Spanish Consumers' Commitment towards Sustainable Food Consumption

İspanyol Tüketicilerinin Sürdürülebilir Gıda Tüketimi İlgilenimi

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Abstract

This research analyzes the level of commitment with sustainability of Spanish consumers, and their perception and preferences toward more sustainable food, production systems, and consumption practices. Based on the analysis of a survey of 324 consumers in the regions of Extremadura and Region of Murcia, the perception of citizens on the sustainability of their consumption and different production systems is analyzed, paying special attention to their opinions towards more sustainable vegetable and meat production practices. Findings show that almost all consumers are highly sensitive to the impact of their consumption on the environment. Although this perception does not translate into the purchase of sustainable foods for an important segment of the population, it does translate into their efforts to participate in recycling, waste reduction, or in changes in their consumption habits related to health. The bivariate and cluster analyses carried out have identified the existence of an important segment of citizens with high levels of environmental sensitivity, which translates into sustainable consumption practices and a preference for the purchase of Sustainable Food (SF), with high importance granted when purchasing to its impact on the environment.

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1. Introduction

Sustainability is a complex concept although it is increasingly present in our society, where it is used in a generalized and maybe even an indiscriminate manner. In fact, references can be found in such diversified aspects as sustainable production (Escribano et al., 2020), sustainable development (Abreu et al., 2019), sustainable consumption (Song et al., 2019), or even, sustainable lending or sustainable lighting. This gives an idea of the difficulty faced by consumers when they have to interpret what this term refers to when applied to products of such a varied nature.

When defining sustainability, one of the must-read references is the "Brundtland Report", which was the first attempt to combine development and sustainability and defines sustainable development as "*the one which meets the present needs without compromising the ability of future generations to meet their own needs*" (World Commission on Environment and Development, 1987). Other definitions which derive from this one may be more comprehensive, such as "*meeting today's needs of society without compromising the ability of future generations to meet their own needs, ensuring a balance between economic growth, environmental care and social welfare*". The three basic aspects of sustainability thus appear: on the one hand, environmental sustainability (avoiding environmental degradation) versus economic sustainability (economic growth) and social sustainability (the need for this growth to alleviate poverty).

Food consumption is one of the areas that most influences sustainability - especially environmental sustainability - although many consumers are not fully aware of the association between their consumption and the environmental impact of food production (Eldesouky et al., 2020). On the other hand, growing social concern about the environmental impacts caused by the need to produce food to meet global demand (Florindo et al., 2017) has led to increasing consumer interest about the way their food is produced and the production methods used (Briggeman and Lusk, 2011).

Within this context, sustainable food consumption would thus refer to consumption patterns that are economically, socially, and environmentally compatible in all spheres of the food system, from food production, processing, and distribution to food purchases by consumers and waste disposal (Pack, 2007). For all these reasons, there is a growing need for the consumption of households and citizens in Spain

and other developed countries to become more sustainable, which, in addition to considering aspects such as mobility and energy use, must also take into account the environmental impact associated with food consumption.

Against this background, growing public awareness regarding the importance of their food being more environmentally friendly is leading to changes in the consumption and production models of the agri-food sector, which should tend towards production systems that are more efficient in the use of natural resources and with less impact, leading to a change in lifestyles. It is worth remembering that, for example in Spain, an average citizen ate an average of 758.19 kilos of food and beverages in 2019 (with total consumption reaching 33,303.08 million kg or liters), with an average food expenditure of 2,567.17€ per person per year (MAPA, 2020), most of which (81.1%) was consumed at home. This trend has led to increasing sustainability labeling schemes being used in the food industry (Caputo et al., 2013; Gadema and Oglethorpe, 2011) with the aim to communicate information related to food sustainability to consumers. Among the most popular tools in this regard are logos, the best known being fair trade, Rainforest Alliance, and others related to animal welfare and carbon footprint (Eldesouky et al., 2020; Grunert et al., 2014). However, consumers' unfamiliarity with the concept of sustainability makes it difficult to evaluate and compare different products in the market (Kemp et al., 2010). This makes food companies interested in analysing the influence that the concept of sustainability has on consumers, not only in terms of their awareness, but also regarding the way it is reflected in their purchasing and consumption behaviour.

On the other hand, changes in demographics and lifestyles, in addition to bringing an increasing demand for fresh and healthy products, or convenience products, according to household typologies, are generating new trends in food consumption, with segments of the population increasingly aware of the impact of their consumption habits and the generation of waste and plastics, or concerned about the origin of their food.

It is therefore relevant to segment sustainable food consumers, for which variables relevant for the research should be used and which allow to obtain meaningful groups. Compared to traditional consumer segmentation based on social or demographic characteristics, (Dagevos, 2005; Verain et al., 2012) already claimed that these variables have lost much of their power to explain contemporary consumer groups, while (Diamantopoulos et al., 2003) pointed out the limited usefulness of socio-demographic characteristics to establish the profile of consumers concerned about the environment. That is why in this work have been used segmentation variables related to consumer perceptions and behavior with respect to sustainability.

Therefore, the objective of this study is to analyze the Spanish consumers´ level of commitment with sustainability, and their perceptions and preferences for more sustainable food, production systems, and consumption practices. Particular attention has been paid to

the analysis of meat and vegetable production systems, since it has been considered that there could be differences in consumer perceptions of the sustainability of these production systems, given the negative information that, for example in the case of meat, appears systematically in the media.

This study can help fill the knowledge gap between farmers, the food industry, and consumers on key issues for the agri-food sector such as the meaning of sustainability for consumers and the identification of consumer segments that are inclined towards sustainable food choices.

2. Methodology

2.1. Data collection

Data analyzed in this paper were obtained from a survey of 324 individuals in charge of food purchasing in their households and carried out in two Spanish regions, Extremadura (162) and the Región de Murcia (162). This results in errors, for 95% confidence and an infinite target population for sampling purposes, of 5.55%, 7.85% and 7.85%, for the Spanish total, Región de Murcia and Extremadura respectively if average proportions are considered. Sample sizes in both regions are similar to those used at regional level in the Food Consumption Panel of the Ministry of Agriculture, Fisheries and Food (MAPA, 2021),which not only allows a very interesting comparative analysis of regional differences, but also makes it possible to compare both studies.

The choice of both regions for the study was due to their similarities with the Spanish population as a whole, in addition to being regions of similar population size (just over one million inhabitants), with comparable levels of income and development and both being important areas of agri-food production in Spain, although the Region of Murcia is one of the most important areas of vegetable production while Extremadura is a benchmark in animal production. Given that limited economic resources prevented the study from being extended to the whole of Spain, results can only be generalised to the whole of the Spanish market with the appropriate reservations.

Data collection was performed by drafting a questionnaire on Google Forms (www.docs.google.com) which was distributed in October 2020-Abril 2021. This type of online tool is more and more increasingly used for research purposes (Elghannam and Mesías, 2018; Viana et al., 2016) and works adequately in consume investigations due to its flexibility, low cost and the speed of collection of the information in comparison with traditional surveys. The participants were contacted by email using databases created by the research team from previous studies, therefore using a convenience sampling.

The questionnaire included an initial part where consumers had to assess their awareness towards sustainability (*Are you aware that the production and distribution of the food you consume has an environmental impact?*), their knowledge of sustainable food production (*Do you know and have you ever consumed sustainably produced food? If yes, please indicate which ones*), their usual consumption of

these foods (*Do you regularly eat sustainably produced food?*) and finally their willingness to change their consumption habits towards more sustainable patterns (*Do you think it is possible for you to change what and how you buy in order to make your habits more sustainable?*). A distinction was made in the response to this question between those who understood that their individual behaviour was important, and those who understood that it was up to other actors (companies, administration, etc.) or sectors (energy, etc.) to modify their impacts.

Since it was assumed that some participants might be unfamiliar with the concept of sustainability, the following definition was previously presented: "Sustainability refers to meeting society's current needs without compromising the ability of future generations to meet theirs, ensuring a balance between economic growth, environmental stewardship and social well-being. There are several related concepts, such as environmental sustainability (which emphasizes preserving biodiversity without having to give up economic and social progress), economic sustainability (which seeks the profitability of activities in a sustainable manner) and social sustainability (which seeks population cohesion and stability)".

Subsequently, self-assessment questions were asked about their level of agreement (Likert scale from 1 to 5) for a series of statements about sustainability in food consumption, taking into account their impact at different stages (production, distribution, consumption and waste generation, etc.). This allowed us to quantify the importance for different segments of the population, with increasingly sustainable consumption habits, and who would therefore form part of new consumer categories with a greater willingness to buy more sustainable products.

2.2. Segmentation

Cluster analysis has been used in this paper to provide a more in-depth analysis, identifying homogeneous subgroups of consumers that might show different perceptions and levels of commitment towards sustainability.

The calculations were carried out using the Cluster module of the IBM SPSS 21 statistical package, and using a k-means procedure. Eleven variables related to perceptions and habits of sustainable purchasing and consumption were used as inputs (table 3). A three-group solution was chosen according to the size of the segments, their higher statistical significance and the interpretation of the segments carried out by the research team.

3. Results and Discussion

3.1 Level of environmental awareness, knowledge and consumption of Sustainable Foods

The results of the survey presented in Table 1 show the high level of awareness that the citizens state that they are aware of the impact that the production and consumption of their food has on the environment. Thus, practically all citizens (97.5%) say they are aware of the importance of their consumption on the environment, while only 63.9% say they are

aware of foods whose production is sustainable, having consumed them occasionally, and the percentage of those who indicated that they consume Sustainable Food (SF) with some frequency (48.8%) is even lower. The results achieved are similar in the subsamples of the population of Extremadura (98.1/65.4/49.4) and the Region of Murcia (96.9/62.3/48.1), thus identifying no significant differences between the two. Curiously, this is contradictory to what has been found in other studies such as the one of (Hartmann et al., 2021), where it is discussed that knowledge levels of the environmental impact of food appear to be generally low among consumers, and is the first barrier to paving the way towards more environmentally friendly consumption behavior.

Not only that, but it was also concluded that knowledge does not equal behavior, and although people may have a basic understanding of the environmental impact of food, various practical and motivational barriers, such as price, negative expectations about taste or poor availability may prevent consumers from buying the most environmentally friendly option (Bryła, 2016; Moser, 2015; Tanner and Kast, 2003). In addition, a majority of studies show that when it comes to changing eating habits to reduce the impact on the environment, the idea of reducing meat consumption is the least accepted among the population (Hoek et al., 2017; Panzone et al., 2016) while in this study practically the entire sample (95.7%) considered that it was possible to introduce changes in their purchasing and consumption habits to make them more sustainable. Therefore, at least 4.3% of consumers are not willing to change their consumption habits -they could be considered naysayers- with an additional 29.0% who believe that a change in their consumption habits would have little impact on the environment, indicating that it is in other areas or other actors that they should have an impact, such as transport, industry or energy.

Table 1. Awareness, knowledge and willingness to consume Sustainable Food (SA)

Awareness[a]	**%**	**Knowledge[b]**	**%**	**Willing to change purchasing habits[c]**	**%**	**Consumtion of SF[d]**	**%**
No	2,5	No	36,1	No	4,3	No	51,2
Yes	97,5	Yes	63,9	Yes$^{\text{Low Impact}}$	29,0	Yes	48,8
Total	100	Total	100	Yes$^{\text{willingtochange}}$	66,7	Total	100
				Total	100		

[a] Are you aware that the production and distribution of the food you consume has an environmental impact?

[b] Do you know and have you ever consumed sustainably produced foods (SF)?

[c] Do you think it is possible for you to change what and how you buy in order to make your habits more sustainable? Answers: No; Yes, but I consider that it has a low impact since there are other sectors that have a much greater environmental impact (industry, transportation, etc.); Yes

[d] Do you regularly consume sustainably produced food?

After asking the respondents if they knew of sustainable foods, they were asked which ones in particular they knew of and had consumed, and this information is presented in Table 2. As can be seen, most of them indicated as examples of sustainable foods the ecological, biological and organic ones (51.9%), in order of mention, vegetables, fruits, ecological eggs, or eco and Fair Trade coffee and chocolate, among others. While vegetables and fruits were the

most mentioned category, on the other hand, one of the categories least mentioned by consumers was meat products. Interestingly, meat is a food group that has a significantly higher environmental impact than cereals or vegetables (Poore and Nemecek, 2018).

Table 2. Frequency of mention (knowledge) of Sustainable Food occasionally/frequently consumed (Frequency of mention in %)

	Category	Subcategory/Sustainable Food (SF)	(%)
Ecological, organic or biological food	Fruits and vegetables	Organic fruits (oranges. lemons. cherries. grapes...)	30.6
		Organic vegetables and greens (tomatoes. lettuce. carrots. potatoes...)	35.8
	Packaged foods	Organic and Fair Trade coffee and chocolate	5.8
		Organic honey	1.2
		Organic oil	0.9
		Cereals (oats. wheat. etc.). rice. organic legumes	3.7
		Organic pasta	0.6
		Organic bread	1.2
		Organic wine	1.5
		Canned food and processed dishes	0.9
		Various organic foods (fried tomato. canned food. juices...)	9.6
	Snacks	Organic nuts and dried fruits (walnuts. pistachios. figs. ...)	1.9
		Olives	0.9
	Eggs	Organic eggs	9.3
	Meat products	Organic meat (chicken. lamb. pork. beef...)	2.5
		Meat and sausages from extensive livestock farming (pork. lamb. veal....)	2.5
		Organic and free-range sausages (100% Iberian pork...)	1.9
	Dairy products	Organic milk	0.9
		Organic cheese and yogurt	0.6
Total Eco Food		**Sustainable Food (Ecological, Biological or Organic)**	**51.9**
No Eco	Other non-organic sustainable foods and products	Local fruits and vegetables. from small traditional producers and whole fruit production	10.0
		Free range chickens and eggs	1.2
		Fish from sustainable production (farm-raised) and with blue seal	1.9
		Fresh food in biodegradable packaging (fruits. etc.)	2.5
Total Other SF		**Sustainable Food (Non-organic)**	**19.4**

In addition to the above, there are other interesting groups of consumers (19.4%): (i) a group that mentioned knowing and consuming with some frequency fruits and vegetables purchased from small producers, of proximity and following traditional production systems and (ii) some consumers who indicated knowing/consuming extensively produced meat (chicken, lamb, pork and beef), free range chickens and eggs among others, as well as foods that can be purchased in biodegradable packaging (fruits, drinks....), also mentioning the purchase of farmed fish and fish from sustainable fisheries with some kind of seal, among many other foods described.

3.2 Sustainable behaviors in food consumption

Respondents were asked to self-assess their sustainable food consumption behavior by indicating their level of agreement or disagreement with a series of statements (Table 3). The respondents' self-assessment of their efforts towards more sustainable consumption patterns shows that a large majority of them expressed a high level of commitment to environmental protection in terms of trying to make purchases adjusted to the needs of the household, reusing food to avoid wasting it, recycling packaging, and their willingness to buy food from closer proximity and in bulk formats with less packaging.

Table 3 shows that, although citizens' awareness of these aspects is high, their self-assessment (scale of 1 to 5, where 1=not at all in agreement and 5=totally in agreement) is higher, as would be expected, among those who indicate that they consume sustainable food (SF).

Table 3. Self-assessment of perceptions and habits of sustainable purchasing and consumption (1=strongly disagree; 5=strongly agree) as a function of SF consumption.

	Consumption of SF		
	No	**Yes**	**Total**
1. I try to consume unpackaged or bulk foods***	3.87	4.16	4.01
2. I try to buy local and national products because of the impact of transportation***	3.60	4.20	3.89
3. I try to buy local and national products for the employment/wealth generated***	3.83	4.34	4.08
4. I try to buy meat produced in a traditional way and that contributes to the conservation of the environment***	3.42	3.80	3.60
5. Intensive food production ensures affordable prices, which is my main concern*	2.89	2.64	2.77
6. I match my food purchases to what I need and reuse foods**	4.37	4.64	4.50
7. I actively recycle at home**	4.01	4.30	4.15
8. I follow a balanced diet, because I am concerned about the effect of food on my health**	4.15	4.38	4.26
9. Modern vegetable production has a major environmental impact***	2.89	3.78	3.34
10. Meat consumption negatively impacts sustainability***	3.08	3.47	3.27
11. I try to buy vegetables produced in a more natural way, organic...*	3.01	3.72	3.36
*[a]Significance: * p < 0.1. ** p < 0.05. *** p < 0.01*			

It should also be noted that, in addition to the higher level of commitment to sustainability shown by the consumers of SF, there is also less concern about the price of food. That is to say, the SF consumers, by giving priority in their choice of food to certain aspects -health, environment, social economy- are more aware of the production costs of this type of food and therefore assume that they will have to pay a higher price than that of conventional food.

One of the aspects with the highest scores was the maintenance of a balanced diet, because they were concerned about the effect of food on their health. In this aspect, a higher score is noted for those who do consume SF compared to those who do not consume SF. This may be due to the fact that other studies have found a positive correlation with health awareness and environmentally friendly food purchasing behavior. A positive correlation was also observed with knowledge scores on the environmental impact of food and environmentally friendly food purchasing behavior (Hartmann et al., 2021) . This explains why in almost all aspects the highest scores were given by the SF consumers.

The only case in which an aspect has had a higher score from non-consumers is in aspect nr. 5, where a higher importance has been given to price by non-consumers, and this could be an influencing reason as mentioned in other studies where price is considered a barrier to increased consumption of environmentally responsible products. (Bryła, 2016; Moser, 2015).

3.3 Sustainable behaviors in relation to the consumption of plant foods and meat.

The differentiation of consumers according to their location of the two subsamples (Extremadura versus Region of Murcia), allowed us to verify how in 5 of the aspects

evaluated on their food consumption habits and perceptions, there are no differences in means according to the area of Spain in which the consumer resides. On the other hand, significant differences were observed between the consumers of both Spanish regions, as described in Table 4, showing a greater sensitivity of the consumers of Extremadura in three aspects: a greater self-assessment of the effort made in recycling and selective separation of waste in the home; a greater intention to buy local and national products to avoid the impact that transport has on the environment; and finally, a purchase more adjusted to the needs of the home, reusing the food they purchase as much as possible.

Table 4. Differences in perceptions and habits of sustainable purchasing and consumption at regional level (Extremadura-Murcia Region) (1=not at all agree; 5=totally agree)

	Extremadura (n=162)	**Región de Murcia (n=167)**	**Total (n=324)**
1. I try to consume unpackaged or bulk foods	4.04	4.01	4.01
2. I try to buy local and national products because of the impact of transportation*	3.99	3.78	3.89
3. I try to buy local and national products for the employment/wealth generated	4.14	4.02	4.08
4. I try to buy meat produced in a traditional way and that contributes to the conservation of the environment	3.74	3.47	3.60
5. Intensive food production ensures affordable prices, which is my main concern***	2.58	2.95	2.77
6. I match my food purchases to what I need and reuse foods*	4.53	4.49	4.50
7. I actively recycle at home***	4.38	3.93	4.15
8. I follow a balanced diet, because I am concerned about the effect of food on my health	4.36	4.19	4.26
9. Modern vegetable production has a major environmental impact**	3.49	3.23	3.36
10. Meat consumption negatively impacts sustainability***	3.08	3.47	3.27
11. I try to buy vegetables produced in a more natural way, organic...	3.38	3.30	3.34
*[a]Significance: * p < 0.1. ** p < 0.05. *** p < 0.01*			

It is noteworthy in this analysis of regional differences that there are no significant differences in the self-assessments given to the variables related to the intention to purchase vegetable (or meat) products from more traditional (extensive) production systems (livestock), although in both cases the score given by consumers in Extremadura is slightly higher than that of the Region of Murcia.

However, it can be seen that consumers in each region consider that the production of the most typical foods of that region (vegetables in the case of the Region of Murcia, meat in the case of Extremadura) has less environmental impact than those produced outside the region. These results, which could be pointing to differences between Spanish citizens according to the productive specialization of the different territories, open the door to future research that addresses the relationship between the existing production systems in each region and the vision that citizens have about the sustainability of these systems.

3.4 Consumer segmentation with respect to sustainability in the consumption of plant and meat foods

The analysis of the variables described above led to the construction of three large groups of consumers, according to their assessment of their sustainable purchasing and consumption habits (Table 5).

As can be seen, a first group of respondents (Cluster 1) was identified, with 13.58% of the population, which includes individuals who are not very concerned about sustainability in the purchase and consumption of food, and with a low perception of the negative impact that intensive production systems have on the environment. This is the group of citizens in which the consumption of unpackaged products reaches a neutral or indifferent valuation, valuing themselves as not very active in recycling, disagreeing that it is relevant in their purchasing habits that are directly related to the protection of the environment in terms of seeking to buy local or national products because of their impact on transportation or on employment and wealth, buying meat produced in a traditional way or not considering that intensive vegetable production systems have a serious impact on the environment.

This population group, therefore, responds to consumers who in their food purchasing habits are not aware of or concerned about the impact that their consumption has on the environment, not paying attention to environmental issues in their food purchases, who for various reasons -do not recycle, do not promote the purchase of local products, do not consider important the purchase of food from production systems-. This is also the cluster that gives more relevance to price, although almost at the same level as Cluster 2. Therefore, this segment could be called "*consumers not concerned about the environmental impact of their consumption and sensitive to price*". This type of consumer, sensitive to price and unconcerned about the environmental aspects related to their food, has been identified in other studies related to sustainably produced foods, such as those by (Arnot et al., 2006; Mesías et al., 2011; Sama et al., 2018) where they also appeared as a minority segment of the population. However, different studies have identified price as the most important factor when it comes to buying sustainable food (Escobar-López et al., 2017; Lee and Yun, 2015) although both articles focus on organic foods. Given the diffusion of this type of food compared to other sustainably produced foods, it can be assumed that these conclusions are broadly extrapolable. Nevertheless, the relevance of price in the purchasing decision is a constant that confirms economic theory in most staple goods and food.

Table 5. Cluster description according to their perceptions and sustainable purchasing and consumption habits (1=strongly disagree; 5=strongly agree)

	C1 (n=44)	**C2 (n=146)**	**C3 (n=134)**	**Total (n=324)**
1. I try to consume unpackaged or bulk foods*	3.18	3.86	4.46	4.01
2. I try to buy local and national products because of the impact of transportation*	2.00	3.95	4.44	3.89
3. I try to buy local and national products for the employment/wealth generated*	2.39	4.07	4.64	4.08
4. I try to buy meat produced in a traditional way and that contributes to the conservation of the environment*	1.98	3.48	4.27	3.60
5. Intensive food production ensures affordable prices, which is my main concern*	3.07	3.05	2.35	2.77
6. I match my food purchases to what I need and reuse foods*	4.02	4.47	4.69	4.50
7. I actively recycle at home**	3.16	4.10	4.54	4.15
8. I follow a balanced diet, because I am concerned about the effect of food on my health*	3.52	4.23	4.54	4.26
9. Modern vegetable production has a major environmental impact*	1.91	2.96	4.22	3.34
10. Meat consumption negatively impacts sustainability*	2.66	2.86	3.93	3.27
11. I try to buy vegetables produced in a more natural way, organic...*	2.11	2.95	4.21	3.36
*[a]Significance: * p < 0.1. ** p < 0.05. *** p < 0.01.*				

A second group, in which 45.05% of the population is found, presents a greater sensitivity to the impact on the environment of their consumption, increasing in this group the rating given to most of the items raised to around a value of 4 on a scale of 1 to 5, equivalent to a high level of agreement or commitment to these criteria in their purchase decision and consumption habits. Thus, in this Cluster 2 increases to a rating of "high" -equivalent or close to 4- its intention to purchase products that avoid packaging (3.86) or proximity for the impact of transportation (3.95) or local employment (4.07); or actively recycle at home (4.10). However, they are still indifferent -valuation close to 3- in considering true the statement that modern vegetable production systems have a great environmental impact (2.96), being together with Cluster 1 those who give greater relevance to the fact that current production systems guarantee food at affordable prices. For all these reasons, this group has been called "*environmentally conscious and concerned consumers*".

Finally, Cluster 3, formed by the remaining 41.36%, includes citizens with higher levels of perception of the importance that food consumption has on the environment, presenting values higher than 4 in practically all the items raised. This is the group in which the intention to buy products without packaging is the highest, in seeking to buy local products to avoid transport or to promote local or national wealth, with a more active attitude towards recycling and the most concerned about the effect of food on their health.

Cluster 3 is the least concerned about food prices, being also the group of consumers who try to buy more vegetables and meat produced in a more natural or ecological way, who most recognize the environmental impact of modern vegetable production systems and who give the highest value to the fact that meat consumption has a great environmental impact.

This group, therefore, would be made up of consumers who are not only more conscious, but above all more environmentally active, which is why they have been called "*conscious and active consumers regarding their purchasing decisions to protect the environment and health*". Consumers committed to sustainability in their food consumption/purchase also appear repeatedly in studies on attitudes towards sustainable food. (Grymshi et al., 2022; Mesías et al., 2011) identified as those who buy more organic, local food and food with social and environmental values, all aspects that are also identified in this work.

To complement these results, a second-stage analysis was carried out in which the existence of significant relationships between the three segments described and the socio-demographic characteristics of the respondents was contrasted (Table 6).

Table 6. Relationship between Clusters and socio-demographic variables (%)

	Second stage analysis	C1 (n=44)	C2 (n=146)	C3 (n=134)	Total (n=324)
Gender***	Male	41.8	35.8	61.4	42.0
	Female	58.2	64.2	38.6	58.0
Age	<35 years old	47.7	47.9	38.1	43.8
	35 to 50 years old	31.8	28.8	32.1	30.6
	>50 years old	20.5	23.3	29.9	25.6
Studies**	No education or primary education	27.3	9.6	9.7	12.0
	High School / Professional Training	34.1	28.1	25.4	27.8
	University Degree	38.6	62.3	64.9	60.2
Family income**	< 1.500€ net/month	34.1	17.8	23.9	22.5
	1.500 - 2.500€ net/month	18.2	39.7	27.6	31.8
	>2.500€ net/month	47.7	42.5	48.5	45.7
Zone	Extremadura	45.5	47.9	53.7	50.0
	Murcia region	54.5	52.1	46.3	50.0
[a]Significance: * p < 0.1. ** p < 0.05. *** p < 0.01.					

This analysis allowed us to identify a significant and positive relationship between the evaluation of sustainability in food consumption and the educational level of the respondents, income or gender, with higher levels of sustainability in consumption among men, among people with a university education and with a higher income level.

The results shown in Table 6 are generally in agreement with the literature, where the typical profile of the consumer of sustainable products is mostly female, with a high level of education and middle-aged (Escobar-López et al., 2019; Mohamad et al., 2014; Wu et al., 2014). However, although gender in this study showed significant differences, there is no clear distinction between women and men in the segments of conscientious consumers.

The relationship found in this work between lower levels of education and rejection/indifference towards environmental or ethical aspects in food consumption has been found in other studies such as that of (Mesias et al., 2012) on organic tomatoes or that of (Sama et al., 2018) on honey produced in a socio-environmentally responsible way. In line with the above, several authors have also found that an increase in educational level leads to a greater likelihood of including organic food products in

the daily diet (Escobar-López et al., 2019; Kriwy and Mecking, 2012; Olsen and Bánáti, 2014).

Finally, a new analysis was conducted to test for differences with respect to awareness, knowledge and willingness to consume sustainable food (Table 7).

Table 7. Relationship between Clusters and awareness, knowledge and willingness to consume SF (%)

Second stage analysis	C1 (n=44)	C2 (n=146)	C3 (n=134)	Total (n=324)
Awareness (of the impact of its consumption on the environment)	95.5	97.9	97.8	97.5
Knowledge (SF)	40.9	62.3	73.1	63.9
Willing to change (Habits and purchases)$^{\text{Low Impact}}$	47.7	28.1	23.9	29.0
Willing to change (Habits and purchases)$^{\text{Willing to change}}$***	38.6	70.5	71.6	66.7
Consumption of SF***	11.4	44.5	65.7	48.8
*[a]Significance: * p < 0.1. ** p < 0.05. *** p < 0.01.*				

As expected from the description of the clusters, a greater presence of consumers of SF was identified in Cluster 3, where the percentage of consumers willing to change their consumption habits is also higher. However, it should be noted that awareness of the environmental impact of food production is very high in all clusters (over 95%), so that the translation of this awareness into sustainable consumption habits depends (or not) on other variables, such as the availability of information, which together with adequate identification have been identified as crucial variables for promoting pro-environmental attitudes and the purchase of "green" products (Grymshi et al., 2022; Mohamad et al., 2014).

4. Conclusions

Results show that Spanish consumers have a high level of awareness of the impact of their food consumption on the environment. On the other hand, their knowledge of products considered to be sustainable and their willingness to change their purchasing habits are lower.

The analysis of consumers' self-assessment regarding their consumption habits, and the importance they attach to certain practices or products that would make their consumption more sustainable, reveals a high level of commitment in areas such as recycling, avoiding waste and the attention they pay to origin when buying food – with local or national products being preferred-.

On the other hand, the consumer segmentation carried out allows us to identify two segments of citizens with a high level of environmental awareness in their food purchasing and consumption, together with a third group that is not sensitive to sustainability and which, almost in their entirety, do not correspond to regular purchasers of SF. However, there is a high level of consistency and correspondence in the perceptions of the importance that more sustainable consumption has for them - in its different facets - and in the fact that they finally decide to purchase SF, especially among "*conscious and active*" consumers.

It should be pointed out here that food in Spain has undergone important changes in the

last decade, linked to the growing concern of the population about climate issues and the overexploitation of resources. This has led to the widespread presence of organic food in hypermarkets and supermarkets, the increasing number of specialised shops selling it, and the growing availability of other foods with quality and sustainability labels - e.g. Fair Trade products, local products, etc.-. All this can help to explain the significant number of citizens who reported a regular consumption of products with certain characteristics that allow them to be classified as sustainable foods.

Although price is a relevant variable in the final purchase decision of the generality of the Spanish population, their level of income, together with a growing awareness of the importance of food and the impact of production systems on the environment, leads to detect that it is an increasingly less relevant element in the final decision to purchase sustainable food. The results, therefore, show the greater relevance that other variables could currently have in the decision to buy sustainable products, such as a higher level of education, which in addition to being directly related to higher income levels, would be marking a greater awareness of these citizens.

Finally, it is worth highlighting how this study has identified the importance to be given to the geographical variable -focused on different food production orientations in the region where consumers reside- in the study of consumption, due to the existence of differences in sustainable purchasing and consumption habits depending on the geographical area of residence and its productive specialization. Thus, it has been observed that consumers in each region consider that the most traditional foods of the region (vegetables in the case of the Región de Murcia, meats in the case of Extremadura) have less environmental impact than those produced outside the region. This could be related to the culture of the consumer, who is accustomed to the traditional products of the region and considers them more sustainable because of their proximity, their link to the local economy, etc.

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