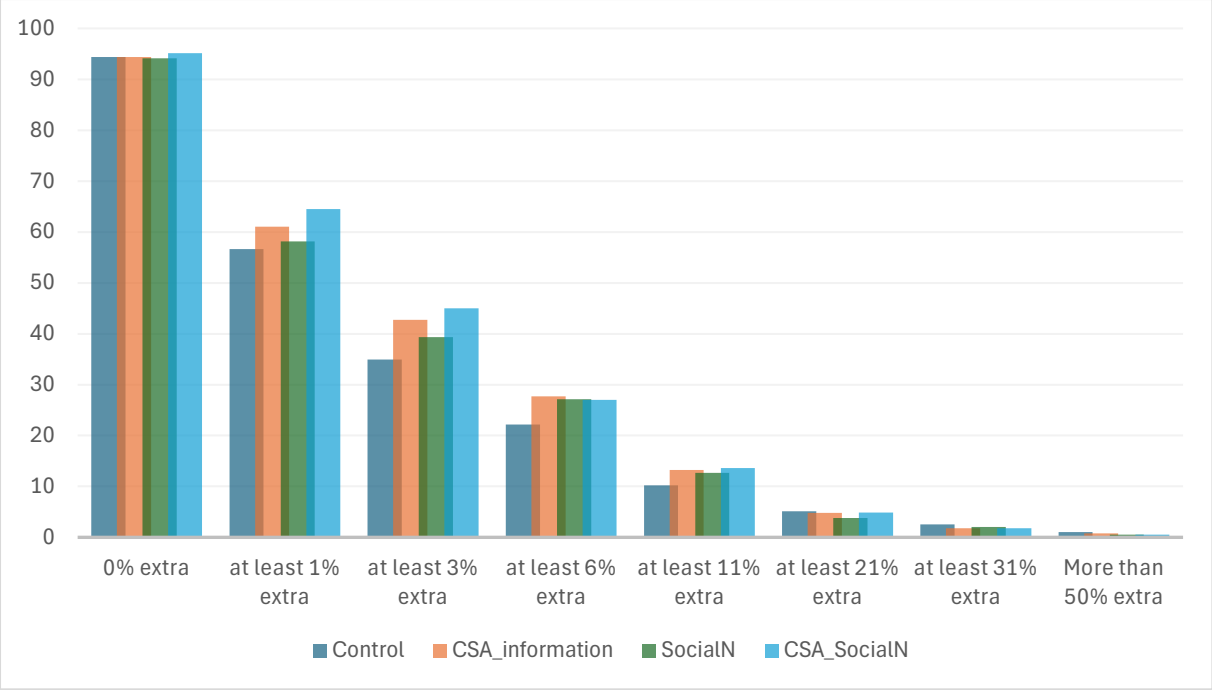
This section presented the cumulative percentage distributions of the WTP extra the three climate friendly food products followed by a short conclusion.

3.2.1. Consumers WTP extra for climate-friendly carrots

The cumulative percentage distributions of WTP extra for climate friendly carrots as compared to standard carrot across the four groups in experiment one: control; those that receive a CSA information; those that receive a dynamic social norm; and those that receive a CSA information + dynamic social norms.
Figure 5 shows that 56.65% of sampled consumers under control group are willing to pay at least 1% extra for climate friendly produced carrots, while 61.06% consumers who received CSA information are willing to pay at least 1% extra.

Among the respondent who receives social norm priming information group, 58.12% of sampled consumers were willing to pay at least 1% extra. The 64.52% of the sampled consumers in CSA_SocialN group expressed their willingness to pay at least 1% for climate friendly produced carrots, highlighting a slightly higher WTP extra across all premium ranges. This implies, that the combination of CSA information and social influence (SocialN) substantially increase the WTP for climate-friendly food products.

Overall, the cumulative distribution of WTP extra for climate-friendly produced carrots in experiment 1 indicates that a slightly higher percentage of consumers who received climate-friendly production practices information along with a dynamic social norm of an increasing trend of climate-friendly food consumption expressed their willingness to pay extra level.

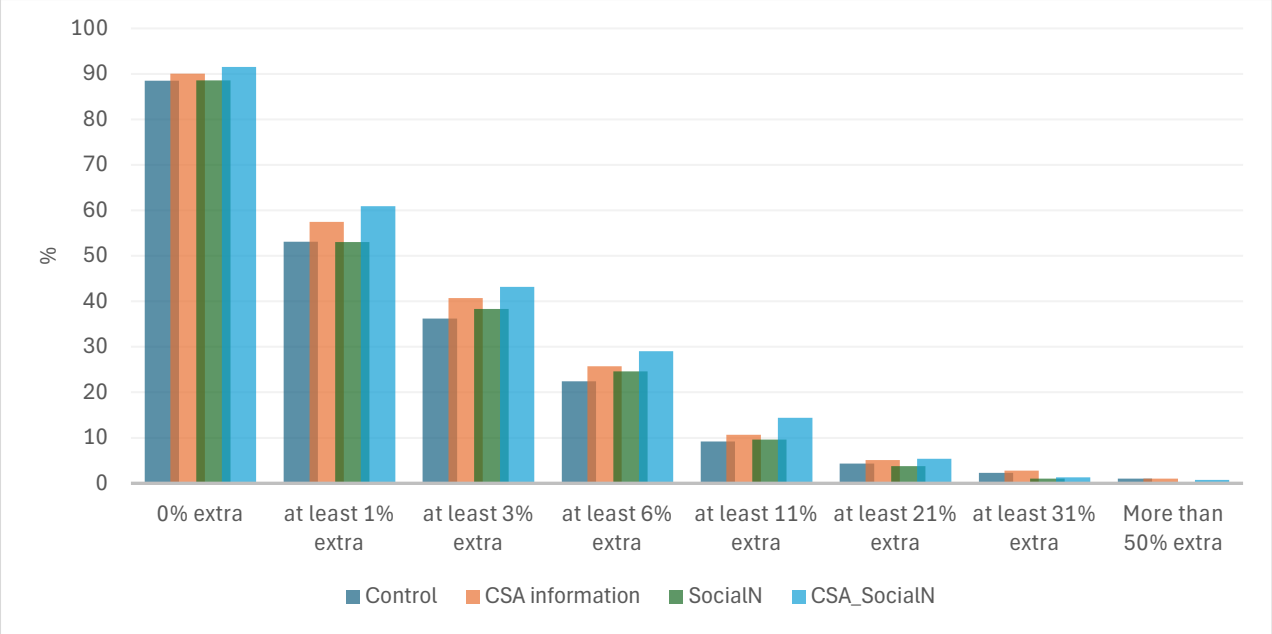


Note that 5,61 %, 5,59%, 5,84 % and 4,88 % of consumers that responded "I do not know & I never buy this product" for WTP choice from control, CSA_information, SocialN and CSA_SocialN intervention groups, respectively were not included in cumulative percentage and presented in the graph.

Figure 1: Percentage distribution of WTP extra for climate friendly carrots across experimental groups (N= 1,568)

3.2.2. Consumers WTP extra for climate-friendly beef

The WTP extra for beef produced by climate-friendly production practices was compared to standard beef around 53% of those in the control group indicated their WTP at least 1% more for climate friendly beef. Around 58%, 53% and 61% of sampled consumers under CSA information, SocialN group and CSA_SocialN indicated their WTP at least 1% more for climate friendly beef (Figure 2). Overall, in experiment one, the cumulative percentage results in Figure 8 indicates that slightly more people in the CSA information and CSA information_SocialN groups were willing to pay extra for climate-friendly beef as compared to the standard one.

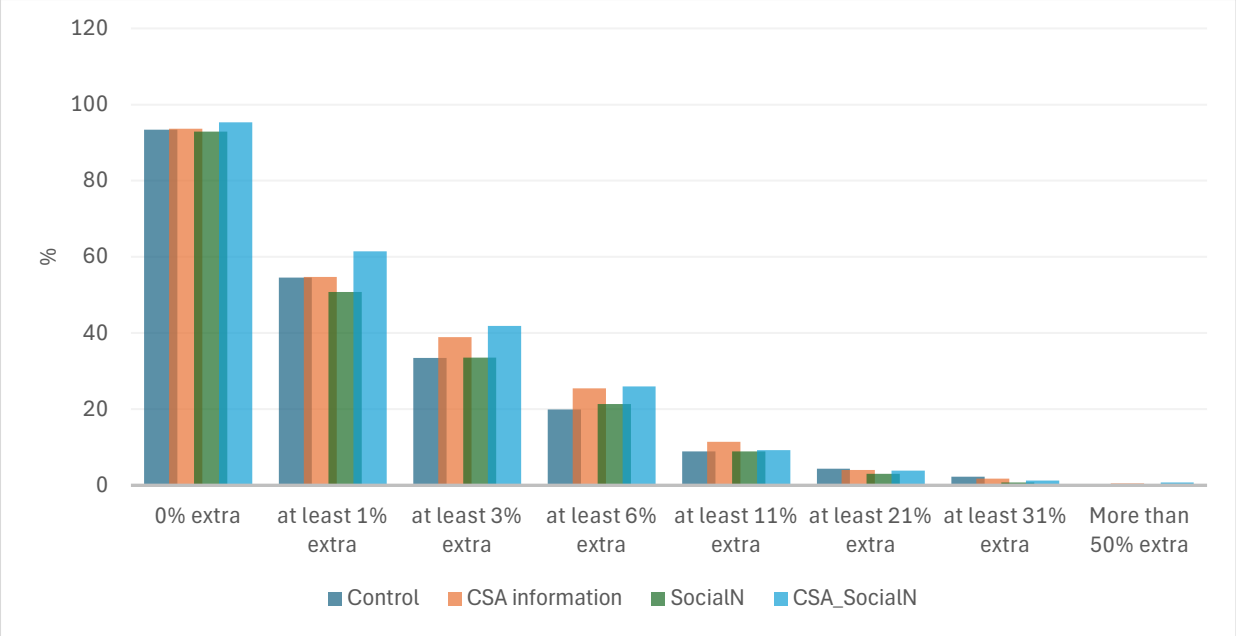


Note that 11.49%, 9.83%,11.42 % and 8.48% of consumers that responded "I do not know & I never buy this product" for WTP choice from control, CSA_information, SocialN and CSA_SocialN experimental groups, respectively were not included in cumulative percentage and presented in the graph.

Figure 2: Percentage distribution of WTP extra for climate friendly beef across experimental groups (N= 1,568)

3.2.3. Consumers WTP extra for climate-friendly bread

In experiment 1, the WTP for climate-friendly bread that is produced from wheat using climate-friendly agricultural technologies (in our case, precision technologies that can reduce the use of chemical fertilizers, pesticides, and irrigation water) was assessed for the three intervention and control groups compared to standard bread. The cumulative percentage of sampled consumers in Experiment 1 who were willing to pay more for climate-friendly bread showed that 54.59% of those in the control group were willing to pay at least 1% more, whereas around 55%, 51%, and 61% of the CSA information group, SocialN group, and CSA_SocialN group, respectively, were willing to pay at least 1% extra (Figure 3).In summary, the cumulative percentage distribution for extra WTP for climate friendly bread form experiment 1 seems that higher percentage of sampled consumers in CSA_SocialN group were more willing to pay more for climate-friendly bread, ranging from 1 to 10% more while consumers in CSA information group shows their willing to pay more than 10% for climate-friendly bread.



Note that 6.64%, 6.36%,7.11 % and 4.54% of consumers that responded "I do not know & I never buy this product" for WTP choice from control, CSA information, SocialN and CSA_SocialN experimental groups, respectively were not included in cumulative percentage and presented in the graph.

Figure 3: Percentage distribution WTP extra for climate friendly bread across experimental groups (N= 1,568)

3.3. Non-parametric testing for WTP extra by experimental groups and products

The non-parametric test for experiment 1 in Table 10 reveals a significant mean difference between the control group and CSA information for carrot. However, for climate-friendly beef and bread, the differences are not significant. None of the mean differences for climate-friendly carrot, beef, or bread shows a statistical significance due to social norm intervention as compared to control. For all three food products (carrot, beef, and bread), provisions of a combined CSA information and social norm information show statistically significant differences compared to the control group. The Kruskal-Wallis equality-of-populations rank test indicates that there is a statistically significant difference in WTP among the experimental groups for carrot (p = 0.0594) and bread (p = 0.0524), but not for beef (p = 0.1289).

Table 10: Dunn's Pairwise Comparison of WTP by experimental groups (experiment 1)

Col Mean-Row Mean	**Climate-friendly carrot**	**Climate-friendly beef**	**Climate-friendly bread**
Interventions	**Control z-statistic**	**Control z-statistic**	**Control z-statistic**
CSA information	-1.96 (0.025)	-1.209 (0.113)	-1.021 (0.154)
SocialN	-1.151(0.126)	-0.359 (0.359)	0.472 (0.318)
CSA_SocialN	-2.58(0.005)	-2.179(0.015)	-2.075 (0.019)
Kruskal–Wallis equality-of-populations rank test	0.059	0.129	Prob = 0.052

Note: The z-statistic indicates the standardised difference in mean ranks between two groups. The value enclosed in brackets is the p-value. A negative z-statistic indicates that the mean rank of the first group (control) is lower than that of the second group (intervention). The z-statistic value indicates the size of the difference (Dinno, 2015).

In summary, compared to the control group in experiment 1, the combined CSA information and social norm intervention has significant influence on consumers' WTP for all three climate-friendly food products, while CSA information intervention shows a mixed results depending on the specific food product.

3.4. Assessment the interventions influence on awareness and future food choices

3.3.1. Influence of interventions on increased awareness about climate impact of food production

Table 11 shows the influence of the provided CSA information, the dynamic social norm, and the combination of two interventions on awareness change about climate impact of food production. The sampled consumers who received the CSA information showed a slightly higher agreement percentage (46.06%) as compared others, indicating that this information might have had a positive influence in improving their awareness about the impact of food production on climate. On the other hand, 43.91% of respondents in the social norm group expressed partial or total agreement regarding their improved awareness. Moderately, 44.47% of the sampled respondents who received combined CSA and social norm information indicated their partial and total agreement regarding increased awareness about climate impact of food production as a result of the provided information.

Overall, of the tested three interventions seems respondent's awareness relatively improved as compared to the respondents in control group. This suggests that including information about CSA, social norms, or a combination of both on the top label could increase people's awareness of the impact of food production on the climate, potentially influencing their consumption behaviour towards climate friendly food.

Table 11: The percentage distribution of participants increased awareness in experiment 1

Experimental groups	**Increased my awareness**						
	Totally_disagree	Partly_disagree	Neither_agree_nor_disagree	Partly_agree	Totally_agree	Do_not_know	Total
Control	47	45	124	104	53	19	392
%	11.99	11.48	31.63	26.53	13.52	4.85	100.00
CSA information	34	47	120	123	58	11	393
%	8.65	11.96	30.53	31.30	14.76	2.80	100.00
SocialN	48	49	113	108	65	11	394
%	12.18	12.44	28.68	27.41	16.50	2.79	100.00
CSA_SocialN	45	34	131	105	68	6	389
%	11.57	8.74	33.68	26.99	17.48	1.54	100.00
Total	174	175	488	440	244	47	1,568
%	11.10	11.16	31.12	28.06	15.56	3.00	100.00

Pearson chi2(15) = 19.1146 Pr = 0.209

Note: The first row indicates the number of respondents, and the second row is percentage for each experimental group.

3.3.2. Influence of the interventions on future consumer purchasing decisions

In assessing if the given information as an intervention influences the future food choices of the sampled consumers for different experimental groups, experiment one's results

show that 41.99% of the sampled consumers who received CSA information expressed partial or total agreement, indicating that the provided information has influenced their future food choices towards climate-friendly choices (Table 12). Among the sampled consumers in experiment one who received combined information about CSA and social norms, 39.83% showed partial or total agreement with the information's influence on their future climate friendly food choices. Overall, when looking at how much people agreed with the given intervention's effectiveness, it seems that the sampled consumers who received CSA information and combined it with social norms had a slightly higher percentage of both partial and total agreement, indicating that the given intervention had a slightly higher influence on consumers future climate-friendly food choices.

Table 12: The information I just received will affect my future food choice in experiment 1

Experimental groups	**Will affect my future food choice**						
	Totally_ disagree	Partly_disa gree	Neither_agre e_nor_disagr ee	Partly_a gree	Totally_a gree	Do_not_ know	Total
Control	57	50	127	105	34	19	392
%	14.54	12.76	32.40	26.79	8.67	4.85	100.00
CSA information	48	41	127	116	49	12	393
%	12.21	10.43	32.32	29.52	12.47	3.05	100.00
SocialN	57	41	129	101	53	13	394
%	14.47	10.41	32.74	25.63	13.45	3.30	100.00
CSA_SocialN	49	39	138	108	46	9	389
%	12.60	10.03	35.48	27.76	11.83	2.31	100.00
Total	211	171	521	430	182	53	1,568
%	13.46	10.91	33.23	27.42	11.61	3.38	100.00

Pearson chi2(15) = 13.2088 Pr = 0.586

Note: The first row indicates the number of respondents, and the second row is percentage for each experimental group.

3.5. Certainty about the stated extra WTP percentage

We also looked at how certain consumers feel about their stated extra WTP percentage level. Of the sampled consumers who participated in experiment one, 3.7% indicated very high uncertainty about their stated extra WTP, whereas 9.57% indicated a little uncertainty (Figure 4). In experiment one, the majority of sampled respondents stated their WTP extra, with 34.25% expressing a somewhat certain feeling and 34.69% indicating a high level of certainty. Overall, the distribution indicates that the majority of the sampled consumers (around 69% of the experiment participants) were somehow certain about their stated extra WTP, signaling their intention to pay a premium for climate-friendly produced food.

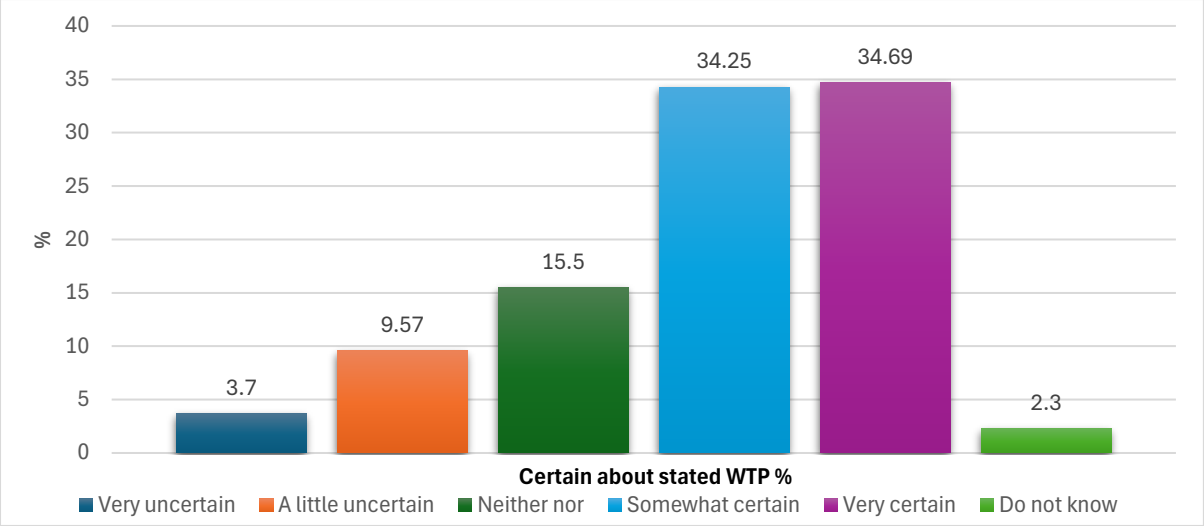


Figure 4: Certainty about the stated extra willingness to pay percentage (Experiment 1)

3.6. Control behaviour factors considered

3.6.1. *Consumer Perceptions on Paying extra for Climate-Friendly Food*

The result in Table 13 on consumers perceptions of not paying more than the stated percentages reflects the proportion of respondents who agree to varying degrees with three different statements: 1) I think food is expensive enough already; 2) I do not think it is me, as a consumer, who should pay for a lower climate impact from food; and 3) I do not trust that the label will guarantee a lower climate impact from the product.

Regarding "I think food is expensive enough already," a significant majority of 72.10% either partly or totally agree, indicating a general perception that food prices are already high without additional costs for climate-friendly choices. While regarding "I do not think it is me as a consumer who should pay for lower climate impact from food," the results are more evenly distributed across the spectrum of agreement, but there is a slight leaning towards disagreement, with a combined total of 28.76% either totally or partly disagreeing. Furthermore, in terms of "I do not trust that the label will guarantee lower climate impact from the product," the highest percentage of respondents, 32.53%, partly agree, while 25.65% totally agree.

Table 13: Percentage distribution consumers perception on paying extra for Climate-Friendly Food (N= 1568)

Statements	Totally disagree	Partly disagree	Neither agree nor disagree	Partly agree	Totally agree	Do not know
I think food is expensive enough already	2.55	5.23	15.63	30.80	44.39	1.40
I do not think it is me as a consumer, who should pay for lower climate impact from food	5.87	15.11	26.85	24.36	25.19	2.61
I do not trust that the label will guarantee lower climate impact from the product	5.68	12.05	23.21	29.91	26.53	2.61

Due to its importance, the trust in the label is also presented country-wise. Here we found that in Denmark and Spain, close to 50% stated that they don't trust the label (they stated

that they partly or totally agree that they do not trust the label). In Lithuania, the distrust is higher 67% of the sample distrusted the label (precise numbers are found in appendix table 4).

3.6.2. *The consumers opinions on the impact of food production on climate change*

The results in Table 14 below show a variety of opinions of the sampled consumers for experiment 1 on the impact of food production on climate change and personal responsibility in mitigating it. A significant proportion of respondents, 32.35%, partly agree that food production has a large impact on climate change, while 24.80% totally agree, indicating a general consensus on the issue. However, when it comes to personal food consumption, 25.21% partly agree, and only 11.65% totally agree that they try to consume food with low climate impact. Conversely, a larger percentage, 37.97%, totally agree that they try to decrease their climate impact in ways other than food consumption. In experiment 1, the sampled consumers (36.63%) partially agreed on their concern for global climate change, with 28.76% totally agreeing. The sampled consumers' perception regarding their willingness to pay a higher price for food produced using new climate-friendly agricultural solutions is moderately high, with about 34% of consumers indicating their total agreement. Finally, about 29.09% and 22.24% of the sampled respondents for experiment one were totally and partially in agreement with the statement, "Because my personal contribution is very small, I do not feel responsible for climate change," respectively.

Table 14: Percentage distribution of on extend of agreement with the following statements (N=1568)

Statements	Totally disagree	Partly disagree	Neither agree nor disagree	Partly agree	Totally agree
I think that food production has a large impact on climate change	6.75	8.16	27.94	32.35	24.80
I try to consume food with low climate impact	13.82	12.84	36.47	25.21	11.65
I try to decrease my climate impact in other ways than through my food consumption	7.35	6.96	24.51	37.97	23.21
I am concerned about global climate changes	6.96	6.38	21.28	36.63	28.76
I am willing to pay a higher price for food produced using new climate-friendly agricultural solutions	19.92	13.32	23.64	33.96	9.14
Because my personal contribution is very small, I do not feel responsible for climate change (reverse)	14.48	20.61	29.09	22.24	13.57

3.6.3. *Attributes considered when buying food*

The results presented in Table 15 are an assessment of some of the attributes that consumers consider when choosing food products. Price is the most considered factor by the sampled consumers during the purchase of food products, with 49.55% considering it very important. Taste and freshness are other aspects that consumers consider when choosing climate-friendly food products, with 57.77% of sampled consumers in experiment 1 considering them as very important attributes. Consumers also consider the food's health properties, with 36.78% deeming them important and 36.65% considering

them very important. Environmental impact, animal welfare aspects, and organic certification are also other attributes considered by sampled consumers, with 27.4%, 32.55%, and 23.23% of respondents, respectively, indicating them as important. In conclusion, the result shows that consumers prioritize price, taste, and health properties, with considerable consideration to animal welfare and the environmental impact aspects of food when making their purchase decisions.

Table 15: Percentage distribution on characteristics considered for choices of food products (N=1568)

Statements	Not important	Slightly important	Moderately important	Important	Very important
Environmental impact	10.46	18.53	30.51	27.40	13.10
Animal welfare	5.63	11.00	25.80	32.55	25.02
Price	0.91	3.04	12.23	34.28	49.55
Taste and freshness	0.39	1.93	7.41	32.50	57.77
Health properties	1.95	6.45	18.16	36.78	36.65
Certified organic	15.31	18.72	28.40	23.23	14.33

3.6.4. *Eating habits of consumers*

Regarding the eating habits of consumers, the majority of the sampled consumers (51.21%) stated that they often eat meat or fish and also have several meat free days in a week. The second most stated eating habit by sampled consumers is eating meat or fish most days (42.35%) (Figure 5).

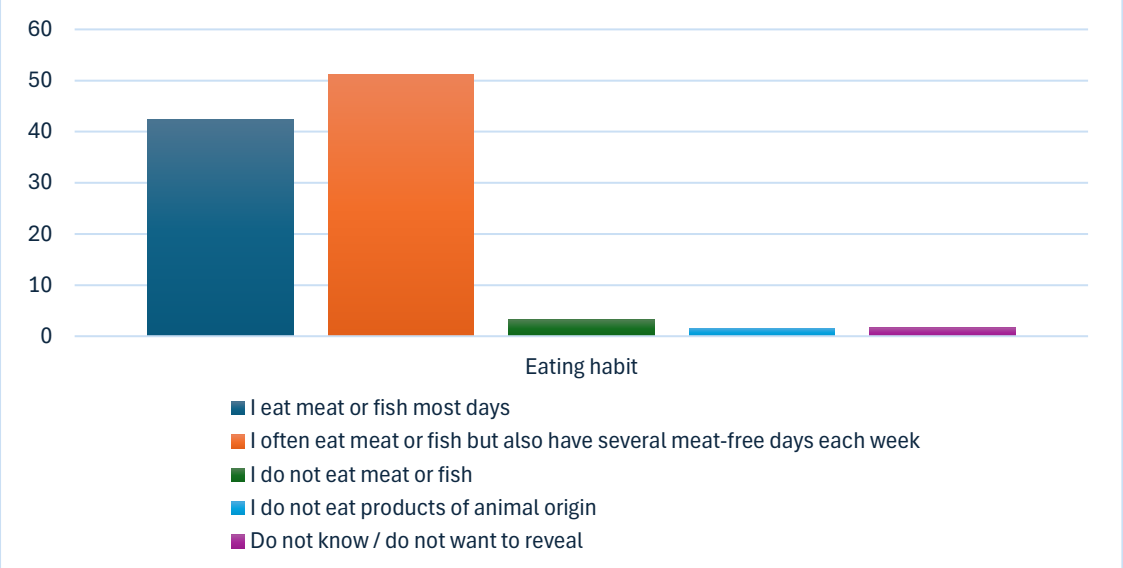


Figure 5: How would you describe your eating habits? Please mark the statement that best describes your eating habits

Regarding the beef consumption frequency of 1587 respondents participated in experiment 1, the majority, accounting for 37.15%, report eating beef around once every week. The second-largest group, comprising 30.92%, consumes beef once per month or less and those stated that those who eat beef several times every week represent 22.96% (Table 16).

Table 16: How often do you eat beef (e.g. steak, minced beef) ?

How often do you eat beef?	Frequency	Percentage
Never	85	5.69

Once per month or less	462	30.92
Around once every week	555	37.15
Several times every week	343	22.96
Every day	26	1.74
Do not know/do not want to reveal	23	1.54
Total	1,494	100.00

Regarding the sampled consumer organic vegetable purchasing habits, the result in table 17 reveals that a majority of consumers (45.22%) sometimes purchase organic vegetables (2-4 times out of every 10 purchases). About 17.60% indicate that they often buy organic (5–6 times out of 10). Only 8.16% of sampled consumers said they buy organic vegetables quite frequently (7-8 times out of 10), whereas only 5.29% said they buy organic vegetables almost always. Conversely, a significant portion, 18.30%, never buy organic products, suggesting either a lack of interest or access to organic options.

Table 17 Think of when you buy vegetables. How often do you buy vegetables that are labelled as "organic"?

How often do you buy vegetables labelled as "organic"	Frequency	Percentage
Never (0 -1 times out of 10)	287	18.30
Sometimes (2-4 times out of 10)	709	45.22
Often (5-6 times out of 10)	276	17.60
Quite frequently times out of 10) (7-8	128	8.16
Almost always times out of 10) (9-10	83	5.29
Do not know	85	5.42
Total	1,568	100.00

3.6.5. *Country-specific questions*

In Denmark, the country-specific question concerned whether pork production was perceived to be more climate friendly than beef. Almost half of the respondents partly agreed or totally agreed that pork is more climate-friendly than beef. Lack of knowledge was indicated by the 21% answering 'don't know'. Thereby, the overall impression is that there is a communication task ahead (or a change in production methods) in order to place consumers on the right page regarding that beef has by far the highest climate footprint as compared to pork.

In Spain, the country-specific question concerned the importance of socio-economic impact compared to the environmental impact of food production. We found that approximately 35% somewhat agree and 27% totally agree that food production's socio-economic impact is as important as its environmental impact. Only 3% answered 'don't know'.

In Lithuania, the country-specific question was whether the income for farmers or the farms' impact on nature was most important. A significant 40% of sampled Lithuanian consumers neither agree nor disagree that ensuring the income of wheat farms is more important than reducing their impact on nature. Furthermore, around 25% agreed and 25% disagreed with the statement. The response category 'don't know' was chosen by 12% of the sample.

Box1: Country-specific statements for Denmark, Spain and Lithuania

Countries	Totally disagree	Partly disagree	Neither agree nor disagree	Partly agree	Totally agree	Do not know	Total
As far as I know, it is more climate-friendly to eat pork than beef.							
DK	14	22	94	115	75	84	404
%	3.47	5.45	23.27	28.47	18.56	20.79	100.00
I believe that the socio-economic impact of food production is at least as important as its environmental impact.							
ES	26	38	117	189	146	16	532
%	4.89	7.14	21.99	35.53	27.44	3.01	100.00
Ensuring the income of the wheat farm is more important than reducing the farm's impact on nature.							
LT	56	101	254	92	54	75	632
%	8.86	15.98	40.19	14.56	8.54	11.87	100.00

3.7. Summing up on experiment 1

Firstly, non-parametric tests were used to assess the overall effects of information-based interventions on consumers' WTP for climate-friendly varieties of three food products (fresh carrots, ground beef and a loaf of bread). The interventions included information about CSA or information about the social norm that more and more people buy and are willing to pay price premiums for climate-friendly food or a combination of these two pieces of information.

The combination of CSA information and social norm intervention was found to have a statistically significant influence on consumers' WTP extra for all three climate-friendly food products. The results for CSA information intervention were mixed as the intervention had a statistically significant effect on the distribution of WTP for carrots but not for beef and bread. The social norm intervention was not statistically significant for any of the products.

The WTP extra results indicated that 53-57% of the respondents had a positive WTP for climate-friendly varieties of the three food products in the control group (small variation across carrots, beef and bread). That is, WTP for the labelled product without additional information provided. Slightly more consumers (61-65%) from the group who has received information about the CSA and about the social norm stated a positive WTP for the climate-friendly product varieties.

Secondly, the effects on the interventions on consumers' self-reported assessment of the interventions' influence on awareness and future food purchase choice were tested. We found that, the tested interventions (information about CSA, social norms, or a combination of both) in experiment one had higher percentage agreement (partial and total) regarding improved awareness of food production on climate than the control group. Regarding the effect of the interventions on future choice, only the CSA information and the combination of CSA information with social norm information had a statistical effect on the share of consumers indicating that the intervention would affect their future choices towards buying more climate-friendly food products. The intervention with social norm information was not found to have a significant effect on future food choices compared to the control group.

4. Results and discussion from experiment 2

4.1. Descriptive statistics

To give an overview of the respondents based on some observed socio-demographic characteristics, we presented the distributions of age, gender, educational level, income, and family size across countries in Table 18, and their variation test across the experimental groups in Appendix Table 2. Regarding age distribution, the sampled respondents from the two countries considered under experiment two exhibit a relatively even age distribution, with proportionate representation in each age group (Table 18). Regarding the variation in age, the test result was insignificant across the experimental groups, suggesting relatively evenly distributed samples across the experimental groups (Appendix Table 2). Respondents were relatively equally distributed by gender across the two countries, and the variation in distributions across the experimental groups was insignificant, indicating an even distribution of respondents. Also, Table 18 shows that respondents' education level, income level, and household size were spread out evenly across the two countries. There was no significant difference in these variables across the experimental groups under experiment two, which also shows a fairly even distribution (Appendix Table 2).

Table 18: Percentage distribution of socioeconomic variables for respondents in experiment 2

Socio-economic variables and their categories	DE	NL	Total
Age group (in years)			
18-24	4.66	11.68	8.21
25-34	24.07	25.73	24.91
35-44	27.24	20.26	23.71
45-54	22.20	25.00	23.62
55-64	21.83	17.34	19.56
Gender			
Male	50.93	50.91	50.92
Female	48.69	49.09	48.89
Other	0.38	0.00	0.38
Education level			
No completed education	0.19	0.73	0.46
Still under education	0.37	0.55	0.46
Primary school	9.70	0.18	4.89
Up to A levels or equivalent (Advanced level)	28.17	14.42	21.22
Other qualifications/apprenticeships	22.76	1.46	11.99
Undergraduate (not a Bachelor's degree)	2.99	31.02	17.16
Graduate (Bachelor's degree)	19.96	33.94	27.03
Postgraduate (master, doctorate, PHD etc.)	14.55	17.34	15.96
Income level			
Below average income in my country	19.03	18.98	19.00
Average income in my country	45.15	31.39	38.19
Above average income in my country	23.88	29.38	26.66
More than twice average income in my country	3.36	7.48	5.44
Do not know or do not want to reveal	8.58	12.77	10.70
Household size			
one	29.10	25.18	27.12

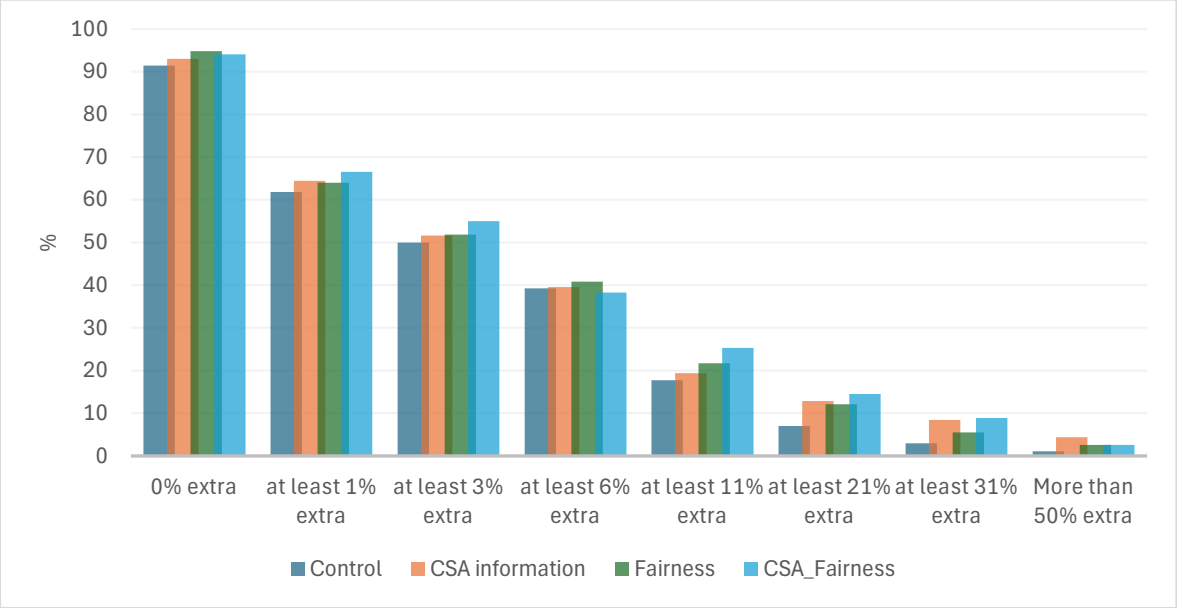
two	30.78	27.92	29.34
three	20.52	17.70	19.10
four and more	19.03	28.65	23.89
donot want reveal	0.56	0.55	0.55

4.2. Distribution of consumers WTP extra for climate-friendly foods by experimental groups

4.2.1. *Consumers WTP extra for climate-friendly carrots*

The cumulative percentage distribution of respondents' WTP extra for climate-friendly produced carrots from experiment 2 (see Figure 6) shows that 61.84% of respondents in the control group, 64.48% in the CSA information group, 63.97% in the Fairness group, and 66.54% in the CSA_Fairness group stated their willingness to pay at least 1% extra.

This distribution also indicates that the cumulative percentage of the WTP extra percentage level for climate friendly carrots is slightly higher in for the three interventions considered compared to the control group. Overall, in experiment two, the interventions, especially the combination of CSA information and CSA_Fairness, indicated a slightly higher percentages of respondents willing to pay a premium for climate-friendly-produced carrots compared to the control group across the different WTP extra percentage level.



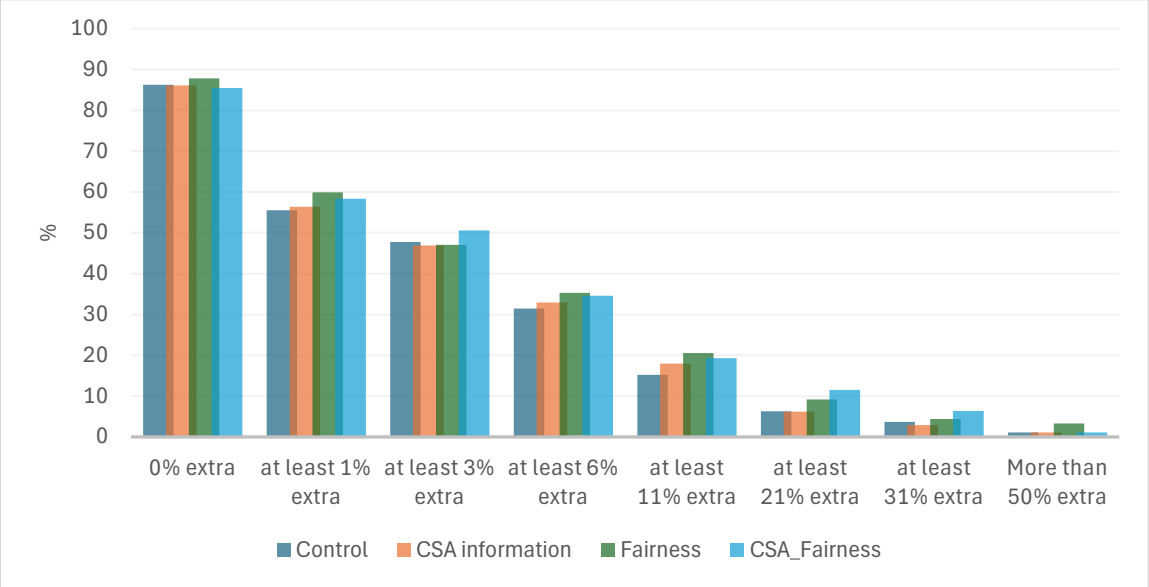
Note that 8.52%, 6.96%,5.15 % and 5.95% of consumers that responded "I do not know" or "I never buy this product" for WTP choice from control, CSA information, Fairness and CSA_Fairness experimental groups, respectively were not included in cumulative percentage and presented in the graph.

Figure 6: Percentage distribution for carrot premium WTP across experimental groups in experiment 2 (N= 1,084)

4.2.2. *Consumers WTP extra for climate-friendly beef*

In experiment 2, 55.56% of the control group were WTP at least a 1% premium for climate friendly beef as compared to standard beef whereas around 56%, 60% and 58% of consumers who received the CSA information, Fairness information and combination of CSA and Fairness, respectively were willing to pay at least one percent extra. Overall, the

cumulative percentage distribution indicates that slightly higher percentage of sampled consumers under Fairness and CSA_Fairness groups show their willingness to pay at least 1% extra for climate-friendly beef.

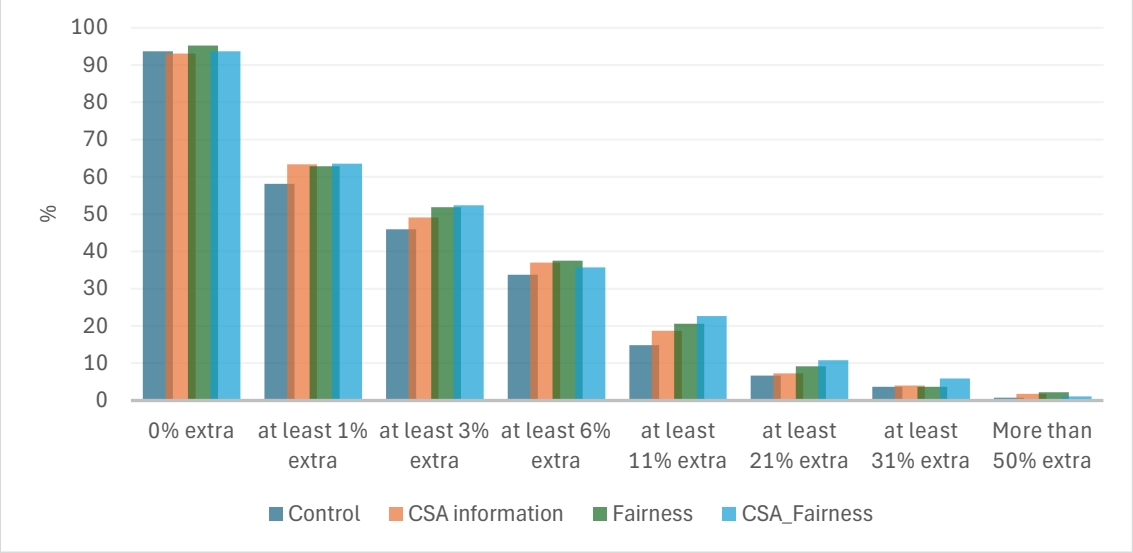


Note that 13.7%, 13.92%, 12.13% and 14.5% of consumers that responded "I do not know & I never buy this product" for WTP choice from control, CSA_information, Fairness and CSA_Fairness experimental groups, respectively were not included in cumulative percentage and presented in the graph.

Figure 7: Percentage distribution of WTP extra for climate friendly produced beef across experimental groups in experiment 2 (N= 1,084)

4.2.3. Consumers WTP extra for climate-friendly bread

The cumulative percentage of WTP extra for climate-friendly bread from experiment 2 shows that 58.14% of respondents were WTP at least 1% more premium in the control group. While 63.39% of respondents were WTP at least 1% more premium in the CSA information, 62.87% in the Fairness group, and 63.57% in the CSA_Fairness group (Fig 8). Overall, it seems that slightly higher percentage of consumers in the CSA information, Fairness and CSA_Fairness experimental groups were willing to pay a WTP for climate-friendly bread.



Note that 6.29%, 6.96%, 4.78% and 6.32% of consumers that responded "I do not know & I never buy this product" for WTP choice from control, CSA_information, Fairness and CSA_Fairness experimental groups, respectively were not included in cumulative percentage and presented in the graph.

Figure 8: Percentage distribution of WTP for bread across experimental groups in experiment 2 (N= 1,084)

4.3. Non-parametric testing for WTP extra by experimental groups and product

In Table 19, the non-parametric test for experiment 2 reveals the mean difference between the control group and CSA information, and fairness has no statistical significance for carrot and beef. However, for climate friendly bread, the difference is significant at the 10% probability level. Regarding WTP extra for climate friendly beef, provisions of a combined CSA and fairness information show statistically significant differences compared to the control group at 10% probability. In addition, the mean difference for WTP extra for climate friendly bread is statistically significant for the combined CSA and fairness information intervention when compared to the control.

In summary, the combined CSA and fairness information intervention has the significant influence on consumers' WTP extra for climate friendly bread and beef compared to the control group, while the other intervention groups and food products show no significant differences.

Table 19: Dunn's Pairwise Comparison of WTP by experimental groups (experiment 2)

Col Mean-Row Mean	Climate-friendly carrot	Climate-friendly beef	Climate-friendly bread
Interventions	Control	Control	Control
	z-statistic	z-statistic	z-statistic
CSA information	-0.598 (0.27)	-0.338 (0.367)	-1.315 (0.094)
Fairness	-0.424 (0.338)	-0.938 (0.174)	-1.337 (0.091)
CSA_Fairness	-1.149 (0.125)	-1.306 (0.096)	-1.736 (0.0413)
Kruskal–Wallis equality-of-populations rank test	Prob=0.715	Prob = 0.559	Prob = 0.330

Note: The z-statistic indicates the standardised difference in mean ranks between two groups. The value enclosed in brackets is the p-value. A negative z-statistic indicates that the mean rank of the first group (control) is lower than that of the second group (intervention). The z-statistic value indicates the size of the difference (Dinno, 2015).

4.4. Assessment the interventions influence on awareness and future food choices

4.4.1. *Influence of interventions on increased awareness about climate impact of food production*

Table 20 shows the influence of the interventions provided in experiment 2, namely CSA information, fairness information along the value chain, and the combination of two interventions changing awareness about the impact of food production on climate. The results indicate that a total of 40.37% of participants in the control group agreed to some extent (partly or totally) about their increased awareness about the impact of food production on climate. On the other hand, those sampled participants who received the CSA information responded that 46.52% were partially or totally in agreement, indicating

that providing CSA information rather than simply putting the label on climate-friendly food might increase awareness about the impact of food production, which will potentially have an influence on shifting towards the consumption of climate-friendly food products. Moderately, 44.64% of the sample respondents who received a combination of CSA and fairness information in experiment 2 agreed that awareness about the climate impact of food production increased as a result of the provided information. Overall, when comparing the percentages in agreement across experimental groups, it seems that the provisions of CSA information and the combination of CSA and fairness information show a slightly higher tendency to increase awareness of the impact of food production on climate.

Table 20: The percentage distribution of participants increased awareness in experiment 2

Experimental groups	**Increased my awareness**						
	Totally_disagree	Partly_disagree	Neither_agree_nor_disagree	Partly_agree	Totally_agree	Do_not_know	Total
Control	37	25	94	77	32	5	270
%	13.70	9.26	34.81	28.52	11.85	1.85	100.00
CSA information	35	34	72	87	40	5	273
%	12.82	12.45	26.37	31.87	14.65	1.83	100.00
Fairness	32	41	75	86	24	14	272
%	11.76	15.07	27.57	31.62	8.82	5.15	100.00
CSA_Fairness	29	29	81	86	34	10	269
%	10.78	10.78	30.11	31.97	12.64	3.72	100.00
Total	133	129	322	336	130	34	1,084
%	12.27	11.90	29.70	31.00	11.99	3.14	100.00

Pearson chi2(15) = 20.5266 Pr = 0.153

Note: The first row indicates the number of respondents, and the second row is percentage for each experimental group

4.4.2. *Influence of the interventions information on future consumer purchasing decisions*

The influence of the tested interventions in experiment 2 in influencing the sampled consumers future food choices towards climate-friendly produced food is presented in Table 21. About 39% of the sampled consumers who received CSA information expressed partial or total agreement, indicating a greater level of optimism about the information's ability to shape their future food choices towards climate-friendly options. While the consumers who received the fairness information showed a slightly higher inclination towards agreement, with 41.18% partly and totally agreeing, Furthermore, among the sampled participants who received the combined CSA and fairness information in experiment 2, 42.38% expressed their partial and total agreement regarding the influence of the information in shaping their future climate-friendly food choices.

Table 21: The information I just received will affect my future food choice in experiment 2

Experimental groups	**Will affect my future food choice**						
	Totally_disagree	Partly_disagree	Neither_agree_nor_disagree	Partly_agree	Totally_agree	Do_not_know	Total
Control	43	30	77	83	27	10	270
%	15.93	11.11	28.52	30.74	10.00	3.70	100.00
CSA information	44	37	73	75	32	12	273
%	16.12	13.55	26.74	27.47	11.72	4.40	100.00
Fairness	40	36	67	87	25	17	272
%	14.71	13.24	24.63	31.99	9.19	6.25	100.00

CSA_Fairness	34	28	79	87	27	14	269
%	12.64	10.41	29.37	32.34	10.04	5.20	100.00
Total	161	131	296	332	111	53	1,084
%	14.85	12.08	27.31	30.63	10.24	4.89	100.00

Pearson chi2(15) = 8.5355 Pr = 0.1901

Note: The first row indicates the number of respondents, and the second row is percentage for each experimental group

4.5. Certainty about the stated extra WTP percentage

Among the sampled consumers who participated in experiment two, about 4% were very uncertain about their stated extra WTP, whereas 6.64% indicated a little uncertainty (Figure 9). The majority of respondents in experiment two stated their extra WTP, with 44.37% expressing a somewhat certain level of certainty and 30.54% indicating a high level of certainty. In general, the distribution indicates that the majority of the sample consumers for experiment two (approximately 75%) are somewhat certain about their stated extra WTP, signalling their intention to pay extra prices for climate-friendly produced food.

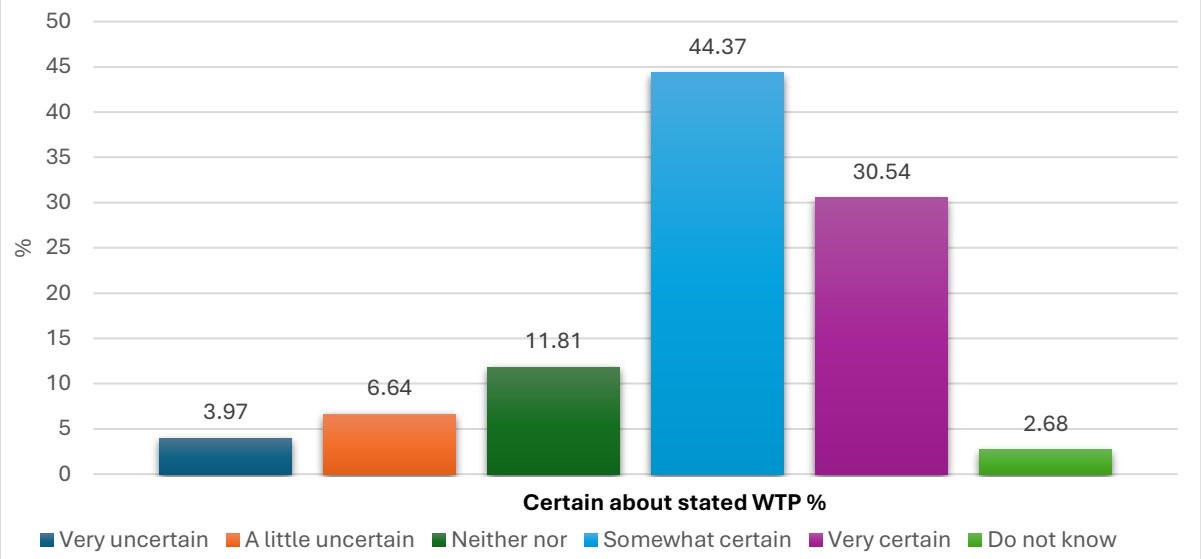


Figure 9: Certainty about the stated extra willingness to pay percentage (Experiment 2)

4.6. Control behaviour factors considered

4.6.1. *Consumer Perceptions on Paying extra for Climate-Friendly Food*

Regarding consumers' perceptions of not being willing to pay more than stated (Table 22), the percentages reflect the proportion of respondents who agree, to varying degrees, with three different statements: 1) I think food is expensive enough already; 2) I do not think it is me, as a consumer, who should pay for a lower climate impact from food; and 3) I do not trust that the label will guarantee a lower climate impact from the product.

Regarding "I think food is expensive enough already," a significant majority of 72.11% either partly or totally agree, indicating a general perception that food prices are already high without additional costs for climate-friendly choices. While regarding “I do not think it is me as a consumer who should pay for lower climate impact from food," the results are more evenly distributed across the spectrum of agreement, but there is a slight leaning towards disagreement, with a combined total of 44,28% either totally or partly agreeing.

Furthermore, in terms of "I do not trust that the label will guarantee lower climate impact from the product," the highest percentage of respondents, 32.84%, partly agree, while 23.06% totally agree.

Table 22: *Percentage distribution about "I will not pay more than I stated for food labelled 'Produced climate-friendly' because (N= 1084)*

Statements	Totally disagree	Partly disagree	Neither agree nor disagree	Partly agree	Totally agree	Do not know
I think food is expensive enough already	3.78	9.32	13.28	29.80	42.34	1.4
I do not think it is me as a consumer, who should pay for lower climate impact from food	11.44	22.97	18.73	24.08	20.20	2.58
I do not trust that the label will guarantee lower climate impact from the product	7.10	13.75	20.11	32.84	23.06	3.14

Due to its importance, the trust in the label is also presented country-wise. Here we found that in Germany 58% and the Netherlands 54% stated that they don't trust the label (they stated that they partly or totally agree that they do not trust the label) (precise numbers are found in appendix table 4).

4.6.2. *The consumers opinions on the impact of food production on climate*

The results in Table 23 below show a variety of opinions on the impact of food production on climate change and personal responsibility in mitigating it. A significant proportion of respondents, 34.59%, partly agree that food production has a large impact on climate change, while 30.14% totally agree. However, when it comes to personal consumption habits, 43.13% partly agree, and only 22.18% totally agree that they try to consume food with low climate impact. The sampled consumer agreement about their concern on the global climate change is relatively high, with 36.66% totally agreeing. The willingness to pay a higher price for food produced using new climate-friendly agricultural solutions is moderately high, with 53.31% of consumers indicated their partially and totally agreement. Finally, about 19.09% and 23.35% were totally and partially in agreement with the statement, "Because my personal contribution is very small, I do not feel responsible for climate change," respectively.

Table 23: Percentage distribution of on extend of agreement with the following statements (N=1084)

Statements	Totally disagree	Partly disagree	Neither agree nor disagree	Partly agree	Totally agree
I think that food production has a large impact on climate change	7.36	7.75	20.16	34.59	30.14
I try to consume food with low climate impact	12.54	12.92	27.27	34.83	12.44
I try to decrease my climate impact in other ways than through my food consumption	5.69	7.30	21.71	43.13	22.18
I am concerned about global climate changes	9.05	7.73	16.59	29.97	36.66
I am willing to pay a higher price for food produced using new climate-friendly agricultural solutions	16.45	12.95	17.30	39.60	13.71
Because my personal contribution is very small, I do not feel responsible for climate change (reverse)	14.37	19.85	23.35	23.35	19.09

4.6.3. *Attributes considered when buying food*

The results presented in Table 24 highlights some factors where the consumers consider when choosing food products. Regarding the environmental impact 30.36 and 12.52% of the respondents consider it as important and very important. 34.22% and 30.06% indicated that they consider animal welfare as important and very important attributes while making their purchase decision. Price is the one of the most considered factors by consumers during the purchase of food products, with 37.10% considering it important and 42.62% consider it as very important. Taste and freshness are other aspects that consumers consider when choosing food products, with 60.14% considering them as very important. Consumers also consider the health properties of the food, with 33.59% indicated it as an important and 25.27% considering it as very important. Even though it is less considered a factor as compared to others, 25.33% consider organic certification as important attribute. In conclusion, the result shows that consumers prioritize price, taste, and health properties, with considerable consideration to animal welfare and the environmental impact aspects of food to be consumed when making their purchase decisions.

Table 24: Percentage distribution on characteristics considered for choices of food products (N=1084)

Statements	Not important	Slightly important	Moderately important	Important	Very important
Environmental impact	10.44	19.83	26.85	30.36	12.52
Animal welfare	3.78	11.06	20.89	34.22	30.06
Price	0.09	4.30	15.89	37.10	42.62
Taste and freshness	0.09	0.84	6.52	32.40	60.15
Health properties	9.10	12.58	19.46	33.59	25.27
Certified organic	19.05	17.71	26.38	25.33	11.52

4.6.4. *Eating habits of consumers*

Regarding the eating habits of consumers, the majority of the sampled consumers (59.32%) stated that they often eat meat or fish and also have several meat free days in a week. The second most stated eating habit by sampled consumers is eating meat or fish most days (29.8%) (Figure 10).

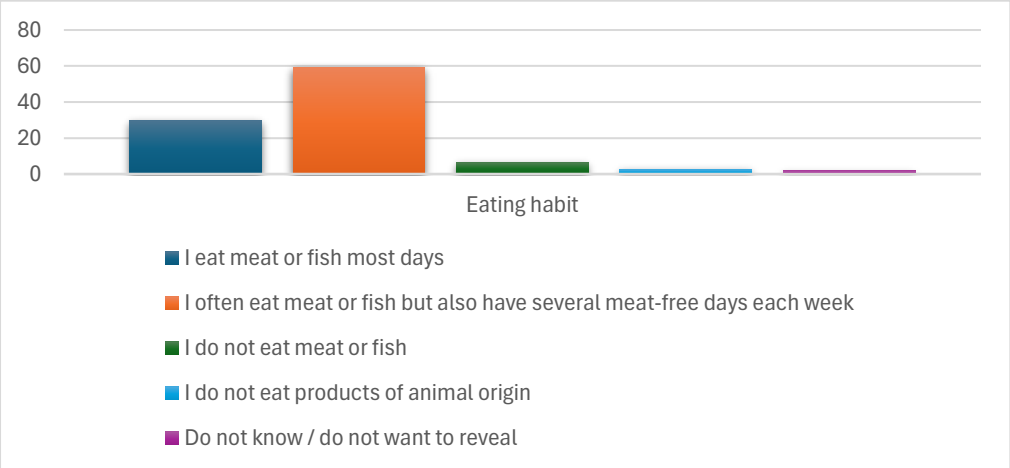


Figure 10: How would you describe your eating habits? Please mark the statement that best describes your eating habits

Regarding the beef consumption frequency of the respondents in experiment 2, the majority, accounting for 36.61%, report eating beef around once every week. The second-largest group, comprising 29.11%, consumes beef once per month or less and those stated that those who eat beef several times every week represent 29.31% (Table 25).

Table 25: How often do you eat beef (e.g. steak, minced beef) ?

How often do you eat beef?	Frequency	Percentage
Never	26	2.64
Once per month or less	287	29.11
Around once every week	361	36.61
Several times every week	289	29.31
Every day	14	1.42
Do not know/do not want to reveal	9	0.91
Total	986	100.00

Regarding the sampled consumer organic vegetable purchasing habits, the result in table 26 reveals that a majority of consumers (42.71%) sometimes purchase organic vegetables (2-4 times out of every 10 purchases). About 16.42% indicate that they often buy organic (5–6 times out of 10). Only 9.59% of sampled consumers said they buy organic vegetables quite frequently (7-8 times out of 10), whereas 6.27% said they buy organic vegetables almost always. Conversely, a significant portion, 20.57%, never buy organic products, suggesting either a lack of interest or access to organic options.

Table 26 How often do you buy vegetables that are labelled as "organic"?

How often do you buy vegetables labelled as "organic"	**Frequency**	**Percentage**
Never (0 -1 times out of 10)	*223*	*20.57*
Sometimes (2-4 times out of 10)	*463*	*42.71*
Often (5-6 times out of 10)	*178*	*16.42*
Quite frequently times out of 10) (7-8	*104*	*9.59*
Almost always times out of 10) (9-10	*68*	*6.27*
Do not know	*48*	*4.43*
Total	*1,084*	*100.00*

4.6.5. *Country-wise questions*

In Germany, the country-specific question concerned whether ensuring fair remuneration and fair-trading relationships is more important than the environmental impact of the agricultural production. The results indicated that a large group of consumers (36%) found fairness of the same importance as the environmental impact while 39% found fairness more important. Only 5% of the sample chose the 'don't know' response.

The country-specific question in the Netherlands was whether consumers perceived the certification 'On the way to Planet Proof' as a powerful tool to raise awareness about climate-friendly food choices. Consumers in the Netherlands have a divided opinion on the effectiveness of the certification 'On the Way to Planet Proof' in raising consumer awareness about climate-friendly choices, with 30% totally or partly disagreeing, 30% neither agreeing nor disagreeing and 25% partly agreeing while only a few percentages totally agreed with the statement that the certification is an effective tool. The 'don't know' response was chosen by 11% of the sample.

Box 2 Country-wise questions

Countries	Totally disagree	Partly disagree	Neither agree nor disagree	Partly agree	Totally agree	Do not know	Total
For me, ensuring fair remuneration and fair-trading relationships is more important than the environmental impact of the agricultural production.							
DE	15	39	195	174	88	25	536
%	2.80	7.28	36.38	32.46	16.42	4.66	100.00
Products with On the Way to Planet Proof certification acts as a powerful tool for raising my consumer awareness about climate-friendly choices.							
NL	86	87	158	136	20	61	548
%	15.69	15.88	28.83	24.82	3.65	11.13	100.00

4.7. Summing up on experiment 2

The cumulative frequency distribution for WTP extra for climate-friendly carrots indicates that consumers who received the CSA information (64.48%) and the combined CSA and fairness information (66.54%) show slightly higher percentages of sampled consumers willing to pay at least 1% premium for climate-friendly-produced carrots. For climate-friendly-produced beef, a relatively higher percentage of the sampled consumers who received the fairness information (59.93%) and CSA and fairness combined (58.37%) indicated their willingness to pay at least 1% extra. Regarding the WTP for climate-friendly bread, it seems that consumers who received CSA information (63.39%) and a combination of CSA and fairness information (63.57%) indicated their WTP at least 1% extra. The non-parametric test also shows that the combined CSA and fairness information intervention has a significant effect on consumers' WTP extra for climate-friendly bread and beef compared to the control group. There are no significant differences between the other intervention groups and food products. In the post-experiment assessment of the influence of the provided interventions on awareness and future food purchase choices, it appears that both the provision of CSA information and the combination of CSA and fairness information have a slightly higher tendency to increase awareness of the impact of food production on climate. Similarly, a relatively higher percentage of the sampled consumers who received the combined CSA and fairness information expressed their partial and total agreement regarding the influence of the information in shaping their future climate-friendly food choices.

5. Results and discussion from experiment 3

5.1. Descriptive statistics

An overview of the respondents in experiment 3 based on some observed socio-demographic characteristics were presented in Table 27, and their variation test across the experimental groups in Appendix Table 3. Regarding age distribution, it seems a relatively even age distribution for the sampled respondents (Table 24) and the test for variation in age distributions was insignificant across the experimental group, suggesting relatively evenly distributed samples (Appendix Table 3). Regarding the gender distribution, around 70% the respondents are male where the remaining 30% were female. However, the variation in distributions of gender across the experimental groups

was insignificant, indicating an even distribution of respondents across the experimental groups. Also, Table 27 shows that respondents' education level, income level, and household size distributed evenly. There was no significant difference in these variables across the experimental groups, which also shows a fairly even distribution (Appendix Table 3).

Table 27: Percentage distribution of socioeconomic variables for respondents in experiment 3

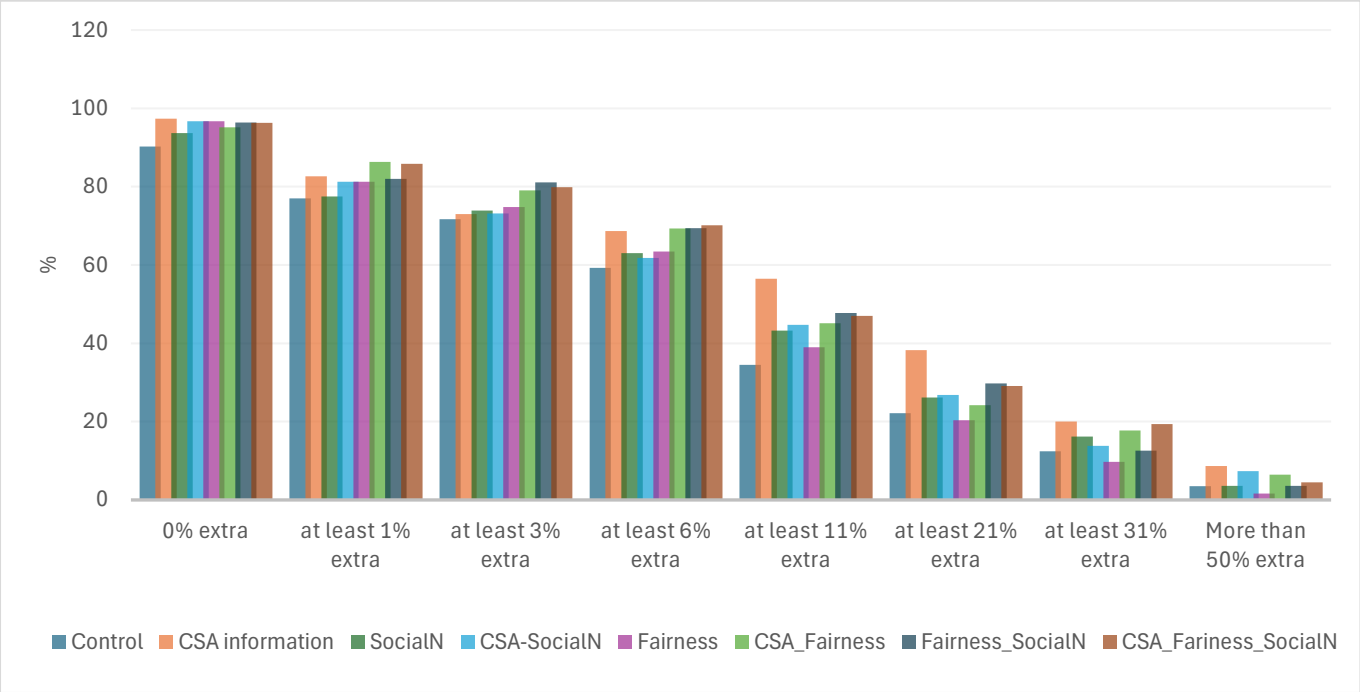
Socio-economic variables and their categories	SL
Age group (in years)	
18-24	1.26
25-34	9.33
35-44	25.68
45-54	35.12
55-64	28.62
Gender	
Male	69.18
Female	30.40
Other	0.42
Education level	
No completed education	0.42
Still under education	2.94
Primary school	20.65
Up to A levels or equivalent (Advanced level)	9.75
Other qualifications/apprenticeships	17.19
Undergraduate (not a Bachelor's degree)	40.15
Graduate (Bachelor's degree)	8.91
Postgraduate (master, doctorate, PHD etc.)	0.00
Income level	
Below average income in my country	10.48
Average income in my country	46.96
Above average income in my country	28.30
More than twice average income in my country	6.71
Do not know or do not want to reveal	7.55
Household size	
one	11.22
two	29.66
three	24.32
four and more	33.86
donot want reveal	0.94

5.2. Distribution of consumers WTP extra for climate-friendly foods by experimental groups

5.2.1. Consumers WTP extra for climate-friendly carrot

The results from experiment 3 regarding the WTP extra for climate friendly produced carrot reveal that 76.99% of respondents in the control group, 82.61% in CSA information group, 77.47% in SocialN group, 81.3% in CSA_SocialN and Fairness group, 86.29% in CSA_Fairness group, 81.98% in Fairness_SocialN group, and 85.82% in CSA_Fairness_SocialN group expressed their willingness to pay at least 1% extra (Fig 11).

The overall distribution of respondents' WTP extra for climate-friendly-produced carrots from experiment 3 indicates that slightly higher percentages of respondents who receive the combined intervention of CSA information_CSA_Fairness or CSA information_Fairness_SocialN—were willing to pay more for climate-friendly-produced carrots than those in the control group.

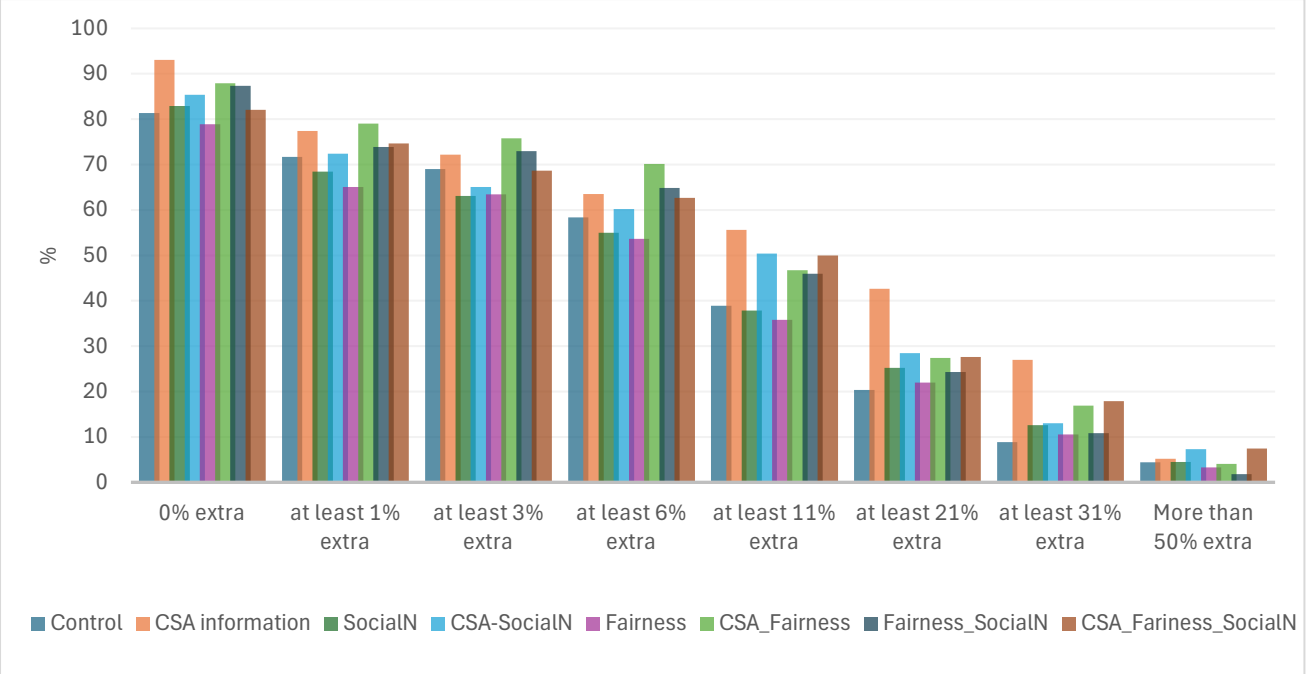


Note that 9,73%,2,61%, 6,3%, 3,25%, 3,26%, 4,84%, 3,6% and 3,73% of consumers that responded "I do not know & I never buy this product" for WTP choice from Control, CSA_information, SocialN, CSA_SocialN, Fairness, CSA_Fairness,Fairness_SocialN and CSA_Fariness_SocialN experimental groups, respectively were not included in cumulative percentage and presented in the graph.

Figure 11: Percentage distribution for carrot premium WTP across experimental groups in experiment 3 (N= 954).

5.2.2. Consumers WTP extra for climate-friendly beef

The cumulative percentage distribution for WTP extra for climate-friendly produced beef as compared to standard beef from experiment three shows that 71.66% were willing to pay at least 1% extra in the control group, while this percentage in the CSA information, CSA_SocialN, CSA_Fairness and Fairness_SocialN groups were 77.4%, 72.37%,79.03% and 73.87%, respectively. Overall, looking at the cumulative percentage distribution for experiment 3, it seems that slightly higher percentages of sampled consumers in the CSA information, CSA_Fairness, and CSA_Fairness_SocialN groups are willing to pay an extra for climate-friendly produced beef across various premium ranges, from 1-2% to more than 30% extra compared to control group (see Figure 12). Overall, the WTP extra for climate friendly beef indicates that around 70% of the respondents would pay this price premium. When it comes to being willing to pay a price premium higher than 10%, in experiment 3, among the respondents that received CSA information, around 56% would pay a price premium higher than 10%, while around 50% of sampled consumers who received both CSA combined with social norm and fairness information are WTP at least 11% for climate friendly beef.

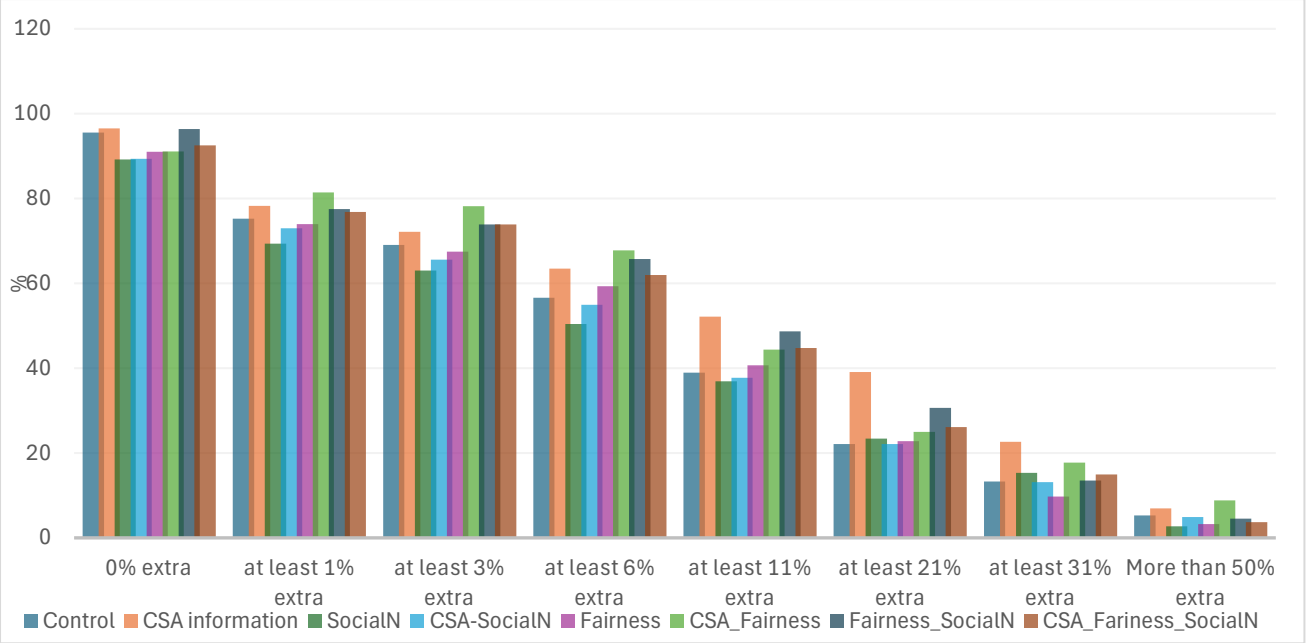


Note that 18,58%, 6,96%, 17,12%, 14,64%, 21,14%, 12,1%, 12,61% and 17,91% of consumers that responded "I do not know & I never buy this product" for WTP choice from Control, CSA_information, SocialN, CSA_SocialN, Fairness, CSA_Fairness, Fairness_SocialN and CSA_Fariness_SocialN experimental groups, respectively were not included in cumulative percentage and presented in the graph.

Figure 12: Percentage distribution of WTP extra for climate friendly produced beef across experimental groups in experiment 3 (N= 954)

5.2.3. Consumers WTP extra for climate-friendly bread

The cumulative percentage distribution of WTP extra for climate-friendly bread in experiment 3 shows that 75.21% of respondents were WTP at least 1% extra in the control group, while 78.26%, 69.36%, 72.96%, 73.98%, 81.45%, 77.48%, and 76.86% of the sampled consumers were WTP at least 1% extra in the CSA infromation, SocialN, CSA-SocialN, Fairness, CSA_Fairness, Fairness_SocialN, and CSA_Fairness_SocialN groups, respectively (Fig 13). Overall, the result for bread indicated that around 75% in experiment 3 were willing to pay at least 1% more for climate friendly bread. In addition, we found the around 40% in experiment 3, respectively were prepared to pay a price premium higher that 10%.



Note that 4.42%, 3.48%, 10.81%, 10.66%, 8.95%, 8.87%,3.6% and 7.47% of consumers that responded "I do not know & I never buy this product" for WTP choice from Control, CSA information, SocialN, CSA_SocialN, Fairness, CSA_Fairness, Fairness_SocialN and CSA_Fariness_SocialN experimental groups, respectively were not included in cumulative percentage and presented in the graph.

Figure 13: Percentage distribution for bread premium WTP across experimental groups in experiment 3 (N= 954)

5.3. Non-parametric testing for WTP extra by experimental groups and product

The non-parametric test for experiment 3 in Table 28 shows a significant median rank difference between the control group and 7 interventions for the three considered climate friendly food products. Combination of CSA and fairness information shows a significant rank median difference for only climate friendly bread, the combination of three interventions (CSA_Fairness_SocialN), exhibits a statistically significant rank median difference for climate friendly carrot and beef when compared to the control. However, none of the median rank differences for climate friendly carrot, beef, or bread show statistical significance due to SocialN, CSA_SocialN, Fairness, and Fairness_SocialN interventions as compared to the control. In summary, the CSA information shows a significant influences consumers' WTP extra for climate friendly Carrot, Beef, and Bread products compared to the control group, while other interventions show mixed results, with some indicating significant differences and others not influencing the WTP extra significantly.

Table 28: Dunn's Pairwise Comparison of WTP by experimental groups (experiment 3)

Col Mean-Row Mean	***Climate-friendly carrot***	***Climate-friendly beef***	***Climate-friendly bread***
Interventions	***Control***	***Control***	***Control***
	z-statistic	*z-statistic*	*z-statistic*
CSA information	*-2.012 (0.022)*	*-1.749(0.0401)*	*-2.008 (0.022)*
SocialN	*-0.625 (0.266)*	*0.178 (0.429)*	*-0.032 (0.487)*
CSA_SocialN	*-0.449 (0.3268)*	*-0.862 (0.194)*	*-0.356 (0.3612*
Fairness	*0.272 (0.393)*	*0.265 (0.395)*	*-0.469 (0.314)*

CSA_Fair	*-1.255 (0.105)*	*-1.144 (0.126)*	*-2.013(0.022)*
Fairness_SocialN	*-1.159 (0.123)*	*-0.3101 (0.378)*	*-1.264 (0.103)*
CSA_Fairness_SocialN	*-1.508(0.065)*	*-1.678 (0.046)*	*-1.223 (0.1105)*
Kruskal–Wallis equality-of-populations rank test	*Prob = 0.2595*	*Prob = 0.2217*	*Prob = 0.226*

Note: The z-statistic indicates the standardised difference in mean ranks between two groups. The value enclosed in brackets is the p-value. A negative z-statistic indicates that the mean rank of the first group (control) is lower than that of the second group (intervention). The z-statistic value indicates the size of the difference (Dinno, 2015).

5.4. Assessment the interventions influence on awareness and future food choices

5.4.1. *Influence of the interventions on increased awareness about climate impact of food production*

Table 29 captures the influence of the provided intervention in experiment 3 on increased awareness about climate impact of food production. It reveals that a total of 38.05% sampled consumers in the control group were agreed to some extent (partly or totally) regarding their increased awareness about climate impact of food production. While 47.82%, 37.81%, 43.91%, 50.41%, 45.16%, 41.45%, and 47.76% of the sampled consumers who received information on CSA, SocialN, CSA-SocialN, Fairness, CSA_Fairness, Fairness_SocialN, and CSA_Fairness_SocialN, respectively were agreed to some extent (partly or totally) regarding their increased awareness about climate impact of food production (Table 29).

Overall, the results indicates that the sampled consumers in Fairness group, as well as the CSA and CSA_Fairness_SocialN groups, seems that the highest percentage of participants who agreed to some extent regarding their increased awareness regarding food production impact on climate.

Table 29: The percentage distribution of participants increased awareness in experiment 3

Experimental groups	**Increased my awareness**						
	Totally_disagree	Partly_disagree	Neither_agree_nor_disagree	Partly_agree	Totally_agree	Do_not_know	Total
Control	28	12	28	31	12	2	113
%	24.78	10.62	24.78	27.43	10.62	1.77	100.00
CSA information	19	9	30	36	19	2	115
%	16.52	7.83	26.09	31.30	16.52	1.74	100.00
SocialN	21	10	36	31	11	2	111
%	18.92	9.01	32.43	27.93	9.91	1.80	100.00
CSA_SocialN	24	14	28	39	15	3	123
%	19.51	11.38	22.76	31.71	12.20	2.44	100.00
Fairness	20	7	31	40	22	3	123
%	16.26	5.69	25.20	32.52	17.89	2.44	100.00
CSA_Fairness	23	12	27	34	22	6	124
%	18.55	9.68	21.77	27.42	17.74	4.84	100.00
Fairness_SocialN	20	11	33	28	18	1	111
%	18.02	9.91	29.73	25.23	16.22	0.90	100.00
CSA_fairness_SocialN	28	12	30	39	25	0	134
%	20.90	8.96	22.39	29.10	18.66	0.00	100.00

Total	183	87	243	278	144	19	954
%	19.18	9.12	25.47	29.14	15.09	1.99	100.00

Pearson chi2(35) = 27.7706 Pr = 0.803
Note: The first row indicates the number of respondents, and the second row is percentage for each experimental group

5.4.2. *Influence of the intervention information on future consumer purchasing decisions*

The result from experiment 3 regarding the influence of the provided information on the sampled consumers' future food choices showed that 37.16% of participants in the control group were partly or totally in agreement (Table 30). Conversely, a higher percentage of respondents who received CSA information were partly or totally agreed (51.3%), highlighting a more positive view of the provided intervention in shifting future consumption decisions. When looking at consumers in the randomly allocated CSA_SocialN group that received a combined intervention, 44.72% were partly or totally in agreement. The highest percentage of participants allocated to the fairness group partly or totally agreed (50.41%), which might indicate that fairness considerations could have a positive influence on future sustainable food choices. In the combined groups involving fairness, such as CSA_Fairness and CSA_Fairness_SocialN, 40.54% and 50% of sampled respondents partly or totally agree with the influence of the provided information by each intervention on their future food choices towards climate-friendly food, respectively.

Table 30: The information I just received will affect my future food choice in experiment 3

Experimental groups	**Will affect my future food choice**						
	Totally_disagree	Partly_disagree	Neither_agree_nor_disagree	Partly_agree	Totally_agree	Do_not_know	Total
Control	26	11	29	31	11	5	113
%	23.01	9.73	25.66	27.43	9.73	4.42	100.00
CSA information	18	7	28	44	15	3	115
%	15.65	6.09	24.35	38.26	13.04	2.61	100.00
SocialN	20	17	24	39	5	6	111
%	18.02	15.32	21.62	35.14	4.50	5.41	100.00
CSA_SocialN	22	10	35	42	13	1	123
%	17.89	8.13	28.46	34.15	10.57	0.81	100.00
Fairness	17	12	29	45	17	3	123
%	13.82	9.76	23.58	36.59	13.82	2.44	100.00
CSA_Fairness	24	10	28	36	21	5	124
%	19.35	8.06	22.58	29.03	16.94	4.03	100.00
Fairness_SocialN	21	7	35	30	15	3	111
%	18.92	6.31	31.53	27.03	13.51	2.70	100.00
CSA_Fariness_SocialN	20	17	30	45	22	0	134
%	14.93	12.69	22.39	33.58	16.42	0.00	100.00
Total	168	91	238	312	119	26	954
%	17.61	9.54	24.95	32.70	12.47	2.73	100.00

Pearson chi2(35) = 41.6936 Pr = 0.203
Note: The first row indicates the number of respondents, and the second row is percentage for each experimental group

5.5. Certainty about the stated extra WTP percentage

In the assessment of how certain the consumers are about their stated extra WPT in experiment 3, about 2% indicated that they are very uncertain about their stated extra WTP, whereas 3.25% indicated a little uncertainty (Figure 14). In experiment three, the majority of respondents stated their extra WTP, with 50% expressing a somewhat certain feeling and 36.16% indicating a high level of certainty. Overall, the distribution suggests that the majority of the sample (around 86%) are certain about their stated extra WTP, indicating they have a positive perception of the prices they want to pay.

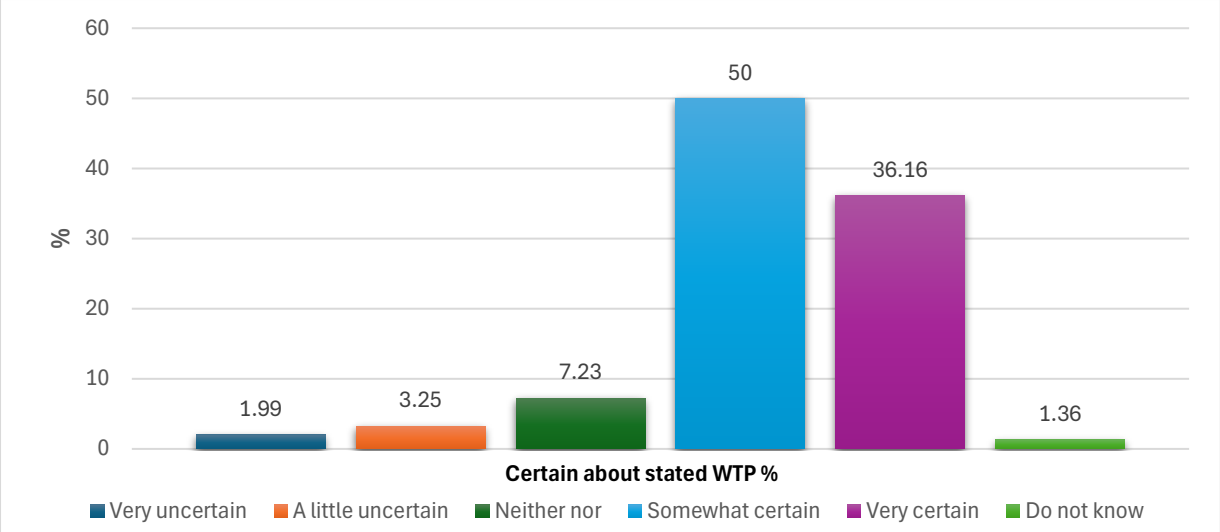


Figure 14: Certainty about the stated extra willingness to pay percentage (Experiment 3)

5.6. Control behaviour factors considered

5.6.1. *Consumer Perceptions on Paying extra for Climate-Friendly Food*

Regarding consumers' perceptions of not being willing to pay more than stated (Table 31), the percentages reflect the proportion of respondents who agree, to varying degrees, with three different statements: 1) I think food is expensive enough already; 2) I do not think it is me, as a consumer, who should pay for a lower climate impact from food; and 3) I do not trust that the label will guarantee a lower climate impact from the product.

Regarding "I think food is expensive enough already," a significant majority of 66.98% partly and totally agree, indicating a general perception that food prices are already high without additional costs for climate-friendly choices. Regarding "I don't believe it's my responsibility as a consumer to mitigate the climate impact from food," the results exhibit a more balanced distribution across the agreement spectrum, yet a slight inclination towards disagreement, with a combined total of 35.12% partially and completely disagreeing. Furthermore, in terms of "I do not trust that the label will guarantee lower limate impact from the product," the highest percentage of respondents, 36.48%, partly agree, while 27.15% totally agree

Table 31: Percentage distribution about "I will not pay more than I stated for food labelled 'Produced climate-friendly' because (N= 954)

Statements	Totally disagree	Partly disagree	Neither agree nor disagree	Partly agree	Totally agree	Do not know
I think food is expensive enough already	5.24	12.68	14.36	33.65	33.33	0.73
I do not think it is me as a consumer, who should pay for lower climate impact from food	15.83	19.29	14.05	29.87	20.02	0.94
I do not trust that the label will guarantee lower climate impact from the product	7.13	13.52	14.36	36.48	27.15	1.36

Due to its importance, the trust in the label is also presented country-wise. Here we found that in Slovenia 64% stated that they don't trust the label (they stated that they partly or totally agree that they do not trust the label) (precise numbers are found in appendix table 4).

5.6.2. *The consumers opinions on the impact of food production on climate change*

The results in Table 32 below show a variety of opinions on the impact of food production on climate change and personal responsibility in mitigating it. A significant proportion of respondents, 34.90%, partly agree that food production has a large impact on climate change, while 41.22% totally agree. Regarding the consumption of food with low climate impact, 36.27% partly agree, and only 30.26% totally agree that they will try to consume food with low climate impact. A larger percentage, 59.07%, totally agree that they try to decrease their climate impact in ways other than food consumption. The sampled consumer agreement about their concern for global climate change is relatively high, with 61.81% totally agreeing. The willingness to pay a higher price for food produced using new climate-friendly agricultural solutions is moderately high, with 46.25% of consumers partially in agreement. Finally, about 32.31% and 24.15% were totally and partially in agreement with the statement, "Because my personal contribution is very small, I do not feel responsible for climate change," respectively.

Table 32: Percentage distribution of on extend of agreement with the following statements (N=954)

Statements	Totally disagree	Partly disagree	Neither agree nor disagree	Partly agree	Totally agree
I think that food production has a large impact on climate change	5.14	7.49	11.24	34.90	41.22
I try to consume food with low climate impact	7.40	7.94	18.13	36.27	30.26
I try to decrease my climate impact in other ways than through my food consumption	1.16	2.64	4.11	33.02	59.07
I am concerned about global climate changes	3.80	3.38	6.86	24.16	61.81
I am willing to pay a higher price for food produced using new climate-friendly agricultural solutions	12.67	6.02	8.34	46.25	26.72
Because my personal contribution is very small, I do not feel responsible for climate change (reverse)	9.00	19.28	15.25	24.15	32.31

5.6.3. *Attributes considered when buying food*

The results presented in Table 33 shed light on the important attributes that consumers consider when choosing food products, based on a sample of respondents from experiment 3. Significant proportions of respondents, 38.95% and 26.63%, consider environmental impact when buying food to be important and very important, respectively. Consumers also consider animal welfare as an important factor, with 37.30% indicating it as important and 40.91% of respondents indicating it as very important. When purchasing food products, a higher percentage of sampled consumers consider the price to be important, with 42.45% considering it important and 24.42% considering it very important. Consumers place a high value on taste and freshness when choosing food products, with 74.16% of the sampled consumers in experiment 3 considering them to be very important attributes. Consumers also prioritise the food's health properties, ranking it as the second most important attribute, with 71.28% of the sampled consumers in experiment 3 citing it as extremely important. Despite its relatively low importance compared to other factors, 25.50% of consumers consider certified organic food to be a highly significant attribute. In conclusion, the results demonstrate that consumers prioritise taste, health benefits, and animal welfare when making food purchases, while also giving price and environmental impact aspects significant consideration.

Table 33: Percentage distribution on characteristics considered for choices of food products (N=954)

Statements	Not important	Slightly important	Moderately important	Important	Very important
Environmental impact	4.21	7.37	22.84	38.95	26.63
Animal welfare	2.44	5.53	13.82	37.30	40.91
Price	1.05	4.93	27.15	42.45	24.42
Taste and freshness	0.11	0.11	2.21	23.42	74.16
Health properties	0.31	0.63	3.77	24.00	71.28
Certified organic	8.85	9.91	22.66	33.09	25.50

5.6.4. *Eating habits of consumers*

Regarding the eating habits of sampled consumers in experiment 3, the majority of the sampled consumers (70.23%) stated that they often eat meat or fish and also have several meat free days in a week. The second most stated eating habit by sampled consumers is eating meat or fish most days (15.09%) (Figure 15).

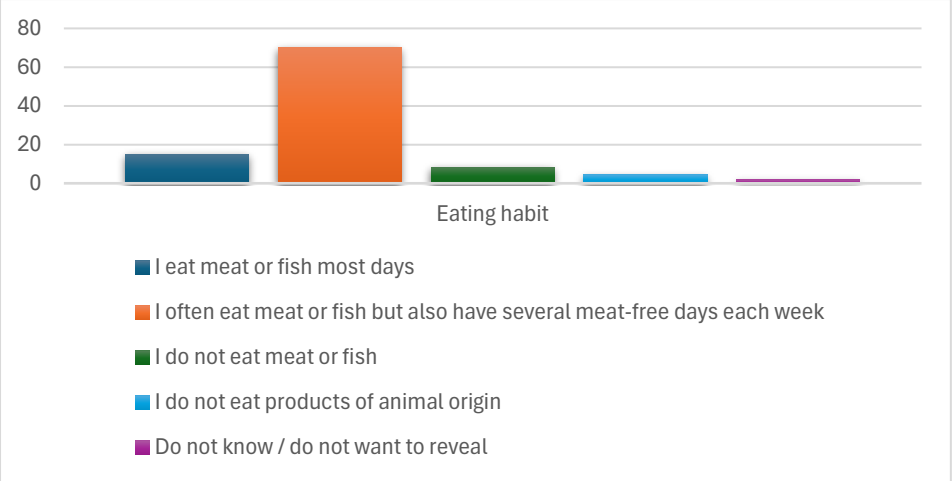


Figure 15: How would you describe your eating habits? Please mark the statement that best describes your eating habits

Regarding the beef consumption frequency of 953 respondents, the majority, accounting for 50.41%, report eating beef around once every week. The second-largest group, comprising 21.41%, consumes beef once per month or less, and those who eat beef several times every week represent 12.91% (Table 34).

Table 34: How often do you eat beef (e.g. steak, minced beef) ?

How often do you eat beef?	Frequency	Percentage
Never	141	14.80
Once per month or less	204	21.41
Around once every week	479	50.26
Several times every week	123	12.91
Every day	4	0.42
Do not know/do not want to reveal	2	0.21
Total	953	100.00

Regarding the organic vegetable purchasing habits of the sampled consumer for experiment 3, the result in table 35 reveals that a majority of consumers (35.47%) sometimes purchase organic vegetables (2-4 times out of every 10 purchases). About 23.92% indicate that they often buy organic (5–6 times out of 10). About 17% of sampled consumers indicated that they are buying organic vegetables quite frequently (7-8 times out of 10), whereas 12.38% indicated that they buy organic vegetables almost always. Conversely, a significantly lower proportion of sampled Slovenian consumers, about 10%, indicated that they never buy organic products.

Table 35 Think of when you buy vegetables. How often do you buy vegetables that are labelled as "organic"?

How often do you buy vegetables labelled as "organic"	**Frequency**	**Percentage**
Never (0 -1 times out of 10)	98	10.28
Sometimes (2-4 times out of 10)	338	35.47
Often (5-6 times out of 10)	228	23.92
Quite frequently times out of 10) (7-8	161	16.89
Almost always times out of 10) (9-10	118	12.38
Do not know	10	1.05
Total	953	100.00

5.6.5. *Country-specific question*

In Slovenia, the country-specific question was whether pork production was perceived to be more climate-friendly than beef. The results indicated that many of the sampled consumers in Slovenia don't know whether pork or beef is more climate friendly as altogether 30% answered 'don't know'. The remaining sample was almost equally distributed on disagreements, agreements or neither agree nor disagree. Lack of knowledge was indicated by the large share of respondents answering 'don't know'. Thereby, there seems to be a communication task ahead (or a change in production methods) in order to place consumers on the right page regarding that beef has by far the highest climate footprint as compared to pork.

Box 3 Country-specific question

Country	Totally disagree	Partly disagree	Neither agree nor disagree	Partly agree	Totally agree	Do not know	Total
As far as I know, it is more climate-friendly to eat pork than beef.							
SL	169	52	219	171	60	282	953
%	17.73	5.46	22.98	17.94	6.30	29.59	100.00

5.7. Summing up on experiment 3

The results from experiment three show that higher percentages of respondents' who received CSA information, CSA and fairness, and CSA with fairness and social norm were WTP premiums for climate-friendly-produced carrots. Regarding CSA beef, consumers who received the CSA, CSA_Fairness, and CSA_Fairness_SocialN interventions were willing to pay more for climate-friendly beef across various price ranges. Finally, for climate-friendly bread, the sampled consumers who received the CSA information, CSA_Fairness, and Fairness groups showed a higher willingness to pay. This indicates a slight increase in the impact of these interventions' provisions on motivating consumers to allocate more of their WTP to climate-friendly food. The results of the non-parametric test for experiment 3 show that the CSA information has a significant effect on consumers' WTP extra for climate-friendly carrot, beef, and bread products compared to the control group. Other interventions have mixed effects, with some showing significant differences and others not having a significant effect on the WTP extra. Regarding the post-experiment assessment of the provided interventions influence on awareness and future food purchase choice, the results also indicate that the sampled consumers in the Fairness group, as well as the CSA and CSA_Fairness_SocialN groups, seem to have the highest percentage of participants who agreed to some extent regarding their increased awareness regarding food production impact on climate. In the CSA information and the combined groups involving fairness, such as CSA_Fairness and CSA_Fairness_SocialN, 40.54% and 50% of sampled respondents partly or totally agree with the influence of the provided information by each intervention on their future food choices towards climate-friendly food, respectively.

6. Limitations

The implemented experiments are based on a selected number of countries in Europe, therefore only representing a limited number of countries in Europe. On the other hand, the data for the three experiments was collected through two different consumer panel lists. Data from 5 countries was collected and handled by the company Norstat Consumer Panel, which collected data for experiment one from Denmark, Lithuania, and Spain and data for experiment two from Germany and the Netherlands. Data for experiment three was collected from Slovenia and handled by the Slovenian Consumer Association (ZIPs) through its consumer panel. In this regard, there might be some differences in the distribution of observed socio-demographics even if the test for these variables' distribution variation across the experiment groups is insignificant (see Appendix Tables 1–3). Another point that needs consideration is interpreting the highlight results of these three experiments. Even though the non-parametric test result showed some significance level of provided intervention groups as compared to control, it did not capture some unobserved country variations and some behavioural control variables into consideration, which could influence the significance level of provided interventions effect on consumers' WTP extra for three climate-friendly products compared to the control group. It is important to interpret the results with caution, as a parametric test may change the significant level of the intervention compared to the control when taking into account some heterogeneity.

7. Summing up

Overall, the findings from the three experiments indicate a positive WTP extra for climate friendly carrots, bread and beef that information about production techniques and practices that reduce the climate impact of food production (called CSA information) seemed to have a small but positive impact on WTP. Another finding is that the WTP for climate-friendly products seemed to increase slightly with the proposed interventions. In example, when CSA information was combined with either information that more and more people are willing to pay for climate-friendly food or combined with information saying "that supermarket will pay the farmers a fair price for climate-friendly products the WTP for climate-friendly food seemed to increase slightly. Next to this, there seemed to be some small variations across products.

Regarding the attributes considered by consumers when buying climate-friendly food products, price, taste and freshness, and health properties were very important attributes for their purchase decisions. In addition, environmental impact and animal welfare are important considerations for many consumers when making purchasing decisions about climate-friendly food products.

Finally, regarding the distribution of certain controlled behavioral factors, we found that 58% of respondents either partly or totally agreed that they do not trust the label to guarantee lower climate impact from the product. This may present a significant challenge in effectively marketing and promoting climate-friendly food choices to consumers.

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Appendix

Table 1. Testing the sociodemographic characteristics of the sample (n = 1,568) difference across experimental groups (Experiment one)

Socio-economic variables and their categories	Control		CSA		SocialN		CSA_SocialN		Pearson chi2 P-value
	Freq.	Prop.	Freq.	Prop.	Freq.	Prop.	Freq.	Prop.	
Age_group									
18-24	89	,23	91	,23	85	,22	91	,23	
25-34	121	,31	131	,33	131	,33	119	,31	0.999
35-44	90	,23	84	,21	87	,22	85	,22	
45-54	73	,19	68	,17	73	,19	72	,19	
55-64	19	,05	19	,05	18	,05	22	,06	
Gender									
Male	197	,50	200	,51	188	,48	196	,50	
Female	194	,49	193	,49	205	,52	193	,50	0.823
Other	1	,00			1	,00			
EducationLevel									
No completed education	1	,00	4	,01			1	,00	
Still under education	21	,05	14	,04	14	,04	17	,04	0.301
Primary school	45	,11	40	,10	41	,10	47	,12	
Up to A levels or equivalent (Advanced level)	84	,21	77	,20	77	,20	90	,23	
Other qualifications/apprenticeships	93	,24	98	,25	96	,24	69	,18	
Undergraduate (not a Bachelor's degree)	69	,18	86	,22	76	,19	74	,19	
Graduate (Bachelor's degree)	62	,16	55	,14	69	,18	72	,19	
Postgraduate (master, doctorate, PHD etc.)	17	,04	19	,05	18	,05	18	,05	
Other					3	,01	1	,00	
Income level									
Below average income in my country	89	,23	86	,22	76	,19	89	,23	
Average income in my country	176	,45	176	,45	173	,44	169	,43	
Above average income in my country	77	,20	76	,19	86	,22	76	,20	0.986
More than twice the average income in my country	11	,03	9	,02	11	,03	9	,02	
Do not know or do not want to reveal	39	,10	46	,12	48	,12	46	,12	
Household size									
one	63	,16	55	,14	57	,14	53	,14	0.713
two	136	,35	126	,32	114	,29	134	,34	
three	84	,21	102	,26	103	,26	97	,25	
four and more	108	,28	110	,28	119	,30	103	,26	
donot want reveal	1	,00			1	,00	2	,01	

Table 2. Testing the sociodemographic characteristics of the sample (n = 1,084) difference across experimental groups (Experiment two)

Socio-economic variables and their categories	Control		CSA		Fairness		CSA_Fairness		chi2 P-value
	Freq.	Prop.	Freq.	Prop.	Freq.	Prop.	Freq.	Prop.	
Age_group									
18-24	20	,07	22	,08	21	,08	26	,10	0.791
25-34	69	,26	72	,26	70	,26	59	,22	
35-44	71	,26	61	,22	62	,23	63	,23	
45-54	56	,21	64	,23	74	,27	62	,23	
55-64	54	,20	54	,20	45	,17	59	,22	
Gender									
Male	137	,51	139	,51	143	,53	133	,49	0.691
Female	133	,49	133	,49	129	,47	135	,50	
Other			1	,00					
Do_not_know_							1	,00	
EducationLevel									
No completed education	2	,01	1	,00	1	,00	1	,00	0.265
Still under education			2	,01	1	,00	2	,01	
Primary school	18	,07	15	,05	7	,03	13	,05	
Up to A levels or equivalent (Advanced level)	45	,17	71	,26	54	,20	60	,22	
Other qualifications/apprenticeships	31	,11	26	,10	35	,13	38	,14	
Undergraduate (not a Bachelor's degree)	47	,17	54	,20	42	,15	43	,16	
Graduate (Bachelor's degree)	73	,27	62	,23	87	,32	71	,26	
Postgraduate (master, doctorate, PHD etc.)	51	,19	38	,14	44	,16	40	,15	
Other	3	,01	4	,01	1	,00	1	,00	
Income level									
Below average income in my country	44	,16	56	,21	49	,18	57	,21	0.242
Average income in my country	98	,36	104	,38	101	,37	111	,41	
Above average income in my country	75	,28	72	,26	82	,30	60	,22	
More than twice average income in my country	14	,05	20	,07	13	,05	12	,04	
Do not know or do not want to reveal	39	,14	21	,08	27	,10	29	,11	
Household size									
one	70	,26	72	,26	76	,28	76	,28	0.934
two	80	,30	80	,29	79	,29	79	,29	
three	54	,20	54	,20	55	,20	44	,16	
four and more	64	,24	67	,25	61	,22	67	,25	
donot want reveal	2	,01			1	,00	3	,01	

Table 3. Testing the sociodemographic characteristics of the sample (n = 954) difference across experimental groups (Experiment three)

Socio-economic variables and their categories	Control	CSA	SocialN	CSA_SocialN	Fairness	CSA_Fairness	Fairness_SocialN	CSA_Fariness_SocialN	Chi2
	Prop.	Prop.	Prop.	Prop.	Prop.	Prop.	Prop.	Prop.	
Age_group									
18-24	,03	,01	,01	,02	,02	,01		,01	0.584
25-34	,10	,07	,14	,11	,11	,08	,09	,06	
35-44	,26	,26	,32	,28	,23	,20	,23	,28	
45-54	,35	,39	,29	,35	,30	,34	,39	,40	
55-64	,27	,27	,24	,24	,35	,37	,30	,25	
Gender									0.516
Male	,73	,75	,68	,70	,59	,71	,66	,71	
Female	,26	,25	,31	,30	,40	,29	,33	,29	
Do_not_know_donot_want_to_reveal	,01		,01		,01		,01		
EducationLevel									
No completed education	,02			,01	,01				
Still under education	,04	,04	,02	,05	,02	,02	,02	,02	0.623
Primary school	,18	,20	,18	,24	,20	,22	,22	,22	
Up to A levels or equivalent (Advanced level)	,09	,14	,12	,07	,11	,12	,10	,05	
Other qualifications/apprenticeships	,13	,09	,17	,19	,22	,19	,17	,21	
Undergraduate (not a Bachelor's degree)	,46	,43	,41	,41	,33	,38	,39	,40	
Graduate (Bachelor's degree)	,09	,10	,10	,04	,11	,07	,11	,09	
Income level									
Below average income in my country	,11	,13	,08	,14	,09	,10	,10	,09	
Average income in my country	,44	,43	,50	,49	,46	,49	,49	,46	

Above average income in my country	,32	,32	,24	,26	,26	,27	,26	,32	0.960
More than twice the average income in my country	,05	,04	,11	,04	,11	,06	,07	,05	
Do not know or do not want to reveal	,08	,07	,07	,07	,08	,06	,08	,08	
Household level									
one	,08	,12	,10	,07	,16	,10	,13	,13	0.561
two	,34	,27	,34	,29	,25	,25	,32	,31	
three	,23	,22	,21	,25	,31	,30	,25	,18	
four and more	,35	,37	,34	,39	,28	,33	,29	,36	
donot want reveal	,01	,02	,01			,02	,01	,01	

Table 4: I do not trust that the label will guarantee lower climate impact from the product.

Countries	Totally disagree	Partly disagree	Neither agree nor disagree	Partly agree	Totally agree	Do not know	Total
DK	5.69	19.06	22.77	30.69	17.82	3.96	100
ES	8.65	13.72	26.13	30.45	19.74	1.32	100
LT	3.16	6.17	21.04	28.96	37.82	2.85	100
DE	9.33	14.55	17.16	32.46	25.19	1.31	100
NL	4.93	12.96	22.99	33.21	20.99	4.93	100
SL	7.13	13.52	14.36	36.48	27.15	1.36	100
Total	6.49	12.95	19.94	32.53	25.65	2.44	100

Questionnaires for the 3 experiments

Note that

- **Experiment 1: versions 1,2,3,4**
- **Experiment 2: versions 1,2,5,6**
- **Experiment 3: versions 1,2,3,4,5,6,7,8**
- **The price vectors are only shown for Danish price level.**

PART 1

Info

Thank you for participating in this survey.

We ask questions about eating habits and about views on food and food production.

The study is carried out by researchers at the University of Copenhagen. It is part of a larger project (the BEATLES project) that is financed by the European Commission (EU).

The results of the study are used only for research. Your answers are handled confidentially. You can always choose to withdraw from the study during or after completing the questionnaire. If you choose to do so, your answers will be deleted.

Single

Q0 I hereby consent to the usage of my answers for research purposes.

1. Yes
2. No

If Q0=2 please screen out

Open numeric 18-60 – please screen out if not 18-60

Q1 What is your age?

99. Do not know / do not want to reveal

Single

Q2 What is your gender identity?

1. Female
2. Male
3. Other
4. Don't know / do not want to reveal

Single

Q3 Where do you live?

1. Capital
2. Larger city (other than Capital)
3. Suburb or smaller city
4. Countryside
5. Do not know / none of these

Single

Q4 What is your highest completed level of education?

1. No training was completed
2. Primary school
3. Secondary school
4. Vocational training
5. Bachelor degree
6. Master's degree or higher
7. Other education
8. Do not know / do not want to reveal

Single

Q5 What is your household income?

1. Below average income in my country
2. Average income in my country
3. Above average income in my country
4. More than twice the average income in my country
5. Do not know / do not want to reveal

Single

Q6 How many are there in your household, including yourself?

1. 1
2. 2
3. 3
4. 4 or more
5. Do not want to reveal

PART 2 (8 versions of part 2)

There will be 8 versions of part 2 that needs to be used in different countries so please script all and then we will activate/hide as it suits

Version 1

Info1

The shopping situation Suppose that you are shopping for an everyday meal. Suppose that in addition to the standard products, the supermarkets also sell new versions which are produced with much lower climate impact. These are labelled 'Produced climate-friendly'. In all other aspects, the two versions of the products are the same.

Be realistic Please note that people often overestimate their willingness to pay in surveys. Consider your answers carefully and respond as if you were shopping in a supermarket. Remember: If you spend more money on food, then you have less to spend on other things.

Version 2
Info2

The shopping situation Suppose that you are shopping for an everyday meal. Suppose that in addition to the standard products, the supermarkets also sell new versions which are produced with much lower climate impact. These are labelled 'Produced climate-friendly'. In all other aspects, the two versions of the products are the same.

Produced climate-friendly Farmers can produce crops, vegetables and fruit more climate-friendly by investments in precision technologies that can reduce the use of chemical fertilizers, pesticides and irrigation water. Farmers can also produce meat and dairy products more climate-friendly by optimizing the feed (such as using legumes as feed instead of imported soy) and by improving manure handling. For all types of farming, using renewable energy is part of climate-friendly production.

Be realistic Please note that people often overestimate their willingness to pay in surveys. Consider your answers carefully and respond as if you were shopping in a supermarket. Remember: If you spend more money on food, then you have less to spend on other things.

Version 3

Info3

The shopping situation Suppose that you are shopping for an everyday meal. Suppose that in addition to the standard products, the supermarkets also sell new versions which are produced with much lower climate impact. These are labelled 'Produced climate-friendly'. In all other aspects, the two versions of the products are the same.

Other people More and more people think about the climate impact of their food and many have changed their consumption behaviour towards more climate-friendly food

products. Many people also state that they want to pay a higher price for food that is produced with climate-friendly agricultural practices.

Be realistic Please note that people often overestimate their willingness to pay in surveys. Consider your answers carefully and respond as if you were shopping in a supermarket. Remember: If you spend more money on food, then you have less to spend on other things.

Version 4

Info4

The shopping situation Suppose that you are shopping for an everyday meal. Suppose that in addition to the standard products, the supermarkets also sell new versions which are produced with much lower climate impact. These are labelled 'Produced climate-friendly'. In all other aspects, the two versions of the products are the same.

Produced climate-friendly Farmers can produce crops, vegetables and fruit more climate-friendly by investments in precision technologies that can reduce the use of chemical fertilizers, pesticides and irrigation water. Farmers can also produce meat and dairy products more climate-friendly by optimizing the feed (such as using legumes as feed instead of imported soy) and by improving manure handling. For all types of farming, using renewable energy is part of climate-friendly production.

Other people More and more people think about the climate impact of their food and many have changed their consumption behaviour towards more climate-friendly food products. Many people also state that they want to pay a higher price for food that is produced with climate-friendly agricultural practices.

Be realistic Please note that people often overestimate their willingness to pay in surveys. Consider your answers carefully and respond as if you were shopping in a supermarket. Remember: If you spend more money on food, then you have less to spend on other things.

Version 5

Info5

The shopping situation Suppose that you are shopping for an everyday meal. Suppose that in addition to the standard products, the supermarkets also sell new versions which are produced with much lower climate impact. These are labelled 'Produced climate-friendly'. In all other aspects, the two versions of the products are the same.

Fair pricing Imagine a situation where the major supermarkets collectively enhance the accessibility of environmentally friendly food. In this collaborative effort, supermarkets commit to providing farmers with the additional required compensation for climate-friendly products, and do not capitalize on the higher prices for the products.

Be realistic Please note that people often overestimate their willingness to pay in surveys. Consider your answers carefully and respond as if you were shopping in a supermarket. Remember: If you spend more money on food, then you have less to spend on other things.

Version 6

Info6

The shopping situation Suppose that you are shopping for an everyday meal. Suppose that in addition to the standard products, the supermarkets also sell new versions which are produced with much lower climate impact. These are labelled 'Produced climate-friendly'. In all other aspects, the two versions of the products are the same.

Produced climate-friendly Farmers can produce crops, vegetables and fruit more climate-friendly by investments in precision technologies that can reduce the use of chemical fertilizers, pesticides and irrigation water. Farmers can also produce meat and dairy products more climate-friendly by optimizing the feed (such as using legumes as feed instead of imported soy) and by improving manure handling. For all types of farming, using renewable energy is part of climate-friendly production.

Fair pricing Imagine a situation where the major supermarkets collectively enhance the accessibility of environmentally friendly food. In this collaborative effort, supermarkets commit to providing farmers with the additional required compensation for climate-friendly products, and do not capitalize on the higher prices for the products

Be realistic Please note that people often overestimate their willingness to pay in surveys. Consider your answers carefully and respond as if you were shopping in a supermarket. Remember: If you spend more money on food, then you have less to spend on other things.

Version 7

Info7

The shopping situation Suppose that you are shopping for an everyday meal. Suppose that in addition to the standard products, the supermarkets also sell new versions which are produced with much lower climate impact. These are labelled 'Produced climate-friendly'. In all other aspects, the two versions of the products are the same.

Other people More and more people think about the climate impact of their food and many have changed their consumption behaviour towards more climate-friendly food products. Many people also state that they want to pay a higher price for food that is produced with climate-friendly agricultural practices.

Fair pricing Imagine a situation where the major supermarkets collectively enhance the accessibility of environmentally friendly food. In this collaborative effort, supermarkets commit to providing farmers with the additional required compensation for climate-friendly products, and do not capitalize on the higher prices for the products

Be realistic Please note that people often overestimate their willingness to pay in surveys. Consider your answers carefully and respond as if you were shopping in a supermarket. Remember: If you spend more money on food, then you have less to spend on other things.

Version 8

Info8

The shopping situation Suppose that you are shopping for an everyday meal. Suppose that in addition to the standard products, the supermarkets also sell new versions which are produced with much lower climate impact. These are labelled 'Produced climate-friendly'. In all other aspects, the two versions of the products are the same.

Produced climate-friendly Farmers can produce crops, vegetables and fruit more climate-friendly by investments in precision technologies that can reduce the use of chemical fertilizers, pesticides and irrigation water. Farmers can also produce meat and dairy products more climate-friendly by optimizing the feed (such as using legumes as feed instead of imported soy) and by improving manure handling. For all types of farming, using renewable energy is part of climate-friendly production.

Other people More and more people think about the climate impact of their food and many have changed their consumption behaviour towards more climate-friendly food products. Many people also state that they want to pay a higher price for food that is produced with climate-friendly agricultural practices.

Fair pricing Imagine a situation where the major supermarkets collectively enhance the accessibility of environmentally friendly food. In this collaborative effort, supermarkets commit to providing farmers with the additional required compensation for climate-friendly products, and do not capitalize on the higher prices for the products

Be realistic Please note that people often overestimate their willingness to pay in surveys. Consider your answers carefully and respond as if you were shopping in a supermarket. Remember: If you spend more money on food, then you have less to spend on other things.

PART 3

Info

We will now show you 3 food products and ask you to state your interest in buying each of the products.

[please randomize order of questions Q7, Q8, Q9].

Please randomize Q7, Q8 and Q9

Single

Q7 A bag of carrots

Imagine that you can buy 1 kg of standard carrots at the price of 2 Euro.

Given that you can buy 1 kg of standard carrots at the price of 2 Euro, what would you then at the most pay extra for carrots produced climate-friendly and labelled 'Produced climate-friendly'?

I am willing to pay extra:

1. 0 % (I would not pay more than I do for the standard product)
2. 1-2 % extra
3. 3-5 % extra
4. 6-10 % extra
5. 11-20 % extra
6. 21-30 % extra
7. 31-50 % extra
8. More than 50 % extra
9. I do not know
10. I never buy this product

Single

Q8 A package of minced beef

Imagine that you can buy 500 grams of standard minced beef at the price of 6.7 Euro.

Given that you can buy 500 grams of standard minced beef at the price of 6.7 Euro, what would you then at the most pay extra for minced beef that is produced climate-friendly and labelled 'Produced climate-friendly'?

I am willing to pay extra:

1. 0 % (I would not pay more than I do for the standard product)
2. 1-2 % extra
3. 3-5 % extra
4. 6-10 % extra

5. 11-20 % extra
6. 21-30 % extra
7. 31-50 % extra
8. More than 50 % extra
9. I do not know
10. I never buy this product

Single

Q9 A loaf of bread

Imagine that you can buy a loaf of standard bread (650 grams) at the price of 3.4 Euro.

Given that you can buy a loaf of standard bread (650 grams) at the price of 3.4 Euro, what would you then at the most pay extra for a loaf of bread produced climate-friendly and labelled 'Produced climate-friendly'?

I am willing to pay extra:

1. 0 % (I would not pay more than I do for the standard product)
2. 1-2 % extra
3. 3-5 % extra
4. 6-10 % extra
5. 11-20 % extra
6. 21-30 % extra
7. 31-50 % extra
8. More than 50 % extra
9. I do not know
10. I never buy this product

Single grid

Q10 Please state to what extend you agree or disagree with the following statements:

Alternatives

1. The information I just received about food labelled 'Produced climate-friendly' has increased my awareness of the climate impact of food production
2. The information I just received about food labelled 'Produced climate-friendly' will affect my future food choices towards more climate-friendly food

Scale

1. Totally disagree
2. Partly disagree
3. Neither agree nor disagree
4. Partly agree
5. Totally agree
6. Do not know

Single

Q12 Thank you for stating your willingness to pay (or not to pay) for products labelled 'Produced climate-friendly'. How certain are you about the prices that you stated you wanted to pay?

1. Very uncertain
2. A little uncertain
3. Neither nor
4. Somewhat certain
5. Very certain
6. Do not know

Single grid

Randomize alternatives

Q13 Think again of the questions about your willingness to pay for products labelled 'Produced climate-friendly'. Please state to what extend you agree or disagree with the following statements.

I will not pay more than I stated for food labelled 'Produced climate-friendly' because…

Alternatives

1. I think food is expensive enough already
2. I do not think it is me as a consumer, who should pay for lower climate impact from food
3. I do not trust that the label will guarantee lower climate impact from the product

Scale

1. Totally disagree
2. Partly disagree
3. Neither agree nor disagree
4. Partly agree
5. Totally agree
6. Do not know

[please randomize order of questions].

Single grid

Randomize alternatives

Q14 Please state to what extend you agree or disagree with the following statements.

I will not pay more than I stated for food labelled 'Produced climate-friendly' because...

Alternatives

1. I think that food production has a large impact on climate change
2. I try to consume food with low climate impact
3. I try to decrease my climate impact in other ways than through my food consumption
4. I am concerned about global climate changes
5. I am willing to pay a higher price for food produced using new climate-friendly agricultural solutions
6. Because my personal contribution is very small, I do not feel responsible for climate change

Scale

1. Totally disagree
2. Partly disagree
3. Neither agree nor disagree
4. Partly agree
5. Totally agree
6. Do not know

Please state to what extend you agree or disagree with the following statements.

[please randomize order of questions]

Single grid

Randomize alternatives

Q22 How important are the following characteristics for your choices of food products?

Alternatives

1. Environmental impact
2. Animal welfare
3. Price
4. Taste and freshness
5. Health properties

6. Certified organic

Scale

1. Not important
2. Slightly important
3. Moderately important
4. Important
5. Very important
6. Do not know

[please randomize order of questions]

Single

Q28 How would you describe your eating habits? Please mark the statement that best describes your eating habits.

1. I eat meat or fish most days
2. I often eat meat or fish but also have several meat-free days each week
3. I do not eat meat or fish
4. I do not eat products of animal origin
5. Do not know / do not want to reveal

Single

Q29 How often do you eat beef (e.g. steak, minced beef,…) ?

- Never
- Once per month or less
- Around once every week
- Several times every week
- Every day
- Do not know / do not want to reveal

Single

Q30 Think of when you buy vegetables. How often do you buy vegetables that are labelled as "organic"?

1. Never (0 -1 times out of 10)
2. Sometimes (2-4 times out of 10)
3. Often (5-6 times out of 10)
4. Quite frequently (7-8 times out of 10)
5. Almost always (9-10 times out of 10)
6. Do not know

Single

Q31 To what extend do you agree or disagree with the following statement?

As far as I know, it is more climate-friendly to eat pork than beef

1. Totally disagree

2. Partly disagree
3. Neither agree nor disagree
4. Partly agree
5. Totally agree
6. Do not know

Open

Q32 If you have any additional comments about the questionnaire, you are very welcome to write them here:

Info

Thank you very much for participating!