



Consumers' Willingness to Pay for Sustainable Rice in the European Union and Brazil

AUTOR

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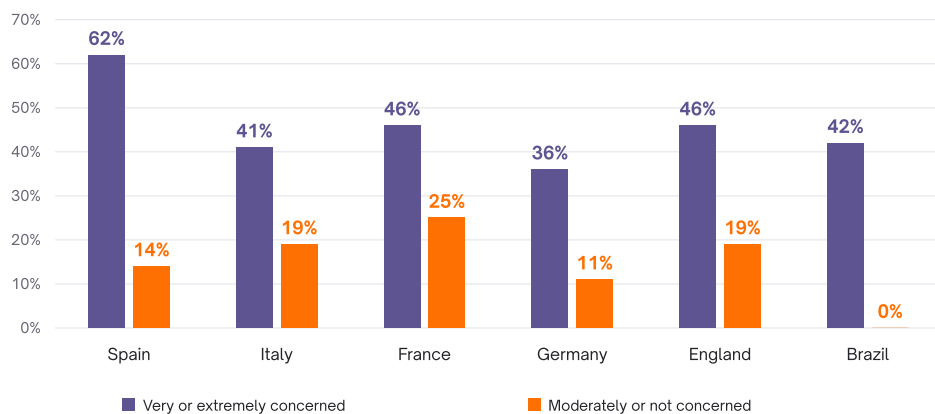
Executive Summary

This study evaluates consumers' willingness to pay (WTP) for rice produced with sustainable irrigation practices across six countries: Spain, Italy, France, Germany, England, and Brazil using a consistent dichotomous choice contingent valuation approach.

Across all six countries, respondents demonstrate a positive and statistically significant WTP premium for sustainable rice relative to conventional rice, ranging from a high of ~36% in Spain to a low of 23% in Germany), Italy (~30%) France (35%) Germany (23%) England (32%) Brazil (26%).

Concern about climate change is the strongest and most significant predictor of WTP. This pattern appears in all countries studied. Environmental concern acts as the main segmentation variable. Markets with a higher share of highly concerned consumers show higher average WTP.

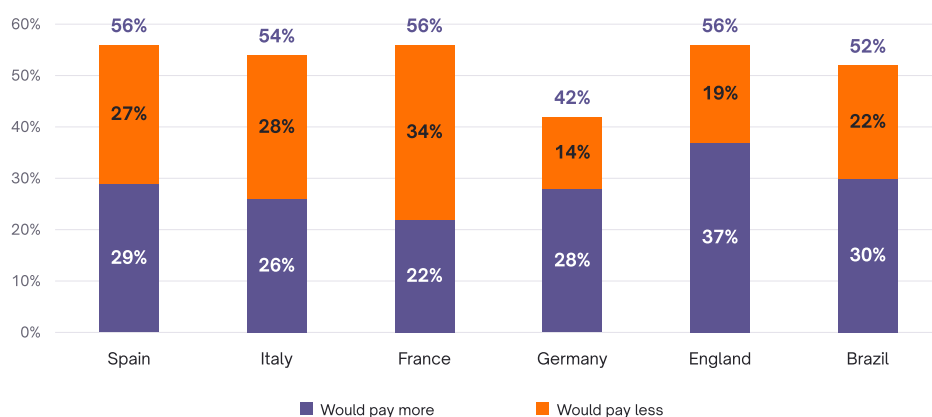
Premium over conventional rice by degree of environmental concern



Other covariates of significance include gender in France (male having a higher WTP than women), income level in France and Brazil (higher WTP among participants with higher incomes), education level in Germany and England (higher WTP among participants with higher education), share of income spent on food in Brazil (counterintuitively, the higher the income share spent on food, the higher the WTP for sustainable rice).

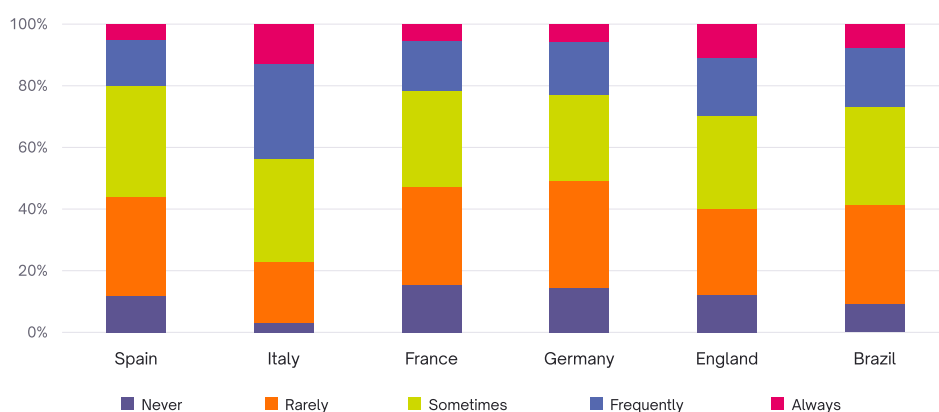
The origin of sustainable rice changes the price consumers are willing to pay for it differently across countries. Except for Germany, more than half of the respondents stated that they would change the price offered for sustainable rice if it was imported: among those that stated they would pay less because of it, the main reason was that “rice produced locally is better for the environment,” whereas “supporting a more sustainable global rice system” was the main reason for participants willing to pay more for sustainable rice.

Change in WTP due to imported nature of rice



Except for Italy, less than a third of the participants stated that they read the rice labels at least frequently, primarily to know about the nutritional value and country of origin. Those participants that do not frequently read the rice labels rarely seek information from other sources.

Pay attention to rice labels



The findings highlight two key challenges to marketing sustainable rice in these markets: first, how to identify those consumers concerned with climate change given that there is no strong correlation with other socioeconomic variables such as income and education, and second, how to change the behavior of consumers that read the labels so they can be drawn to find out more information about the sustainability of the rice they buy, and most importantly how to inform consumers that do not read the rice labels nor seek other sources to inform their rice choices.

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Country Report: Spain

Methodology Brief

The goal of this study was to assess Spanish consumers' willingness to pay (WTP) for rice produced following sustainable irrigation practices using a dichotomous choice contingent valuation approach.

Dichotomous choice contingent valuation is a survey-based economic method used to estimate individuals' WTP for a good or policy. Respondents are presented with a hypothetical scenario and asked whether they would be willing to pay a specific price (or bid) for the good, answering simply "yes" or "no." By varying the bid amounts across respondents and analyzing the pattern of responses, researchers can infer the distribution of willingness to pay in the population.

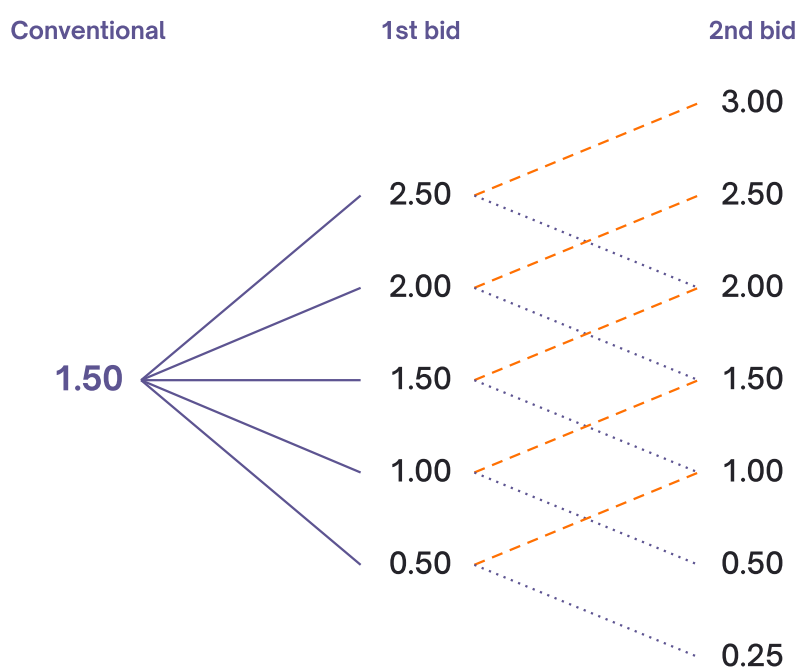
The survey was designed by Dr. Durand-Morat in Qualtrics® and administered online by the global market research company Dynata® between October and November of 2025.

Figure 1 shows the price tree used in this study. The price for conventional rice was estimated based on ongoing market prices collected from Statista® in August of 2025.

Figure 1. Price levels for conventional and sustainable rice used in this study (Euros/kg).

Spain

Price levels for conventional and sustainable rice (Euros/kg)



Results

A total of 889 surveys were completed and used for this analysis. Table 1 shows the descriptive statistics of the main variables collected in this study and used in the econometric analysis.

Table 1. Descriptive statistics of selected variables (N=889)

Variable	Mean	Min.	Max.
Age (years)	50.9	19	84
Household size	2.7	1	10
Rice consumption (kg/hh/month)	2.5	0	11
	Count	Share	
Gender			
Female	418	47.0%	
Male	469	52.8%	
Other	2	0.2%	
Education completed			
None	5	0.6%	
Elementary	57	6.4%	
Secondary mandatory	339	38.1%	
Secondary	338	38.0%	
Technical degree	26	2.9%	
University	60	6.8%	
Graduate	64	7.2%	
Household income (Euros/month)			
< 2000	404	45.4%	
2000-4000	359	40.4%	
4000-6000	80	9.0%	
6000-8000	27	3.0%	
8000-10000	8	0.9%	
>10000	11	1.2%	
Share of income spent on food			
<10%	33	3.7%	
10-19%	182	20.5%	
20-29%	291	32.7%	
30-39%	225	25.3%	
40-49%	98	11.0%	
>=50%	60	6.8%	
Concern about climate change			
Not at all concerned	53	6.0%	
Slightly concerned	131	14.7%	
Moderately concerned	293	33.0%	
Very concerned	280	31.5%	
Extremely concerned	132	14.8%	
Degree to which concern about climate change influences purchase behavior*			
Not at all	64	7.7%	
Slightly	192	23.0%	
Moderately	326	39.0%	
Highly	204	24.4%	
Extremely	50	6.0%	

*. Only for those that are slightly to extremely concerned about climate change.

Table 2 shows the independent variables considered for econometric analysis.

Table 2. Definition of variables used in the econometric model.

Variable	Definition	Expected sign
Female	Binary variable equal to 1 if female, zero otherwise	NA
Age	Continuous variable	NA
Age3039	Binary variable equal to 1 if age between 30 and 39, zero otherwise	NA
Age4049	Binary variable equal to 1 if age between 40 and 49, zero otherwise	NA
Age5059	Binary variable equal to 1 if age between 50 and 59, zero otherwise	NA
Age60up	Binary variable equal to 1 if age 60 or above, zero otherwise	NA
Household size (hhsz)	Continuous variable	-
Education (edu)	Binary variable equal to 1 if education of respondent is technical degree or higher, zero otherwise	+
Income (inc)	Binary variable equal to 1 if monthly household income greater than 4000 Euros, zero otherwise	+
Middle income (midinc)	Binary variable equal to 1 if monthly household income is between 2000 and 6000 Euros, zero otherwise	+
High income (highinc)	Binary variable equal to 1 if monthly household income is higher than 6000 Euros, zero otherwise	+
Income share (incshr)	Binary variable equal to 1 if income spent on food is less than 30%, zero otherwise	+
Rice consumption (rcon)	Binary variable equal to 1 if monthly household consumption is less than or equal to 2 kg., zero otherwise	+
Climate change concerns (climcon)	Binary variable equal to 1 if very or extremely concerned about climate change, zero otherwise	+

Four different models were compiled using the variables above, ran and compared for fitness using Akaike's information criterion (AIC) and Bayesian information criterion (BIC).

Model 1: $WTP = f(\text{female}, \text{age}, \text{hhsz}, \text{edu}, \text{inc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 2: $WTP = f(\text{female}, \text{age}, \text{hhsz}, \text{edu}, \text{midinc}, \text{highinc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 3: $WTP = f(\text{female}, \text{age3039}, \text{age4049}, \text{age5059}, \text{age60up}, \text{hhsz}, \text{edu}, \text{inc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 4: $WTP = f(\text{female}, \text{age3039}, \text{age4049}, \text{age5059}, \text{age60up}, \text{hhsz}, \text{edu}, \text{midinc}, \text{highinc}, \text{incshr}, \text{rcon}, \text{climcon})$

Table 3 shows the AIC and BIC results, which indicate that Model 1 has the best fit (lowest AIC and BIC values) among the four models assessed. Consequently, only the results from Model 1 will be discussed in this report.

Table 3. Goodness of fit results for the four models considered in this study.

Criterion	Model 1	Model 2	Model 3	Model 4
AIC	1972.6	1973.5	1977.3	1978.2
BIC	2020.5	2026.2	2039.5	2045.2

Table 4 shows the econometric results for Model 1. Among the independent variables, age has a significant ($p < 0.05$) and negative impact on WTP, meaning that older people have a lower WTP for sustainable rice relative to younger people. "Climate change concerns" has a significant ($p < 0.01$) and positive impact on the WTP for sustainable rice, and of large magnitude (0.717). In fact, "climate change concerns" has the largest coefficient among all independent

variables (excluding the constant).

Table 4. Results from the double-bounded model.

	Coefficient	S.E.	P>z
Beta			
Female	-0.008	0.087	0.925
Age	-0.007	0.004	0.044
Household size	0.050	0.038	0.186
Education	0.084	0.132	0.526
Income	0.012	0.140	0.930
Income share	0.015	0.089	0.867
Rice consumption	-0.151	0.099	0.128
Climate change concerns	0.717	0.091	0.000
Constant	1.959	0.252	0.000
Sigma			
Constant	1.064	0.048	0.000
Observations	889		
Log likelihood	-976.30		
Wald chi2	67.27		
Prob. > chi2	0.000		

Table 5 shows the WTP values for the pooled samples and for the variable “climate change concerns.” On average, participants stated a WTP of €2.039/kg for sustainable rice, compared to €1.5/kg for conventional rice, which results in a statistically significant ($p < 0.01$) WTP premium of 35.94%.

The results show that participants who are very or extremely concerned with climate change have a significantly higher WTP of €2.424/kg, resulting in a significant ($p < 0.01$) 61.59% price premium over conventional rice. Even participants with moderate to no concern about climate change state a significantly higher WTP for sustainable rice, with a premium of 13.78% over conventional rice. The difference in WTP between participants very and extremely concerned about climate change and those that are moderately or no concerned is statistically significant ($p < 0.01$) and amount to €0.717/kg.

Table 5. Willingness to pay (WTP) estimates for selected samples.

Estimates	Average WTP (€/kg)	Average WTP premium† (%)
Climate change concerns		
Very or extremely concerned	2.424	61.59%***
Moderately or not concerned	1.707	13.78%***
Difference	0.717	47.81%***
†. Relative to the price of conventional rice (€1.5/kg).		
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.		

After the CV section, participants were asked three follow-up questions:

- (1) whether their responses would change if the sustainable rice were imported rather than domestically produced;
- (2) if yes, whether they would pay more or less; and
- (3) the reason for this change.

A total of 497 participants (55.9%) indicated that they would alter their responses. This suggests two possible interpretations: some respondents may not fully understand the global nature of climate change and sustainability, while others may hold preferences related to food sovereignty and domestic food production.

Table 6 summarizes the direction of change and the reasons provided. Among those who would revise their valuation, about half would pay less if they knew the sustainable rice was imported. The most common justification was the belief that locally produced rice is better for the environment, a perception that may not always reflect the full environmental impact. Other reasons included concerns about the environmental impact of transporting rice from other countries (which may be valid depending on distance and transportation mode), and the view that methane emissions abroad do not benefit their own country, which is biased given the global nature of greenhouse gases.

Slightly more than half of those willing to change their valuation said they would pay more if the sustainable rice were imported. Their main reason was a desire to support sustainable rice production globally. Additional reasons included the belief that imported rice is better for the environment, and a wish to support farmers in other countries.

Table 6. Direction and reasons offered for the change in the willingness to pay for sustainable rice if imported relative to domestically produced (N=497).

Direction of change	Main reasons for change
Pay less = 239 (48.1%)	(1) Locally produced rice is better for the environment (51.6%) (2) Transporting rice from overseas offsets the benefits of sustainable rice (31.8%) (3) Methane emissions happening in other parts of the world do not benefit me (14.3%) (4) Other reasons (2.3%)
Pay more = 258 (51.9%)	(1) Want to promote global rice sustainability (63.6%) (2) Imported rice is better for the environment (20.1%) (3) Want to support rice farmers in other countries (14.6%) (4) Other reasons (1.7%)

Conclusion

This study provides evidence of a significant willingness to pay (WTP) premium for sustainable rice among Spanish consumers. On average, respondents are willing to pay €2.04/kg for sustainable rice, representing a 35.9% premium over conventional rice. Climate change concern emerges as the strongest and most significant determinant of WTP, with individuals who are very or extremely concerned willing to pay a substantially higher premium of 61.6%. In contrast, age has a negative effect on WTP, indicating lower valuation of sustainability among older consumers. Overall, the results suggest that sustainability attributes are valued by consumers, particularly those with strong environmental concerns, highlighting the importance of environmental awareness in promoting sustainable food choices in Spain.

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Country Report: Italy

Methodology Brief

The goal of this study was to assess Italian consumers’ willingness to pay (WTP) for rice produced following sustainable irrigation practices using a dichotomous choice contingent valuation approach.

Dichotomous choice contingent valuation is a survey-based economic method used to estimate individuals’ WTP for a good or policy. Respondents are presented with a hypothetical scenario and asked whether they would be willing to pay a specific price (or bid) for the good, answering simply “yes” or “no.” By varying the bid amounts across respondents and analyzing the pattern of responses, researchers can infer the distribution of willingness to pay in the population.

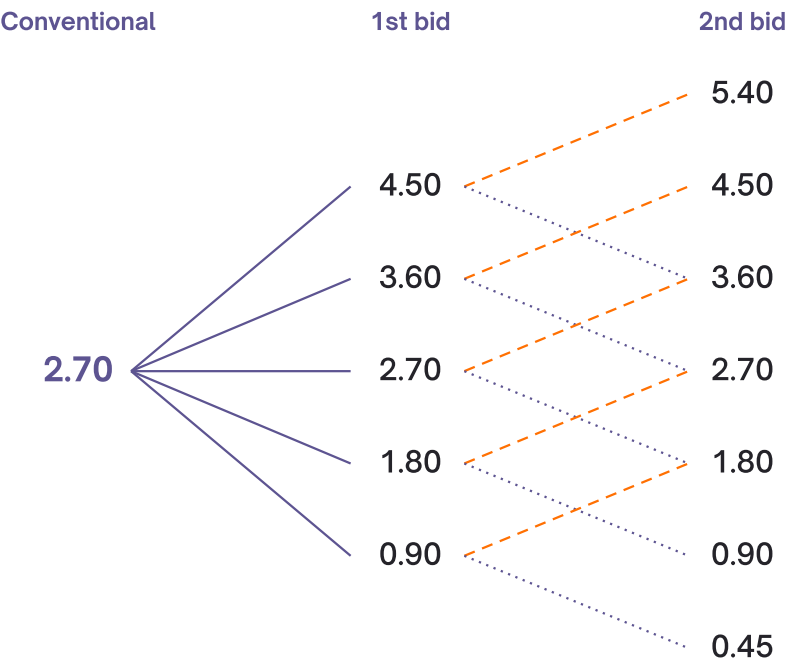
The survey was designed by Dr. Durand-Morat in Qualtrics® and administered online by the global market research company Dynata® between October and November of 2025.

Figure 2 shows the price tree used in this study. The price for conventional rice was estimated based on ongoing market prices collected from Statista® in August of 2025.

Figure 2. Price levels for conventional and sustainable rice used in this study (Euros/kg).

Italy

Price levels for conventional and sustainable rice (Euros/kg)



Results

A total of 310 surveys were completed and used for this analysis. Table 7 shows the descriptive statistics of the main variables collected in this study and used in the econometric analysis.

Table 7. Descriptive statistics of selected variables (N=310)

Variable	Mean	Min.	Max.
Age (years)	48.4	18	89
Household size	3.0	1	10
Rice consumption (kg/hh/month)	2.5	0	11
	Count	Share	
Gender			
Female	149	48.1%	
Male	159	51.3%	
Other	2	0.6%	
Education completed			
None	0	0.0%	
Elementary	27	8.7%	
Lower secondary	27	8.7%	
Upper secondary	92	29.7%	
University (3 years)	60	19.4%	
University (5 years)	68	21.9%	
Graduate	36	11.6%	
Household income (Euros/month)			
< 2000	96	31.0%	
2000-4000	115	37.1%	
4000-6000	43	13.9%	
6000-8000	25	8.1%	
8000-10000	17	5.5%	
>10000	14	4.5%	
Share of income spent on food			
<10%	21	6.8%	
10-19%	68	21.9%	
20-29%	98	31.6%	
30-39%	75	24.2%	
40-49%	13	4.2%	
>=50%	35	11.3%	
Concern about climate change			
Not at all concerned	14	4.5%	
Slightly concerned	39	12.6%	
Moderately concerned	92	29.7%	
Very concerned	108	34.8%	
Extremely concerned	57	18.4%	
Degree to which concern about climate change influences purchase behavior*			
Not at all	17	5.7%	
Slightly	70	23.7%	
Moderately	119	40.2%	
Highly	78	26.4%	
Extremely	12	4.0%	

*. Only for those that are slightly to extremely concerned about climate change.

Table 8 shows the independent variables considered for econometric analysis.

Table 8. Definition of variables used in the econometric model.

Variable	Definition	Expected sign
Female	Binary variable equal to 1 if female, zero otherwise	NA
Age	Continuous variable	NA
Age3039	Binary variable equal to 1 if age between 30 and 39, zero otherwise	NA
Age4049	Binary variable equal to 1 if age between 40 and 49, zero otherwise	NA
Age5059	Binary variable equal to 1 if age between 50 and 59, zero otherwise	NA
Age60up	Binary variable equal to 1 if age 60 or above, zero otherwise	NA
Household size (hhsz)	Continuous variable	-
Education (edu)	Binary variable equal to 1 if education of respondent is university degree or higher, zero otherwise	+
Income (inc)	Binary variable equal to 1 if monthly household income greater than 4000 Euros, zero otherwise	+
Middle income (midinc)	Binary variable equal to 1 if monthly household income is between 4000 and 8000 Euros, zero otherwise	+
High income (highinc)	Binary variable equal to 1 if monthly household income is higher than 8000 Euros, zero otherwise	+
Income share (incshr)	Binary variable equal to 1 if income spent on food is less than 30%, zero otherwise	+
Rice consumption (rcon)	Binary variable equal to 1 if monthly household consumption is more than or equal to 2 kg., zero otherwise	-
Climate change concerns (climcon)	Binary variable equal to 1 if very or extremely concerned about climate change, zero otherwise	+

A correlation assessment indicates no large correlations among independent variables: the largest correlation is between rice consumption and household size (0.3609), which is deemed acceptable. Four different models were compiled using the variables above, ran and compared for fitness using Akaike's information criterion (AIC) and Bayesian information criterion (BIC).

Model 1: $WTP = f(\text{female}, \text{age}, \text{hhsz}, \text{edu}, \text{inc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 2: $WTP = f(\text{female}, \text{age}, \text{hhsz}, \text{edu}, \text{midinc}, \text{highinc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 3: $WTP = f(\text{female}, \text{age3039}, \text{age4049}, \text{age5059}, \text{age60up}, \text{hhsz}, \text{edu}, \text{inc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 4: $WTP = f(\text{female}, \text{age3039}, \text{age4049}, \text{age5059}, \text{age60up}, \text{hhsz}, \text{edu}, \text{midinc}, \text{highinc}, \text{incshr}, \text{rcon}, \text{climcon})$

Table 9 shows the AIC and BIC results, which indicate that Model 1 has the best fit (lowest AIC and BIC values) among the four models assessed. Consequently, only the results from Model 1 will be discussed in this report.

Table 9. Goodness of fit results for the four models considered in this study.

Criterion	Model 1	Model 2	Model 3	Model 4
AIC	643.2	644.8	649.4	651.1
BIC	680.5	686.0	698.0	703.4

Table 10 shows the econometric results for Model 1. Among the independent variables, only "Climate change concerns" has a significant ($p < 0.01$) and positive impact on the WTP for

sustainable rice, and of large magnitude (0.593). In fact, “climate change concerns” has the largest coefficient among all independent variables (excluding the constant).

On average, participants stated a WTP of €3.519/kg for sustainable rice, compared to €2.7/kg for conventional rice, which results in a statistically significant ($p < 0.01$) WTP premium of 30.32%.

Table 11 shows the WTP by the degree of concerns about climate change. The results show that participants who are very and extremely concerned with climate change have a significantly higher WTP of €3.796/kg, resulting in a significant ($p < 0.01$) 40.60% price premium over conventional rice. Even participants with moderate to no concern about climate change state a significantly ($p < 0.10$) higher WTP for sustainable rice, with a premium of 18.63% over conventional rice. The difference in WTP between participants very and extremely concerned about climate change and those who are moderately or not concerned is statistically significant ($p < 0.01$) and amounts to €0.593/kg.

Table 10. Results from the double-bounded model.

	Coefficient	S.E.	P>z
Beta			
Female	0.198	0.196	0.310
Age	0.004	0.007	0.599
Household size	0.099	0.078	0.203
Education	0.267	0.206	0.194
Income	0.252	0.220	0.252
Income share	-0.297	0.224	0.185
Rice consumption	-0.013	0.223	0.952
Climate change concerns	0.593	0.199	0.003
Constant	2.719	0.540	0.000
Sigma			
Constant	1.384	0.096	0.000
Observations	310		
Log likelihood	-311.58		
Wald chi2	21.23		
Prob. > chi2	0.007		

Table 11. Willingness to pay (WTP) estimates for selected samples.

Estimates	Average WTP (€/kg)	Average WTP premium† (%)
Climate change concerns		
Very or extremely concerned	3.796	40.60%***
Moderately or not concerned	3.203	18.63%***
Difference	0.593	21.97%***
†. Relative to the price of conventional rice (€2.4/kg).		
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.		

After the CV section, participants were asked three follow-up questions:

- (1) whether their responses would change if the sustainable rice were imported rather than domestically produced.
- (2) if yes, whether they would pay more or less; and
- (3) the reason for this change.

A total of 166 participants (53.6%) indicated that they would alter their responses. This suggests two possible interpretations: some respondents may not fully understand the global nature of climate change and sustainability, while others may hold preferences related to food sovereignty and domestic food production.

Table 12 summarizes the direction of change and the reasons provided. Among those who would revise their valuation, about 52.4% would pay less if they knew the sustainable rice was imported. The most common justification was the belief that locally produced rice is better for the environment, a perception that does not necessarily capture the full environmental impact. Other reasons include concerns about the environmental impact of transporting rice from other countries (which may be valid depending on distance and transportation mode), and the view that methane emissions abroad do not benefit their own country, which is biased given the global nature of greenhouse gases.

Around 47.6% of those willing to change their valuation said they would pay more if the sustainable rice were imported. Their main reason was a desire to support sustainable rice production globally. Additional reasons included the belief that imported rice is better for the environment, and a wish to support farmers in other countries.

Table 12. Direction and reasons offered for the change in the willingness to pay for sustainable rice if imported relative to domestically produced (N=166).

Direction of change	Main reasons for change
Pay less = 87 (52.4%)	(1) Locally produced rice is better for the environment (43.7%) (2) Transporting rice from overseas offsets the benefits of sustainable rice (41.4%) (3) Methane emissions happening in other parts of the world do not benefit me (11.5%) (4) Other reasons (3.4%)
Pay more = 79 (47.6%)	(1) Want to promote global rice sustainability (58.2%) (2) Imported rice is better for the environment (29.1%) (3) Want to support rice farmers in other countries (11.4%) (4) Other reasons (1.3%)

Conclusion

The findings show that Italian consumers are willing to pay a statistically significant premium for rice produced using sustainable irrigation practices. On average, respondents are willing to pay €3.52/kg for sustainable rice, representing a 30% premium over conventional rice. Concern about climate change emerges as the strongest and most influential determinant of willingness to pay, with highly concerned consumers exhibiting substantially higher premiums than less concerned individuals. Other socio-demographic factors play a limited role. Overall, the results suggest strong market potential for sustainably irrigated rice in Italy, particularly among environmentally conscious consumers, highlighting the importance of sustainability attributes in shaping food purchasing decisions.

The background of the page is a solid light blue color. Overlaid on this background are several decorative elements. A large, faint, light blue outline of the map of France is centered in the upper half of the page. Below the map, there are several large, overlapping, light blue wavy lines that resemble stylized waves or abstract shapes, filling the lower half of the page. The text "Country Report: France" is centered in the middle of the page, between the map and the wavy lines.

Country Report: France

Methodology Brief

The goal of this study was to assess French consumers' willingness to pay (WTP) for rice produced following sustainable irrigation practices using a dichotomous choice contingent valuation approach.

Dichotomous choice contingent valuation is a survey-based economic method used to estimate individuals' WTP for a good or policy. Respondents are presented with a hypothetical scenario and asked whether they would be willing to pay a specific price (or bid) for the good, answering simply "yes" or "no." By varying the bid amounts across respondents and analyzing the pattern of responses, researchers can infer the distribution of willingness to pay in the population.

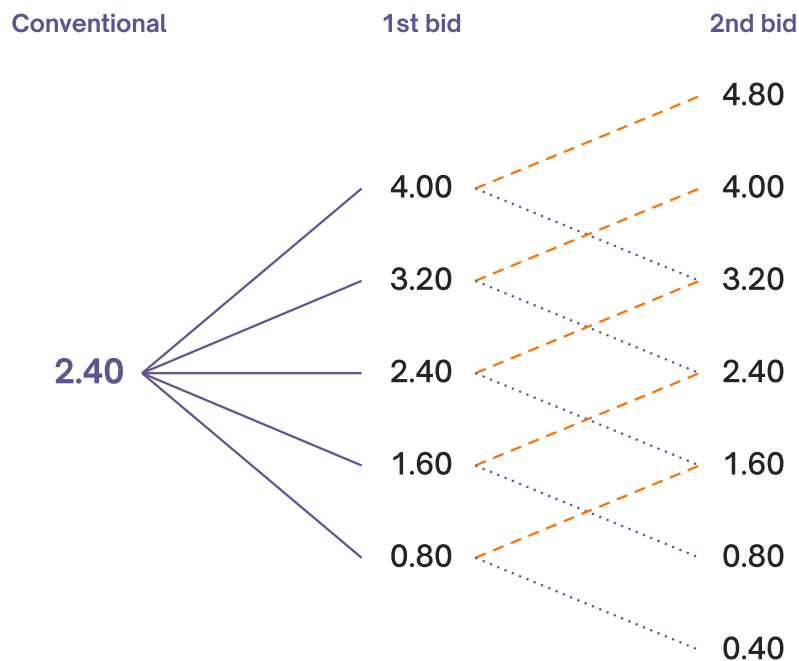
The survey was designed by Dr. Durand-Morat in Qualtrics® and administered online by the global market research company Dynata® between October and November of 2025.

Figure 3 shows the price tree used in this study. The price for conventional rice was estimated based on ongoing market prices collected from Statista® in August of 2025.

Figure 3. Price levels for conventional and sustainable rice used in this study (Euros/kg).

France

Price levels for conventional and sustainable rice (Euros/kg)



Results

A total of 629 surveys were completed and used for this analysis. Table 13 shows the descriptive statistics of the main variables collected in this study and used in the econometric analysis.

Table 13. Descriptive statistics of selected variables (N=629)

Variable	Mean	Min.	Max.
Age (years)	54.3	18	86
Household size	2.3	1	10
Rice consumption (kg/hh/month)	1.8	0	10
	Count	Share	
Gender			
Female	305	48.5%	
Male	324	51.5%	
Other	0	0.0%	
Education completed			
None	3	0.5%	
Elementary	6	1.0%	
Secondary mandatory	75	11.9%	
Secondary	410	65.2%	
Technical degree	64	10.2%	
University	56	8.9%	
Graduate	15	2.4%	
Household income (Euros/month)			
< 2000	241	38.3%	
2000-4000	240	38.2%	
4000-6000	89	14.2%	
6000-8000	35	5.6%	
8000-10000	13	2.1%	
>10000	11	1.6%	
Share of income spent on food			
<10%	32	5.1%	
10-19%	166	26.4%	
20-29%	238	37.8%	
30-39%	107	17.0%	
40-49%	52	8.3%	
>=50%	34	5.4%	
Concern about climate change			
Not at all concerned	33	5.3%	
Slightly concerned	58	9.2%	
Moderately concerned	214	34.0%	
Very concerned	220	35.0%	
Extremely concerned	104	16.5%	
Degree to which concern about climate change influences purchase behavior*			
Not at all	71	11.9%	
Slightly	114	19.1%	
Moderately	238	39.9%	
Highly	131	22.0%	
Extremely	42	7.0%	

*. Only for those that are slightly to extremely concerned about climate change.

Table 14 shows the independent variables considered for econometric analysis.

Table 14. Definition of variables used in the econometric model.

Variable	Definition	Expected sign
Female	Binary variable equal to 1 if female, zero otherwise	NA
Age	Continuous variable	NA
Age3039	Binary variable equal to 1 if age between 30 and 39, zero otherwise	NA
Age4049	Binary variable equal to 1 if age between 40 and 49, zero otherwise	NA
Age5059	Binary variable equal to 1 if age between 50 and 59, zero otherwise	NA
Age60up	Binary variable equal to 1 if age 60 or above, zero otherwise	NA
Household size (hhsz)	Continuous variable	-
Education (edu)	Binary variable equal to 1 if education of respondent is technical degree or higher, zero otherwise	+
Income (inc)	Binary variable equal to 1 if monthly household income greater than 4000 Euros, zero otherwise	+
Middle income (midinc)	Binary variable equal to 1 if monthly household income is between 4000 and 8000 Euros, zero otherwise	+
High income (highinc)	Binary variable equal to 1 if monthly household income is higher than 8000 Euros, zero otherwise	+
Income share (incshr)	Binary variable equal to 1 if income spent on food is less than 30%, zero otherwise	+
Rice consumption (rcon)	Binary variable equal to 1 if monthly household consumption is less than or equal to 1 kg., zero otherwise	+
Climate change concerns (climcon)	Binary variable equal to 1 if very or extremely concerned about climate change, zero otherwise	+

A correlation assessment indicates that education is highly correlated with income (0.6015); therefore, we excluded education from the models to avoid potential multicollinearity. Four different models were compiled using the variables above, ran and compared for fitness using Akaike's information criterion (AIC) and Bayesian information criterion (BIC).

Model 1: $WTP = f(\text{female}, \text{age}, \text{hhsz}, \text{inc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 2: $WTP = f(\text{female}, \text{age}, \text{hhsz}, \text{midinc}, \text{highinc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 3: $WTP = f(\text{female}, \text{age3039}, \text{age4049}, \text{age5059}, \text{age60up}, \text{hhsz}, \text{inc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 4: $WTP = f(\text{female}, \text{age3039}, \text{age4049}, \text{age5059}, \text{age60up}, \text{hhsz}, \text{midinc}, \text{highinc}, \text{incshr}, \text{rcon}, \text{climcon})$

Table 15 shows the AIC and BIC results, which indicate that Model 2 has the best fit (lowest AIC and BIC values) among the four models assessed. Consequently, only the results from Model 2 will be discussed in this report.

Table 15. Goodness of fit results for the four models considered in this study.

Criterion	Model 1	Model 2	Model 3	Model 4
AIC	1240.6	1239.7	1243.1	1243.0
BIC	1280.6	1284.2	1296.4	1300.6

Table 16 shows the econometric results for Model 2. Among the independent variables, female has a significant ($p < 0.05$) and negative impact on WTP, meaning female participants are on average willing to pay less than their male counterparts. High income has a significant

($p < 0.05$) and large positive impact, which means that high-income individuals are willing to pay significantly more than low-income participants. “Climate change concerns” has a significant ($p < 0.01$) and large positive impact on the WTP for sustainable rice. In fact, “climate change concerns” has the second largest coefficient among all independent variables (excluding the constant).

Table 16. Results from the double-bounded model.

	Coefficient	S.E.	P>z
Beta			
Female	-0.323	0.138	0.020
Age	0.003	0.005	0.524
Household size	-0.025	0.063	0.689
Middle income	0.266	0.185	0.151
High income	0.937	0.384	0.015
Income share	-0.009	0.149	0.953
Rice consumption	0.234	0.154	0.129
Climate change concerns	0.502	0.136	0.000
Constant	2.865	0.402	0.000
Sigma			
Constant	1.354	0.071	0.000
Observations	629		
Log likelihood	-609.87		
Wald chi2	33.24		
Prob. > chi2	0.000		

On average, participants stated a WTP of €3.248/kg for sustainable rice, compared to €2.4/kg for conventional rice, which results in a statistically significant ($p < 0.01$) WTP premium of 35.35%.

Table 17 shows the WTP by gender, high income versus all other income levels, and concerns about climate change. Male participants state a WTP significantly larger than female participants, with the difference (€0.323/kg or 13.45% being statistically significant ($p < 0.05$)). Similarly, participants who report a household income equal to or greater than €8000/month also state a WTP significantly larger (difference of €0.937/kg or 39.02%) than participants with lower income levels.

The results show that participants who are very and extremely concerned with climate change have a significantly higher WTP of €3.492/kg, resulting in a significant ($p < 0.01$) 45.50% price premium over conventional rice. Even participants with moderate to no concern about climate change state a significantly higher WTP for sustainable rice, with a premium of 24.57% over conventional rice. The difference in WTP between participants very and extremely concerned about climate change and those who are moderately or not concerned is statistically significant ($p < 0.01$) and amounts to €0.502/kg.

Table 17. Willingness to pay (WTP) estimates for selected samples.

Estimates	Average WTP (€/kg)	Average WTP premium† (%)
Gender		
Female	3.092	28.83%***
Male	3.415	42.28%***
Difference	-0.323**	-13.45%**
Income level		
High income	4.149	72.88%***
Other income	3.213	33.86%***
Difference	0.937	39.02%**
Climate change concerns		
Very or extremely concerned	3.492	45.50%***
Moderately or not concerned	2.990	24.57%***
Difference	0.502***	20.93%***

†. Relative to the price of conventional rice (€2.4/kg).
 * p < 0.10; ** p < 0.05; *** p < 0.01.

After the CV section, participants were asked three follow-up questions:

- (1) whether their responses would change if the sustainable rice were imported rather than domestically produced.
- (2) if yes, whether they would pay more or less; and
- (3) the reason for this change.

A total of 351 participants (55.8%) indicated that they would alter their responses. This suggests two possible interpretations: some respondents may not fully understand the global nature of climate change and sustainability, while others may hold preferences related to food sovereignty and domestic food production.

Table 18 summarizes the direction of change and the reasons provided. Among those who would revise their valuation, about 61% would pay less if they knew the sustainable rice was imported. The most common justification was the belief that locally produced rice is better for the environment, a perception that does not necessarily capture the full environmental impact. Other reasons include concerns about the environmental impact of transporting rice from other countries (which may be valid depending on distance and transportation mode), and the view that methane emissions abroad do not benefit their own country, which is biased given the global nature of greenhouse gases.

Around 39% of those willing to change their valuation said they would pay more if the sustainable rice were imported. Their main reason was a desire to support sustainable rice production globally. Additional reasons included the belief that imported rice is better for the environment, and a wish to support farmers in other countries.

Table 18. Direction and reasons offered for the change in the willingness to pay for sustainable rice if imported relative to domestically produced (N=351).

Direction of change	Main reasons for change
Pay less = 214 (61.0%)	(1) Locally produced rice is better for the environment (59.8%) (2) Transporting rice from overseas offsets the benefits of sustainable rice (29.9%) (3) Methane emissions happening in other parts of the world do not benefit me (8.9%) (4) Other reasons (1.4%)
Pay more = 137 (39.0%)	(1) Want to promote global rice sustainability (43.8%) (2) Imported rice is better for the environment (30.7%) (3) Want to support rice farmers in other countries (22.6%) (4) Other reasons (2.9%)

Conclusion

This study finds clear evidence that French consumers are willing to pay a statistically significant premium for rice produced using sustainable irrigation practices. On average, respondents are willing to pay €3.25/kg for sustainable rice, representing a 35.35% premium over conventional rice prices. Climate change concern emerges as one of the strongest determinants of willingness to pay, with highly concerned consumers exhibiting substantially higher premiums. Income also plays an important role, as high-income households show significantly greater willingness to pay, while female respondents report lower WTP on average. Overall, the results indicate strong market potential for sustainably produced rice in France, particularly among environmentally concerned and higher-income consumers, underscoring the role of sustainability attributes in shaping food purchasing decisions.



Country Report: Germany

Methodology Brief

The goal of this study was to assess German consumers’ willingness to pay (WTP) for rice produced following sustainable irrigation practices using a dichotomous choice contingent valuation approach.

Dichotomous choice contingent valuation is a survey-based economic method used to estimate individuals’ WTP for a good or policy. Respondents are presented with a hypothetical scenario and asked whether they would be willing to pay a specific price (or bid) for the good, answering simply “yes” or “no.” By varying the bid amounts across respondents and analyzing the pattern of responses, researchers can infer the distribution of willingness to pay in the population.

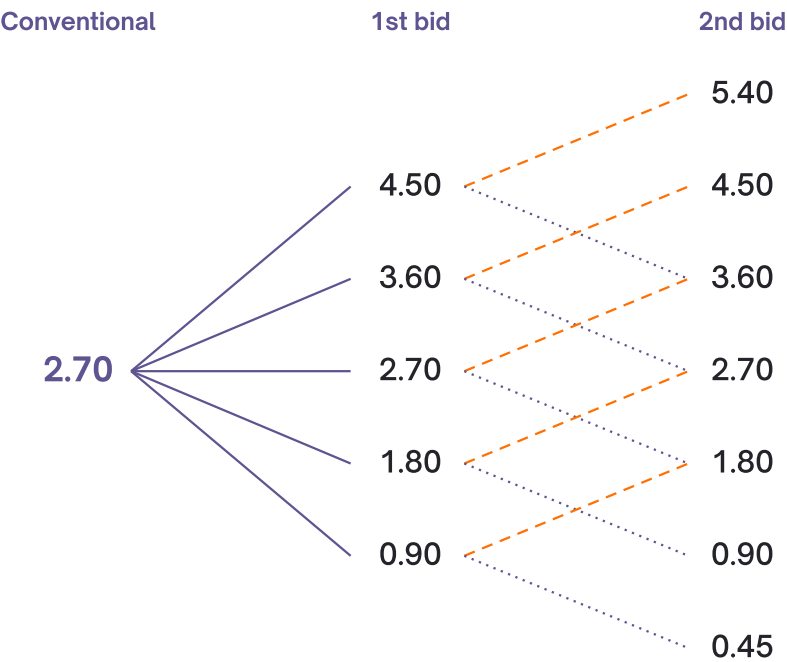
The survey was designed by Dr. Durand-Morat in Qualtrics® and administered online by the global market research company Dynata® between October and November of 2025.

Figure 4 shows the price tree used in this study. The price for conventional rice was estimated based on ongoing market prices collected from Statista® in August of 2025.

Figure 4. Price levels for conventional and sustainable rice used in this study (Euros/kg).

Germany

Price levels for conventional and sustainable rice (Euros/kg)



Results

A total of 323 surveys were completed and used for this analysis. Table 19 shows the descriptive statistics of the main variables collected in this study and used in the econometric analysis.

Table 19. Descriptive statistics of selected variables (N=323)

Variable	Mean	Min.	Max.
Age (years)	48.1	18	84
Household size	2.3	1	10
Rice consumption (kg/hh/month)	2.0	0	11
	Count	Share	
Gender			
Female	150	46.4%	
Male	172	53.3%	
Other	1	0.3%	
Education completed			
None	4	1.3%	
Elementary	9	3.0%	
Lower secondary	32	10.5%	
Upper secondary	113	37.1%	
University	94	30.8%	
Graduate	53	17.4%	
Household income (Euros/month)			
< 2000	106	32.8%	
2000-4000	88	27.2%	
4000-6000	59	18.3%	
6000-8000	35	10.8%	
8000-10000	17	5.3%	
>10000	18	5.6%	
Share of income spent on food			
<10%	35	10.8%	
10-19%	92	28.5%	
20-29%	103	31.9%	
30-39%	58	18.0%	
40-49%	19	5.9%	
>=50%	16	5.0%	
Concern about climate change			
Not at all concerned	26	8.1%	
Slightly concerned	54	16.7%	
Moderately concerned	88	27.2%	
Very concerned	87	26.9%	
Extremely concerned	68	21.1%	
Degree to which concern about climate change influences purchase behavior*			
Not at all	32	10.8%	
Slightly	78	26.3%	
Moderately	107	36.0%	
Highly	62	20.9%	
Extremely	18	6.1%	

*. Only for those that are slightly to extremely concerned about climate change.

Table 20 shows the independent variables considered for econometric analysis.

Table 20. Definition of variables used in the econometric model.

Variable	Definition	Expected sign
Female	Binary variable equal to 1 if female, zero otherwise	NA
Age	Continuous variable	NA
Age3039	Binary variable equal to 1 if age between 30 and 39, zero otherwise	NA
Age4049	Binary variable equal to 1 if age between 40 and 49, zero otherwise	NA
Age5059	Binary variable equal to 1 if age between 50 and 59, zero otherwise	NA
Age60up	Binary variable equal to 1 if age 60 or above, zero otherwise	NA
Household size (hhsz)	Continuous variable	-
Education (edu)	Binary variable equal to 1 if education of respondent is university degree or higher, zero otherwise	+
Income (inc)	Binary variable equal to 1 if monthly household income greater than 4000 Euros, zero otherwise	+
Middle income (midinc)	Binary variable equal to 1 if monthly household income is between 4000 and 8000 Euros, zero otherwise	+
High income (highinc)	Binary variable equal to 1 if monthly household income is higher than 8000 Euros, zero otherwise	+
Income share (incshr)	Binary variable equal to 1 if income spent on food is less than 30%, zero otherwise	+
Rice consumption (rcon)	Binary variable equal to 1 if monthly household consumption is more than or equal to 2 kg., zero otherwise	-
Climate change concerns (climcon)	Binary variable equal to 1 if very or extremely concerned about climate change, zero otherwise	+

A correlation assessment indicates no large correlations among independent variables: the largest correlation is between rice consumption and household size (0.3845), which is deemed acceptable. Four different models were compiled using the variables above, ran and compared for fitness using Akaike's information criterion (AIC) and Bayesian information criterion (BIC).

Model 1: $WTP = f(\text{female}, \text{age}, \text{hhsz}, \text{edu}, \text{inc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 2: $WTP = f(\text{female}, \text{age}, \text{hhsz}, \text{edu}, \text{midinc}, \text{highinc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 3: $WTP = f(\text{female}, \text{age3039}, \text{age4049}, \text{age5059}, \text{age60up}, \text{hhsz}, \text{edu}, \text{inc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 4: $WTP = f(\text{female}, \text{age3039}, \text{age4049}, \text{age5059}, \text{age60up}, \text{hhsz}, \text{edu}, \text{midinc}, \text{highinc}, \text{incshr}, \text{rcon}, \text{climcon})$

Table 21 shows the AIC and BIC results, which indicate that Model 1 has the best fit (lowest AIC and BIC values) among the four models assessed. Consequently, only the results from Model 1 will be discussed in this report.

Table 21. Goodness of fit results for the four models considered in this study.

Criterion	Model 1	Model 2	Model 3	Model 4
AIC	732.46	734.43	734.93	736.76
BIC	770.24	775.99	784.05	789.65

Table 22 shows the econometric results for Model 1. Among the independent variables, education has a significant ($p < 0.05$) and positive impact on WTP, meaning that participants with a university degree or higher have a higher WTP for sustainable rice relative to participants with

lower education attainment. “Climate change concerns” has a significant ($p < 0.01$) and positive impact on the WTP for sustainable rice, and of large magnitude (0.682). In fact, “climate change concerns” has the largest coefficient among all independent variables (excluding the constant).

Table 22. Results from the double-bounded model.

	Coefficient	S.E.	P>z
Beta			
Female	0.202	0.217	0.352
Age	-0.006	0.008	0.406
Household size	-0.103	0.097	0.288
Education	0.493	0.238	0.039
Income	0.262	0.254	0.302
Income share	-0.018	0.244	0.940
Rice consumption	-0.415	0.267	0.121
Climate change concerns	0.682	0.219	0.002
Constant	3.311	0.539	0.000
Sigma			
Constant	1.620	0.112	0.000
Observations	323		
Log likelihood	-356.23		
Wald chi2	20.70		
Prob. > chi2	0.008		

On average, participants stated a WTP of €3.327/kg for sustainable rice, compared to €2.7/kg for conventional rice, which results in a statistically significant ($p < 0.01$) WTP premium of 23.22%.

Table 23 shows the WTP by education and concerns about climate change. Participants with university degrees or higher state a WTP of €3.596/kg compared to €3.103/kg for those with lower education attainment, with the difference (€0.493/kg or 18.26%) being statistically significant ($p < 0.05$).

The results show that participants who are very and extremely concerned with climate change have a significantly higher WTP of €3.682/kg, resulting in a significant ($p < 0.01$) 36.36% price premium over conventional rice. Even participants with moderate to no concern about climate change state a significantly ($p < 0.10$) higher WTP for sustainable rice, with a premium of 11.09% over conventional rice. The difference in WTP between participants very and extremely concerned about climate change and those who are moderately or not concerned is statistically significant ($p < 0.01$) and amounts to €0.682/kg.

Table 23. Willingness to pay (WTP) estimates for selected samples.

Estimates	Average WTP (€/kg)	Average WTP premium† (%)
Education level		
University degree or higher	3.596	33.17%***
Less than university degree	3.103	14.91%**
Difference	0.493	18.26%**
Climate change concerns		
Very or extremely concerned	3.682	36.36%***
Moderately or not concerned	2.999	11.09%*
Difference	0.682	25.27%***

†. Relative to the price of conventional rice (€2.4/kg).

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

After the CV section, participants were asked three follow-up questions:

- (1) whether their responses would change if the sustainable rice were imported rather than domestically produced.
- (2) if yes, whether they would pay more or less; and
- (3) the reason for this change.

A total of 136 participants (42.1%) indicated that they would alter their responses. This suggests two possible interpretations: some respondents may not fully understand the global nature of climate change and sustainability, while others may hold preferences related to food sovereignty and domestic food production.

Table 24 summarizes the direction of change and the reasons provided. Among those who would revise their valuation, about 33.1% would pay less if they knew the sustainable rice was imported. The most common justification was the belief that locally produced rice is better for the environment, a perception that does not necessarily capture the full environmental impact. Other reasons include concerns about the environmental impact of transporting rice from other countries (which may be valid depending on distance and transportation mode), and the view that methane emissions abroad do not benefit their own country, which is biased given the global nature of greenhouse gases.

Around 66.9% of those willing to change their valuation said they would pay more if the sustainable rice were imported. Their main reason was a desire to support sustainable rice production globally. Additional reasons included a wish to support farmers in other countries, and the belief that imported rice is better for the environment.

Table 24. Direction and reasons offered for the change in the willingness to pay for sustainable rice if imported relative to domestically produced (N=136).

Direction of change	Main reasons for change
Pay less = 45 (33.1%)	(1) Locally produced rice is better for the environment (57.8%) (2) Transporting rice from overseas offsets the benefits of sustainable rice (24.4%) (3) Methane emissions happening in other parts of the world do not benefit me (15.6%) (4) Other reasons (2.2%)
Pay more = 91 (66.9%)	(1) Want to promote global rice sustainability (47.3%) (2) Want to support rice farmers in other countries (30.8%) (3) Imported rice is better for the environment (20.9%) (4) Other reasons (1.0%)

Conclusion

The results indicate that German consumers are willing to pay a statistically significant premium for rice produced using sustainable irrigation practices. On average, respondents are willing to pay €3.33/kg for sustainable rice, corresponding to a premium of approximately 23% over conventional rice prices. Climate change concern is the strongest determinant of willingness to pay, with highly concerned consumers exhibiting substantially higher premiums. Higher educational attainment also positively influences willingness to pay, while other socio-demographic factors show limited effects. Overall, the findings highlight strong market potential for sustainably produced rice in Germany, particularly among environmentally concerned and well-educated consumers, underscoring the importance of sustainability attributes in food purchasing decisions.



Country Report: England

Methodology Brief

The goal of this study was to assess British consumers’ willingness to pay (WTP) for rice produced following sustainable irrigation practices using a dichotomous choice contingent valuation approach.

Dichotomous choice contingent valuation is a survey-based economic method used to estimate individuals’ WTP for a good or policy. Respondents are presented with a hypothetical scenario and asked whether they would be willing to pay a specific price (or bid) for the good, answering simply “yes” or “no.” By varying the bid amounts across respondents and analyzing the pattern of responses, researchers can infer the distribution of willingness to pay in the population.

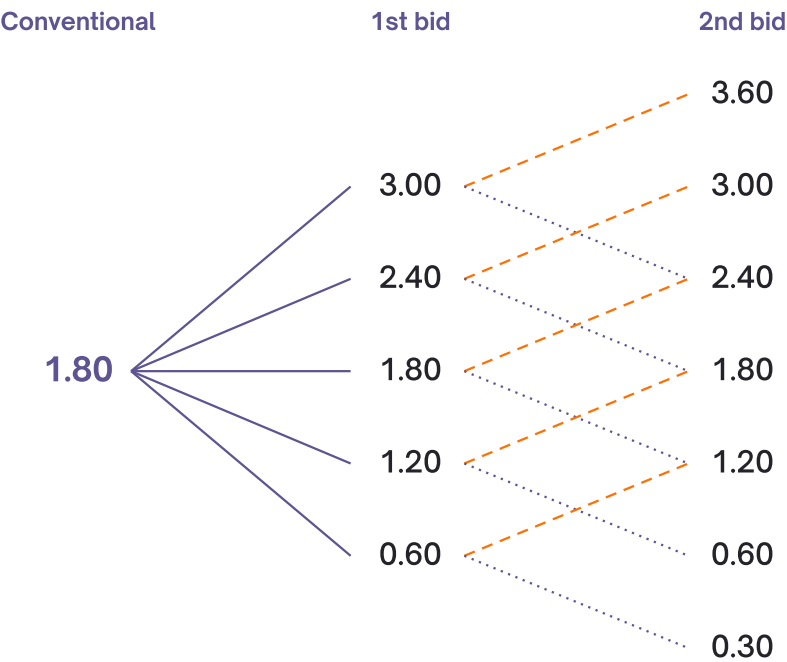
The survey was designed by Dr. Durand-Morat in Qualtrics® and administered online by the global market research company Dynata® between October and November of 2025.

Figure 5 shows the price tree used in this study. The price for conventional rice was estimated based on ongoing market prices collected from Statista® in August of 2025.

Figure 5. Price levels for conventional and sustainable rice used in this study (Euros/kg).

England

Price levels for conventional and sustainable rice (Euros/kg)



Results

A total of 429 surveys were completed and used for this analysis. Table 25 shows the descriptive statistics of the main variables collected in this study and used in the econometric analysis.

Table 25. Descriptive statistics of selected variables (N=429)

Variable	Mean	Min.	Max.
Age (years)	43.3	18	87
Household size	2.8	1	10
Rice consumption (kg/household/month)	3.4	0	11
	Count	Share	
Gender			
Female	244	56.9%	
Male	184	42.9%	
Other	1	0.2%	
Education completed			
None	7	1.6%	
Elementary	3	0.7%	
Secondary	92	21.5%	
Technical degree	49	11.4%	
University	169	39.4%	
Graduate	109	25.4%	
Household income (Euros/month)			
< 2000	116	27.0%	
2000-4000	131	30.5%	
4000-6000	94	21.9%	
6000-8000	36	8.4%	
8000-10000	22	5.1%	
>10000	30	7.0%	
Share of income spent on food			
<10%	38	8.9%	
10-19%	126	29.4%	
20-29%	129	30.1%	
30-39%	84	19.6%	
40-49%	17	4.0%	
>=50%	35	8.2%	
Concern about climate change			
Not at all concerned	24	5.6%	
Slightly concerned	81	18.9%	
Moderately concerned	118	27.5%	
Very concerned	127	29.6%	
Extremely concerned	79	18.4%	
Degree to which concern about climate change influences purchase behavior*			
Not at all	37	9.1%	
Slightly	108	26.7%	
Moderately	140	34.6%	
Highly	88	21.7%	
Extremely	32	7.9%	

*. Only for those that are slightly to extremely concerned about climate change.

Table 26 shows the independent variables considered for econometric analysis.

Table 26. Definition of variables used in the econometric model.

Variable	Definition	Expected sign
Female	Binary variable equal to 1 if female, zero otherwise	NA
Age	Continuous variable	NA
Age3039	Binary variable equal to 1 if age between 30 and 39, zero otherwise	NA
Age4049	Binary variable equal to 1 if age between 40 and 49, zero otherwise	NA
Age5059	Binary variable equal to 1 if age between 50 and 59, zero otherwise	NA
Age60up	Binary variable equal to 1 if age 60 or above, zero otherwise	NA
Household size (hhsz)	Continuous variable	-
Education (edu)	Binary variable equal to 1 if education of respondent is university degree or higher, zero otherwise	+
Income (inc)	Binary variable equal to 1 if monthly household income greater than 4000 Euros, zero otherwise	+
Middle income (midinc)	Binary variable equal to 1 if monthly household income is between 4000 and 8000 Euros, zero otherwise	+
High income (highinc)	Binary variable equal to 1 if monthly household income is higher than 8000 Euros, zero otherwise	+
Income share (incshr)	Binary variable equal to 1 if income spent on food is less than 30%, zero otherwise	+
Rice consumption (rcon)	Binary variable equal to 1 if monthly household consumption is greater than 2 kg., zero otherwise	+
Climate change concerns (climcon)	Binary variable equal to 1 if very or extremely concerned about climate change, zero otherwise	+

A correlation assessment indicates no large correlations among independent variables: the largest correlation is between rice consumption and household size (0.4162), which is deemed acceptable. Four different models were compiled using the variables above, ran and compared for fitness using Akaike's information criterion (AIC) and Bayesian information criterion (BIC).

Model 1: $WTP = f(\text{female}, \text{age}, \text{hhsz}, \text{edu}, \text{inc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 2: $WTP = f(\text{female}, \text{age}, \text{hhsz}, \text{edu}, \text{midinc}, \text{highinc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 3: $WTP = f(\text{female}, \text{age3039}, \text{age4049}, \text{age5059}, \text{age60up}, \text{hhsz}, \text{edu}, \text{inc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 4: $WTP = f(\text{female}, \text{age3039}, \text{age4049}, \text{age5059}, \text{age60up}, \text{hhsz}, \text{edu}, \text{midinc}, \text{highinc}, \text{incshr}, \text{rcon}, \text{climcon})$

Table 27 shows the AIC and BIC results, which indicate that Model 1 has the best fit (lowest AIC and BIC values) among the four models assessed. Consequently, only the results from Model 2 will be discussed in this report.

Table 27. Goodness of fit results for the four models considered in this study.

Criterion	Model 1	Model 2	Model 3	Model 4
AIC	1026.9	1028.4	1030.1	1031.5
BIC	1067.5	1073.1	1082.9	1088.4

Table 28 shows the econometric results for Model 1. Among the independent variables, education has a significant ($p < 0.10$) and positive impact on WTP, meaning participants with a university degree or higher are willing to pay more than those with lower education attainment.

“Climate change concerns” has a significant ($p < 0.01$) and large positive impact on the WTP for sustainable rice. In fact, “climate change concerns” has the largest coefficient among all independent variables (excluding the constant).

Table 28. Results from the double-bounded model.

	Coefficient	S.E.	P>z
Beta			
Female	-0.129	0.160	0.419
Age	0.009	0.007	0.163
Household size	0.081	0.068	0.232
Education	0.331	0.184	0.072
Income	0.234	0.181	0.196
Income share	0.158	0.184	0.390
Rice consumption	-0.093	0.193	0.629
Climate change concerns	0.491	0.163	0.003
Constant	1.119	0.439	0.011
Sigma			
Constant	1.368	0.089	0.000
Observations	429		
Log likelihood	-503.44		
Wald chi2	22.55		
Prob. > chi2	0.004		

On average, participants stated a WTP of €2.373/kg for sustainable rice, compared to €1.8/kg for conventional rice, which results in a statistically significant ($p < 0.01$) WTP premium of 31.84%.

Table 29 shows the WTP by education and concerns about climate change. Participants with university degrees or higher state a WTP of €2.490/kg compared to €2.159/kg for those with lower education attainment, with the difference (€0.331/kg or 18.40%) being statistically significant ($p < 0.10$).

The results show that participants who are very and extremely concerned with climate change have a significantly higher WTP of €2.628/kg, resulting in a significant ($p < 0.01$) 46.02% price premium over conventional rice. Even participants with moderate to no concern about climate change state a significantly higher WTP for sustainable rice, with a premium of 18.75% over conventional rice. The difference in WTP between participants very and extremely concerned about climate change and those who are moderately or not concerned is statistically significant ($p < 0.01$) and amounts to €0.491/kg.

Table 29. Willingness to pay (WTP) estimates for selected samples.

Estimates	Average WTP (€/kg)	Average WTP premium† (%)
Education level		
University degree or higher	2.490	38.32%***
Less than university degree	2.159	19.92%**
Difference	0.331	18.40%*
Climate change concerns		
Very or extremely concerned	2.628	46.02%***
Moderately or not concerned	2.137	18.75%**
Difference	0.491	27.27%***

†. Relative to the price of conventional rice (€2.4/kg).
 * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

After the CV section, participants were asked three follow-up questions:

- (1) whether their responses would change if the sustainable rice were imported rather than domestically produced;
- (2) if yes, whether they would pay more or less; and
- (3) the reason for this change.

A total of 239 participants (55.7%) indicated that they would alter their responses. This suggests two possible interpretations: some respondents may not fully understand the global nature of climate change and sustainability, while others may hold preferences related to food sovereignty and domestic food production.

Table 30 summarizes the direction of change and the reasons provided. Among those who would revise their valuation, about 34.3% would pay less if they knew the sustainable rice was imported. The most common justification was the belief that locally produced rice is better for the environment, a perception that may not always reflect the full environmental impact. Other reasons include concerns about the environmental impact of transporting rice from other countries (which may be valid depending on distance and transportation mode), and the view that methane emissions abroad do not benefit their own country, which is biased given the global nature of greenhouse gases.

Around 65.7% of those willing to change their valuation said they would pay more if the sustainable rice were imported. Their main reason was a desire to support sustainable rice production globally. Additional reasons included the belief that imported rice is better for the environment, and a wish to support farmers in other countries.

Table 30. Direction and reasons offered for the change in the willingness to pay for sustainable rice if imported relative to domestically produced (N=239).

Direction of change	Main reasons for change
Pay less = 82 (34.3%)	(1) Locally produced rice is better for the environment (42.7%) (2) Transporting rice from overseas offsets the benefits of sustainable rice (29.3%) (3) Methane emissions happening in other parts of the world do not benefit me (22.0%) (4) Other reasons (6.0%)
Pay more = 157 (65.7%)	(1) Want to promote global rice sustainability (60.5%) (2) Imported rice is better for the environment (19.1%) (3) Want to support rice farmers in other countries (18.5%) (4) Other reasons (1.9%)

Conclusion

The study demonstrates that consumers in England are willing to pay a significant premium for rice produced using sustainable irrigation practices. On average, respondents were willing to pay €2.37/kg for sustainable rice, representing approximately a 32% premium over conventional rice. Climate change concern emerged as the strongest factor influencing willingness to pay, with highly concerned consumers showing substantially greater premiums. Higher educational attainment also positively influenced willingness to pay. Overall, the findings suggest strong market potential for sustainably produced rice in England, particularly among environmentally aware and highly educated consumers.

A light blue, stylized outline map of Brazil is positioned in the upper left quadrant of the page. The background is a solid light blue color with faint, abstract, wavy lines in a slightly darker shade of blue, creating a textured effect.

Country Report: Brazil

Methodology Brief

The goal of this study was to assess Brazilian consumers' willingness to pay (WTP) for rice produced following sustainable irrigation practices using a dichotomous choice contingent valuation approach.

Dichotomous choice contingent valuation is a survey-based economic method used to estimate individuals' WTP for a good or policy. Respondents are presented with a hypothetical scenario and asked whether they would be willing to pay a specific price (or bid) for the good, answering simply "yes" or "no." By varying the bid amounts across respondents and analyzing the pattern of responses, researchers can infer the distribution of willingness to pay in the population.

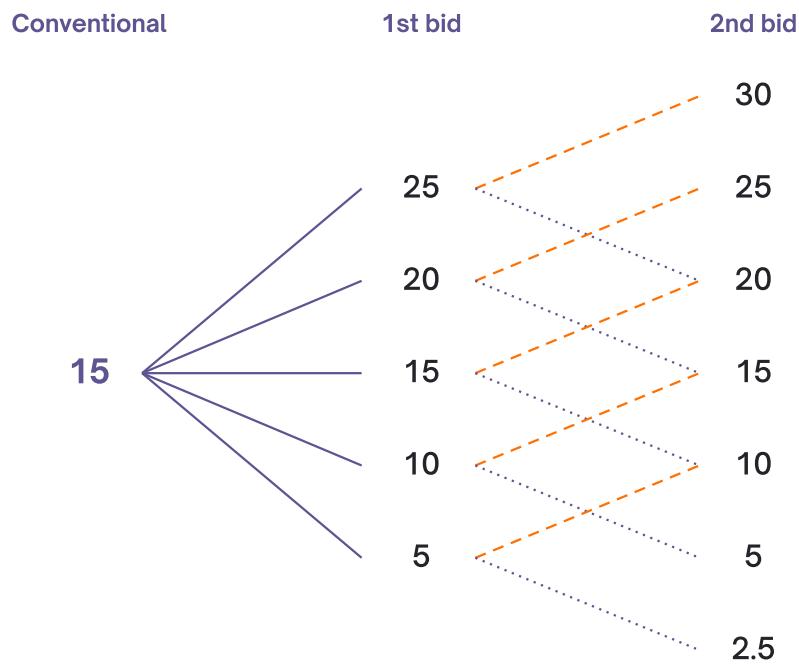
The survey was designed by Dr. Durand-Morat in Qualtrics® and administered online by the global market research company Dynata® between October and November of 2025.

Figure 6 shows the price tree used in this study. The price for conventional rice was estimated based on ongoing market prices collected from Statista® in August of 2025.

Figure 6. Price levels for conventional and sustainable rice used in this study (R\$/kg).

Brazil

Price levels for conventional and sustainable rice (R\$/kg)



Results

A total of 1289 surveys were completed and used for this analysis. Table 31 shows the descriptive statistics of the main variables collected in this study and used in the econometric analysis.

Table 31. Descriptive statistics of selected variables (N=1289)

Variable	Mean	Min.	Max.
Age (years)	37.0	18	79
Household size	3.2	1	10
Rice consumption (kg/household/month)	5.9	0	11
	Count	Share	
Gender			
Female	805	37.6%	
Male	484	62.5%	
Other	0	0.0%	
Education completed			
None	1	0.1%	
Elementary	23	1.8%	
Lower secondary	94	7.3%	
Upper secondary	961	74.6%	
University	141	10.9%	
Graduate	69	5.4%	
Household income (R\$/month)			
< 2500	400	31.0%	
2500-5000	514	39.9%	
5000-7500	175	13.6%	
7500-10000	110	8.5%	
10000-15000	49	3.8%	
>15000	41	3.2%	
Share of income spent on food			
<10%	73	5.7%	
10-19%	189	14.7%	
20-29%	320	24.8%	
30-39%	310	24.1%	
40-49%	181	14.0%	
>=50%	216	16.8%	
Concern about climate change			
Not at all concerned	62	4.8%	
Slightly concerned	131	10.2%	
Moderately concerned	333	25.8%	
Very concerned	455	35.3%	
Extremely concerned	308	23.9%	
Degree to which concern about climate change influences purchase behavior*			
Not at all	81	6.6%	
Slightly	224	18.3%	
Moderately	461	37.6%	
Highly	336	27.4%	
Extremely	125	10.2%	

*. Only for those that are slightly to extremely concerned about climate change.

Table 32 shows the independent variables considered for econometric analysis.

Table 32. Definition of variables used in the econometric model.

Variable	Definition	Expected sign
Female	Binary variable equal to 1 if female, zero otherwise	NA
Age	Continuous variable	NA
Age3039	Binary variable equal to 1 if age between 30 and 39, zero otherwise	NA
Age4049	Binary variable equal to 1 if age between 40 and 49, zero otherwise	NA
Age5059	Binary variable equal to 1 if age between 50 and 59, zero otherwise	NA
Age60up	Binary variable equal to 1 if age 60 or above, zero otherwise	NA
Household size (hhsz)	Continuous variable	-
Education (edu)	Binary variable equal to 1 if education of respondent is university degree or higher, zero otherwise	+
Income (inc)	Binary variable equal to 1 if monthly household income greater than R\$5000, zero otherwise	+
Middle income (midinc)	Binary variable equal to 1 if monthly household income is between R\$5000 and R\$10000, zero otherwise	+
High income (highinc)	Binary variable equal to 1 if monthly household income is higher than R\$10000, zero otherwise	+
Income share (incshr)	Binary variable equal to 1 if income spent on food is less than 30%, zero otherwise	+
Rice consumption (rcon)	Binary variable equal to 1 if monthly household consumption is more than or equal to 5 kg., zero otherwise	-
Climate change concerns (climcon)	Binary variable equal to 1 if very or extremely concerned about climate change, zero otherwise	+

A correlation assessment indicates no large correlations among independent variables: the largest correlation is between income and education (0.397), which is deemed acceptable. Four different models were compiled using the variables above, ran and compared for fitness using Akaike's information criterion (AIC) and Bayesian information criterion (BIC).

Model 1: $WTP = f(\text{female}, \text{age}, \text{hhsz}, \text{edu}, \text{inc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 2: $WTP = f(\text{female}, \text{age}, \text{hhsz}, \text{edu}, \text{midinc}, \text{highinc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 3: $WTP = f(\text{female}, \text{age3039}, \text{age4049}, \text{age5059}, \text{age60up}, \text{hhsz}, \text{edu}, \text{inc}, \text{incshr}, \text{rcon}, \text{climcon})$

Model 4: $WTP = f(\text{female}, \text{age3039}, \text{age4049}, \text{age5059}, \text{age60up}, \text{hhsz}, \text{edu}, \text{midinc}, \text{highinc}, \text{incshr}, \text{rcon}, \text{climcon})$

Table 33 shows the AIC and BIC results, which indicate that Model 1 has the best fit (lowest AIC and BIC values) among the four models assessed. Consequently, only the results from Model 1 will be discussed in this report.

Table 33. Goodness of fit results for the four models considered in this study.

Criterion	Model 1	Model 2	Model 3	Model 4
AIC	3047.8	3048.0	3053.2	3053.4
BIC	3099.4	3104.8	3120.3	3125.6

Table 34 shows the econometric results for Model 1. Among the independent variables, income has a significant ($p < 0.10$) and positive impact on WTP, meaning that participants with higher income have a higher WTP for sustainable rice. The share of income spent on food is

highly significant ($p < 0.01$) and negative, meaning that the lower the share of income spent on food, the lower the WTP for sustainable rice, which is counterintuitive. “Climate change concerns” has a significant ($p < 0.01$) and positive impact on the WTP for sustainable rice, and of large magnitude (5.695). In fact, “climate change concerns” has the largest coefficient among all independent variables (excluding the constant).

Table 34. Results from the double-bounded model.

	Coefficient	S.E.	P>z
Beta			
Female	-0.336	0.849	0.692
Age	0.043	0.033	0.183
Household size	-0.218	0.322	0.498
Education	1.293	1.197	0.280
Income	1.678	1.003	0.094
Income share	-2.364	0.825	0.004
Rice consumption	-1.272	0.864	0.141
Climate change concerns	5.695	0.855	0.000
Constant	15.600	1.930	0.000
Sigma			
Constant	12.213	0.475	0.000
Observations	1289		
Log likelihood	-1513.9		
Wald chi2	76.78		
Prob. > chi2	0.000		

On average, participants stated a WTP of R\$18.974/kg for sustainable rice, compared to R\$15/kg for conventional rice, which results in a statistically significant ($p < 0.01$) WTP premium of 26.49%.

Table 35 shows the WTP by income level, share of income spent on food, and concerns about climate change. Participants with monthly household incomes of R\$5000/month or more state a WTP of R\$20.164/kg compared to R\$18.485/kg for those with lower monthly incomes, with the difference (R\$1.678/kg or 11.18%) being statistically significant ($p < 0.10$). Participants that spend less than 30% of their income on food state a WTP of R\$17.677/kg compared to R\$20.041/kg for those with higher shares, with the difference being statistically significant ($p < 0.01$). This result contradicts the hypothesized impact of this variable that, everything else equal, the WTP is expected to decrease with the food expenses of the household (relative to income).

The results show that participants who are very and extremely concerned with climate change have a significantly higher WTP of R\$21.297/kg, resulting in a significant ($p < 0.01$) 41.98% price premium over conventional rice. However, participants with moderate to no concern about climate change show not significantly higher WTP for sustainable rice over conventional rice. The difference in WTP between participants very and extremely concerned about climate change and those who are moderately or not concerned is statistically significant ($p < 0.01$) and amounts to R\$5.694/kg.

Table 35. Willingness to pay (WTP) estimates for selected samples.

Estimates	Average WTP (R\$/kg)	Average WTP premium† (%)
Income level		
R\$5000/month or more	20.164	34.42%***
Less than R\$5000/month	18.485	23.24%***
Difference	1.678	11.18%*
Income share spent on food		
Less than 30%	17.677	17.84%***
30% or more	20.041	33.61%***
Difference	2.364	15.76%***
Climate change concerns		
Very or extremely concerned	21.297	41.98%***
Moderately or not concerned	15.603	0.04%
Difference	5.694	37.96%***

†. Relative to the price of conventional rice (R\$15/kg).

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

After the CV section, participants were asked three follow-up questions:

- (1) whether their responses would change if the sustainable rice were imported rather than domestically produced;
- (2) if yes, whether they would pay more or less; and
- (3) the reason for this change.

A total of 668 participants (51.8%) indicated that they would alter their responses. This suggests two possible interpretations: some respondents may not fully understand the global nature of climate change and sustainability, while others may hold preferences related to food sovereignty and domestic food production.

Table 36 summarizes the direction of change and the reasons provided. Among those who would revise their valuation, about 42.8% would pay less if they knew the sustainable rice was imported. The most common justification was the belief that locally produced rice is better for the environment, a perception that may not always reflect the full environmental impact. Other reasons include concerns about the environmental impact of transporting rice from other countries (which may be valid depending on distance and transportation mode), and the view that methane emissions abroad do not benefit their own country, which is biased given the global nature of greenhouse gases.

Around 57.2% of those willing to change their valuation said they would pay more if the sustainable rice were imported. Their main reason was a desire to support sustainable rice production globally. Additional reasons included the belief that imported rice is better for the environment, and a wish to support farmers in other countries.

Table 36. Direction and reasons offered for the change in the willingness to pay for sustainable rice if imported relative to domestically produced (N=668).

Direction of change	Main reasons for change
Pay less = 286 (42.8%)	(1) Locally produced rice is better for the environment (50.4%) (2) Transporting rice from overseas offsets the benefits of sustainable rice (30.8%) (3) Methane emissions happening in other parts of the world do not benefit me (12.6%) (4) Other reasons (6.2%)
Pay more = 382 (57.2%)	(1) Want to promote global rice sustainability (62.3%) (2) Imported rice is better for the environment (21.5%) (3) Want to support rice farmers in other countries (13.4%) (4) Other reasons (2.8%)

Conclusion

The results indicate that Brazilian consumers are willing to pay a statistically significant premium for rice produced using sustainable irrigation practices. On average, respondents are willing to pay R\$18.974/kg for sustainable rice, corresponding to a premium of approximately 27% over conventional rice prices. Climate change concern is the strongest determinant of willingness to pay, with highly concerned consumers exhibiting substantially higher premiums. Income also positively influences willingness to pay, which is expected. The share of income spent on food has a positive impact on WTP for sustainable rice, which is unexpected. Overall, the findings highlight strong market potential for sustainably produced rice in Brazil, particularly among environmentally concerned consumers with good income levels, underscoring the importance of sustainability attributes in food purchasing decisions.



Report Conclusions

In summary, the study finds consistent evidence across all six countries that consumers are willing to pay a meaningful premium for rice produced using sustainable irrigation practices. Although the magnitude of this premium varies by country, it remains positive and statistically significant throughout, indicating broad market potential for sustainably produced rice.

A key insight is that concern about climate change is the most powerful and consistent driver of willingness to pay, outweighing traditional socioeconomic factors. While variables such as gender, income, education, and food expenditure show significance in specific countries, their effects are less uniform. This suggests that environmental attitudes, rather than demographic characteristics, play a central role in shaping consumer preferences.

The results also reveal that product origin influences consumer valuation, with many respondents adjusting their willingness to pay depending on whether the rice is locally produced or imported. At the same time, relatively low engagement with product labeling, especially outside Italy, highlights a gap in consumer awareness and information-seeking behavior.

Overall, the findings point to two major challenges for promoting sustainable rice: effectively identifying and targeting environmentally concerned consumers and improving communication strategies to reach both label readers and those who do not actively seek product information. Addressing these issues will be essential for expanding the market for sustainably produced rice.

Experiences with sustainability labels in rice, such as organic rice and Sustainable Rice Platform (SRP) certification, as well as labeling initiatives in other commodities, offer valuable lessons for developing marketing strategies for low-methane rice. Currently, certification rates are substantially higher in other sectors, with approximately 24% of coffee, 14% of cocoa, 12% of tea, and 9% of palm oil production certified. By contrast, certification in rice remains limited; for instance, only about 66,000 hectares were SRP-certified in 2024, and retail marketing of SRP rice is only beginning to emerge in parts of Europe. Notably, Mars Food, one of the largest food manufacturers in the world and a major supporter of SRP, reports that a large share of its rice sourcing comes from farmers working toward SRP standards.

Organic rice provides a useful benchmark as a more mature certification segment with established price premiums. In the United States, organic rice is sold through both specialized outlets (e.g., Whole Foods and organic cooperatives) and mainstream retailers (e.g., Walmart and Costco). It is typically marketed by dedicated organic brands, such as Lundberg Rice and Doguet's Rice, or through private-label offerings (e.g., Walmart's Great Value and Target's Good & Gather). In contrast, traditional rice brands like Riceland, Mhatma, and Ben's Original have a relatively limited presence in this segment.

Looking ahead, stakeholders seeking to market low-methane sustainable rice should prioritize the development of clear protocols and certification systems to substantiate sustainability claims. Equally important are the design of effective labeling and marketing materials, and strategic decisions regarding branding: whether to establish new sustainability-focused brands or to differentiate sustainable options within existing brands. Expanding distribution through both specialized and mainstream retail channels will also be essential for scaling market adoption.



Consumers' Willingness to Pay for Sustainable Rice in the European Union and Brazil

2026

