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Consumer willingness to pay for fair and sustainable foods: who profits in the agri-food chain?

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Going through an era where sustainability and definitions of fairness have been extended and integrated into the agri-food chain, there is a need to understand, on a multi-dimensional and multinational level, the structure of agri-food value chain revenues and consumers' intentions regarding necessity foods. The study analyzed 1,020 questionnaires from Algeria, Germany, Greece, Italy, and Tunisia revealing that taste prioritizes brand and packaging. Social networks, including family and friends, significantly influence the purchase of fair products. Furthermore, a choice experiment revealed the consumer preferences around attributes of the olive oil case as local, traditional, or organic, from a family or farmer association, in a glass bottle, purchased in small local shops/markets, typical and/or extensive nutritional labeling and health claims, non-relevant branding, and finally a fair price reflecting the reasonable quality of the olive oil product. Regarding the agri-food value chain, the results highlight the revenue distribution among stakeholders as unequal and unfair from consumer perceptions, with an imperative need for transparency. The study investigates in-depth the multifaceted dimensions of the fairness concept in the food market from a consumer's perception, showing their willingness to pay for necessities based on fair pricing and sustainable practices.

KEYWORDS

consumer, fairness, sustainability, stakeholders, food value chain, Mediterranean products

1 Introduction

In today's globalized world, it is necessary to understand why people choose different types of food (Foxall, 2005; Cook et al., 2023), and whether these individual food choices go beyond personalization and have implications for sustainable agriculture, economic development, and environmental well-being (Hassoun et al., 2022; Barrett, 1996). As consumer expectations shift, influenced by tastes, health benefits, ecological considerations, and ethical values they hold, companies are forced to be more innovative in developing products that can contribute to human preferences and ecological sustainability (Caswell et al., 2013). Meeting changing

needs means more than following trends; it means transforming the way we produce, distribute, and consume food (Nguyen, 2018).

Progressive consumers prioritize fairness, sustainability, local sourcing, taste, and convenience (Bieldt, 2020). However, the meaning of fairness is too complex to be captured through one expression (Saulters et al., 2018; Gudbrandsdottir et al., 2021). It encompasses multiple dimensions critical to a sustainable and fair agri-food system that includes separate conceptual entities such as transparency, fair revenue distribution, ethical treatment, particularly for farmers, and social justice and empowerment (Samoggia et al., 2023; Samoggia and Beyhan, 2022; Dragusanu et al., 2014; Raynolds and Weeks, 2018). The non-profit organization Fairtrade International, established in 1997, has significantly contributed to the holistic understanding of the concept of fairness (Fairtrade, n.d.). Through its recognizable trademark, this organization enables consumers to identify fair-trade products, raising awareness and support for ethical practices in the marketplace. Since then, the evolution of fair products has accelerated, with over 6,000 products in more than 40 countries between 1999 and 2012 (DiMarcello et al., 2014). Consumers appear to recognize and accept fair trade products at over 70% in some cases (Springer Nature, n.d.; Konuk, 2019), thus influencing the move towards eco-friendly options (Chen and Antonelli, 2020; Bai et al., 2019; Nam et al., 2020; Tavárez and Álamo, 2021). While it is evident that consumer behavior may change, the expectation of another industry revolution persists (Taylor and Boasson, 2014; Bürgin and Wilken, 2022; Rejman et al., 2019). The question, therefore, arises as to what is preventing the rapid growth of the market for fair-trade labeled products. Reports to date indicate that cultural and social influences, local economic conditions, and individual preferences significantly shape the adoption of fair-trade products (Amberg and Fogarassy, 2019; Chen and Antonelli, 2020; Bai et al., 2019). Additionally, demographic characteristics also play a substantial role in influencing consumer preferences (Nam et al., 2020; Tavárez and Álamo, 2021; Hallez et al., 2023).

From taste preferences to considerations of fairness and sustainability, this study undertakes an extensive examination of the consumer dynamic attitudes, and perceptions in food supply chains across five Mediterranean countries. The research also highlights the consumers' awareness of revenue distribution among supply chain stakeholders and comparing their expectations with proposed models. Additionally, the research investigates the influence of peers on fair product choices and explores the consumer preferences concerning the origin of agricultural products, packaging, company types, and pricing. By emphasizing the importance of these attributes, this study aims to provide valuable insights for stakeholders and policymakers in the agricultural sector.

2 Materials and methods

2.1 Questionnaire development

The primary aim of this study was to investigate consumer perceptions of fairness in revenue distribution in food supply chains, particularly for small and medium-sized enterprises (SMEs). A questionnaire was developed and structured into two methodological components: (i) an extensive literature review and (ii) an analysis of fairness attributes that would answer the fairness hypotheses. A variety of sources were utilized to ensure a robust and comprehensive approach. These include academic databases such as Scopus, Web of Science (WOS), and Google Scholar, as well as scholarly repositories like SAGE and JSTOR. Furthermore, it incorporated the knowledge gained from our partners' previous project outcomes. The research also involved examining content from products and companies' websites, as well as reports and official websites from authoritative bodies, such as the European Commission, the Food and Agriculture Organization (FAO), and other relevant institutions. The questionnaire was designed using an online platform and divided into two sections and six thematic blocks, which reflected the physical workflow. Appendix A outline the six thematic blocks covered such aspects as fair food revenue distribution, factors affecting the sense of fairness, buying intentions for fairly priced food products, opinions on reasonable prices of food products acquired from small food producers, possible fair products, and consumption patterns. Five countries participated in the survey, namely: Algeria, Germany, Greece, Italy, and Tunisia.

2.2 Choice experiment

The choice experiment section was integrated into the main questionnaire, as illustrated in Appendix A. Based on a review of the extensive literature (Nam et al., 2020; Bolton et al., 2003; Konuk, 2019; Tavárez and Álamo, 2021), this section of the survey presents several multiple-choice scenarios. Using olive oil as exploratory product, respondents were required to select their preferences among different options that have varying characteristics, such as price levels, origin and place of acquisition, fair business models, packaging, branding and labeling, cultivation, and company type. The purpose of this choice experiment was to establish the pricing for fair products by customers. The present thematic section contains 11 questions in the block 5 of the choice experiment.

2.3 Study participation and data analysis

A web-based platform was used to distribute the questionnaire, and data were collected between April 2022 and May 2023. The participants were informed through an introductory letter regarding the objectives of the survey and data protection measures under the General Data Protection Regulation (GDPR). The data collected from each country received more than 250 responses. After implementing the validation and data filtering procedures, the dataset was refined to include valid responses only. The process resulted in a curated dataset for the analysis comprising 240 responses from Algeria, 229 from Greece, 115 from Germany, 201 from Italy, and 235 from Tunisia. These figures represent the final, reliable datasets from each country that were used for further analysis. Descriptive statistics were initially computed, followed by multivariate analysis to identify key factors driving consumer purchase intentions and construct profiles of customer target groups with fairness-related characteristics in Mediterranean partner countries.

3 Results

3.1 Demographic data

A total of 1.020 respondents completed the questionnaire in the five participating countries. The average age was 37.54 years

(SD = 12.05) for women, 39.34 years (SD = 13.13) for men, and 37.59 years (SD = 12.51) for non-binary respondents, with a range from under 18 to over 65 years old. Table 1 shows the demographic data for these five variables (gender, age, education, and income). The overall sample was strongly skewed (−2.40) toward university affiliation, while the skewness values for the rest of the variables fell within the acceptable levels of −0.15 to 0.46. Non-parametric tests, like the Cochran–Mantel-Hansel, were used for highly skewed data. After examining the data for any noticeable patterns or trends and providing more reliable and meaningful insights, the variables of age and education were merged with the adjacent groups. Multivariate analysis related to consumers' perceptions of the fair attributes of products was conducted using SPSS Statistics 29.

3.2 Importance of purchasing habits and food attributes

Consumer decisions are strongly influenced by purchasing patterns and food characteristics. The participants were asked, to rate the importance of various factors when shopping for key food products such as processed tomatoes, pasta, bread, meat, bakery items, and herbs. The analysis showed that for the "extremely important" factor, the "taste" attribute tops the list, while "brand and packaging" comes last in the ranking. The importance of taste among countries was assessed (Chi2 = χ^2 (16) = 41.43, p = <0.001, Cramér's V = 0.1). In most cases, freshness is given almost equal importance to nutrition, but also to health labels and good prices, with the exception that taste is considered the most important factor.

TABLE 1 Demographic data.

	Algeria		Germany		Greece		Italy		Tunisia		Total	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Gender												
Female	50	20.8	70	60.9	125	54.6	113	56.2	113	48.1	**471**	**46.2**
Male	188	78.3	39	33.9	98	42.8	81	42.8	119	50.6	**525**	**51.5**
Prefer not to say	2	0.8	6	5.2	6	2.6	7	2.6	3	1.3	**24**	**2.4**
Total	**240**	**100**	**115**	**100**	**229**	**100**	**201**	**100**	**235**	**100**	**1,020**	**100**
Age												
** < 18	3	1.3	0	0	1	0.4	0	0	1	0.4	**5**	**0.5**
18–24	38	15.8	7	6.1	23	10	16	8	27	11.5	**111**	**10.9**
25–34	84	35	42	36.5	59	25.8	65	32.3	88	37.4	**338**	**33.1**
35–44	75	31.3	16	13.9	85	37.1	29	14.4	86	36.6	**291**	**28.5**
45–54	31	12.9	17	14.8	46	20.1	32	15.9	23	9.8	**149**	**14.6**
55–64	8	3.3	23	20	14	6.1	43	21.4	8	3.4	**96**	**9.4**
>65	4	0.4	10	8.7	2	0.4	16	8	4	0.9	**19**	**3**
Total	**240**	**100**	**115**	**100**	**229**	**100**	**201**	**100**	**235**	**100**	**1,020**	**100**
Education												
High school	19	7.9	14	12.2	8	3.5	0	0	10	4.3	**51**	**5**
Junior high	4	1.7	8	7	3	1.3	15	7.5	5	2.1	**35**	**3.4**
Other	4	1.7	2	1.7	12	5.2	3	1.5	3	1.3	**24**	**2.3**
**Primary	1	0.4	2	1.7	0	0	1	0.5	0	0	**4**	**0.4**
Secondary school	30	12.5	10	8.7	7	3.1	51	25.4	18	7.7	**116**	**11.4**
University	182	75.8	79	68.7	199	86.9	131	65.2	199	84.7	**790**	**77.5**
Total	**240**	**100**	**115**	**100**	**229**	**100**	**201**	**100**	**235**	**100**	**1,020**	**100**
***Income**												
Easily	41	17.1	58	50.4	42	18.3	63	31.3	27	11.5	**231**	**22.6**
I am quite wealthy	2	0.8	3	2.6	2	0.9	4	2	1	0.4	**12**	**1.2**
No serious issues	96	40	42	36.5	122	53.3	94	46.8	87	37	**441**	**43.2**
Not at all	32	13.3	0	0	12	5.2	14	7	30	12.8	**88**	**8.7**
With difficulty	69	28.8	12	10.4	51	22.3	26	12.9	90	38.3	**248**	**24.3**
Total	**240**	**100**	**115**	**100**	**229**	**100**	**201**	**100**	**235**	**100**	**1,020**	**100**

*Income question referred as "are you able with your incomes to satisfy your needs for food, house permanence, education, entertainment, and other essential needs? ** adjacent groups (>18 = 18–24, primary = junior high). Bold values represent the aggregated data for each individual country and the overall summary across all countries combined.

Algerians and Tunisians emphasize branding and packaging slightly more than other countries, while Greeks (Exp(B) = 3.7; $p < 0.001$) are more likely to purchase fresh and local products when these factors are deemed as "Extremely important" compared to when they are perceived as "Somewhat important" (Table 2). It also examines how financial difficulties relate to the importance of factors such as freshness, locality, and seasonality. This revealed a significant decrease in consumers' perceptions of these aspects once they experienced economic constraints ("With difficulty," $p = 0.001$). This suggests that economic constraints can influence consumer preferences for certain food attributes. Table 2 summarizes the factors that influence the decision-making process when shopping for key food products.

3.3 Fair food revenue distribution

A two-factor analysis of variance with repeated measures was conducted to examine the potential differences among groups concerning the division of percentage revenue in the agri-food chain for €1 spent by consumers on pasta packages at supermarkets. The independent variables were respondents' opinions on anticipation and suggestions for fair income distribution. Remarkably, there were some notable findings across farmer, processor, and retailer perspectives.

For farmers, perceptions differed significantly between anticipation (lower) and suggestion (higher) groups, with various countries showing distinct variations ($p = 0.001$). Whereas gender ($p = 0.594$) and education ($p = 0.137$) had no significant impact, income levels did influence responses ($p = 0.031$).

On the other hand, processors showed significant differences within anticipation (higher) and suggestion (lower) groups, with significant variations among countries ($p = 0.02$). In the case of gender difference, it had an effect ($p = 0.012$), while age difference did not affect responses at all ($p = 0.765$), nor did education have a considerable effect either ($p = 0.767$). There were also income level effects ($p = 0.002$).

Similarly, retailers also exhibited remarkable disparities within anticipation (higher) and suggestion (lower), with responses differing among countries ($p = 0.001$). While both gender and education were important demographic determinants of fair distribution, age was not statistically significant in determining a fair division of revenue ($p = 0.693$). In general, outcomes indicate divergent views from different stakeholders along the agri-food value chain that highlight how anticipations and suggestions influence individuals regarding revenue sharing matters based on demography; economic factors affecting these viewpoints are discussed briefly hereafter. The averages of consumer expectation values and consumer suggestion values per country are shown in Table 3. The revenue distribution among stakeholders in the food chain, such as the farmer (15%), processor (35%), and retailer (50%), is often unknown to consumers. When consumers were presented with actual revenue distribution percentages and asked about fairness, many expressed a negative perception. Specifically, 42% of respondents considered the current distribution "strongly unfair," while 45% deemed it "unfair." Cumulatively, 87% of consumers expressed the belief that the values of revenue distribution are unfair.

3.4 Fairtrade food purchasing intentions

Fairtrade food purchasing intentions refer to the likelihood or willingness of individuals to purchase food products that are produced and traded under fairtrade principles (Konuk, 2019). To examine consumer buying intentions regarding fairtrade food products, participants were presented with a series of statements to assess their levels of agreement or disagreement (Table 4). These statements were designed to estimate their attitudes and perceptions towards fairtrade. By evaluating participants' (dis)agreements with these statements, it is aimed to understand their likelihood (Somewhat/Strongly agree) of purchasing fairtrade food items.

A 55.4% of consumers' state that when they come across with fair-oriented products they want to buy them, while the 70.3% perceive that they are beneficial for the well-being of humanity. Peer approval and conformity play a significant role in influencing 45.6% of participants' decisions to buy fairness-oriented food products. Another 48.7% feel the need to conform to their peers' purchasing behavior, and 50.1% believe that like-minded individuals prefer such products. A considerable percentage of participants (68.3%) express a strong belief that the purchase of fair products has a positive impact on the working conditions of farmers. Additionally, the act of choosing was perceived as a meaningful contribution (61.1%) to addressing fairness issues within the food chain.

To determine the factors (statements) that are mostly associated with consumer intention or agreement, a CHAID (Chi-squared Automatic Interaction Detection) decision tree was calculated. Participants displayed a strong inclination to purchase fairness-oriented food products when they came across them.

According to the analysis, the statement "When I see fairness-oriented food products, I want to buy them" has a greater influence on the variables of education and age, especially for the countries of Greece (age) (Adj. $p = 0.001$; Chi2 = 28.313), Tunisia, for individuals over the age of 45 years old (Adj. $p = 0.000$; Chi2 = 39.734) who were educated at the university level (Adj. $p = 0.0005$; Chi2 = 12.998), and Italy (education) (Adj. $p = 0.000$; Chi2 = 14.027), compared to income and gender variables. The overall percentage of the correct classification is 42.3%, according to the growing method of CHAID. Similarly, for the statement "If fairness-oriented food products were available everywhere, I would buy them more frequently," the same variables (age and education) have a greater influence for Greece and Germany (Adj. $p = 0.046$; Chi2 = 15.975) and Tunisia (Adj. $p = 0.000$; Chi2 = 41.014) (overall classification = 43%).

3.5 Understanding the fairness of the food chain

The analysis of consumer responses (Table 5) regarding the fairness of the food chain revealed diverse opinions and perspectives. While there were areas of agreement (Somewhat/Strongly agree) among countries (91.5%), such as the belief that commercial practices should be trustful and respectful, there were also differing views on topics like fair contracts with farmers and the economic performance of farmers and processors. Participants generally agreed that a fair price should cover the production costs of each chain actor (83%) and recognized the lower revenue share and disadvantaged position of farmers compared to processors and

10.3389/fsufs.2024.1504985

TABLE 2 Purchasing habits and food attributes of statistical importance "extremely important".

How important are the following factors when shopping for key food products, such as processed tomato, pasta, bread, meat, bakery, herbs, etc.?				
	Sig.	B	Exp(B)	Std. error
Freshness, local and seasonal				
Algeria	0.009	−0.859	0.424	0.328
Greece	0.004	1.317	3.732	0.454
Female	0.005	0.584	1.793	0.207
Easily	0.014	0.817	2.263	0.332
With difficulty	0.01	−0.553	0.575	0.215
Junior high	0.033	−1.191	0.304	0.559
Good price and promotion				
Algeria	0.031	0.74	2.097	0.343
Germany	0.036	0.882	2.416	0.42
Greece	<0.001	2.294	9.919	0.378
Italy	<0.001	−1.158	0.314	0.274
Easily	0.038	−0.628	0.534	0.303
Nutritional and health label				
Male	0.017	−0.498	0.607	0.21
Taste				
Germany	0.007	2.069	7.915	0.767
Greece	<0.001	1.974	7.198	0.588
Information on fairness-oriented commercial practices among food chain actors				
Greece	0.043	−0.715	0.489	0.353
Tunisia	0.046	−0.759	0.468	0.38
Female	0.003	0.648	1.912	0.218
Brand and packaging				
Algeria	<0.001	2.495	12.117	0.533
Tunisia	0.003	1.584	4.873	0.396
Italy	0.003	−1.584	0.205	0.534
Female	0.043	−0.456	0.634	0.225
With difficulty	0.01	0.615	1.849	0.238
Fair price for farmers				
Algeria	0.039	−0.686	0.503	0.332
Germany	0.019	1.268	3.553	0.542
Greece	0.039	−0.721	0.486	0.349
Italy	0.018	0.619	1.858	0.262
Tunisia	0.002	−1.037	0.355	0.343
Easily	0.012	−0.793	0.452	0.316
No serious issues	0.047	−0.511	0.6	0.257
Environmental sustainability (e.g., organic)				
Greece	0.004	−0.964	0.381	0.334
Easily	0.05	−0.595	0.552	0.303
No serious issues	0.011	−0.648	0.523	0.254
Junior high	0.011	−1.295	0.274	0.51
Fair-trade label				
Female	0.014	0.549	1.731	224
Easily	0.013	−0.873	0.418	0.352
No serious issues	0.001	−0.908	0.403	0.284
With difficulty	0.004	0.578	1.782	0.252

(Continued)

TABLE 2 (Continued)

retailers (82.7%). However, opinions were divided on whether small food producers' prices were higher than retailers' prices (48.6%) and whether these prices were fair (38.7%). There was also mixed feedback on the affordability of fairness-oriented products, with many respondents acknowledging their higher cost. Additionally, there were different views on whether fairness-oriented products were just marketing activities with limited benefits for farmers than retailers' prices (48.6%), and whether these prices were fair (38.7%).

The intersection between fairness and technology forms the nexus of a conscientious approach, enabling consumers to make informed and fair choices in the marketplace. In order to understand consumers' awareness regarding technologies that certify the authenticity and traceability of food products, a logistic regression analysis was conducted to examine the impact of technologies (value = "Yes, I am aware of the current technology") on the likelihood of the dependent variable (DNA traceability) being "Yes." The overall model was found to be significant ($Chi2(3) = 321.89$, $p < 0.001$). The analysis showed that when DNA traceability was known to consumers, the probability of awareness of the Blockchain technology increased by 2.22 (OD) times (p-value of <0.001), for Molecular identity 9.8 (OD) times (p-value of <0.001), and finally by only 0.89 (OD) times (p-value of 0.538) for Sensors & IoT technology.

Countries explored individually showed that Algeria emerges as a clear leader with a comprehensive adoption score of 136.10%. Greece and Tunisia closely trail behind, both exceeding a notable overall adoption rate of 100%. Greece showcases a well-balanced adoption across various technologies, particularly in DNA traceability. Similarly, Tunisia embraces a holistic approach, emphasizing Molecular identity and Sensors and IoT technology. Italy, while demonstrating a moderate overall adoption rate of 61.23%, stands out for its preference for DNA traceability and Blockchain technologies. On the other hand, Germany lags behind in the overall adoption landscape, presenting the lowest total adoption score of 41.49%. This suggests a comparatively slower uptake of these technologies within its food supply chain, possibly indicating a need for increased awareness or infrastructure development.

3.6 The choice experiment

The choice experiment section presents the profile of olive oil that differs in attributes like origin, type, cultivation, company type, packaging, acquisition place, labeling, branding, and price to pay (Table 6). Consumers had to choose between these different product profiles in order to understand their preferences and willingness to pay.

Across all participating countries, the results showed a high preference for local olive oil. The highest preference for organic

TABLE 3 Average values of consumer anticipation and suggestions regarding revenue distribution among food industry stakeholders in each country.

	Farmer		Processor		Retailer	
	Anticipation	Suggestion	Anticipation	Suggestion	Anticipation	Suggestion
Greece	29.35%	46.91%	34.67%	30.09%	40.30%	26.85%
Algeria	40.17%	42.96%	33.38%	33.17%	30.54%	27.83%
Germany	22.81%	43.86%	33.98%	31.63%	49.51%	26.85%
Tunisia	37.86%	44.02%	35.43%	31.86%	32.38%	28.52%
Italy	28.71%	44.53%	37.90%	32.36%	40.38%	27.32%
Total	33.70%	44.48%	35.10%	31.85%	37.47%	27.54%

TABLE 4 Consumer attitudes towards fairness-oriented food products.

Please rate the following in terms of how much you agree or disagree with each statement	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
When I see fairness-oriented food products, I want to buy them	19.10%	36.30%	20.70%	9.80%	14.10%
Purchasing fair price food products is pleasant for humankind	38.90%	31.40%	6.20%	5.30%	18.20%
My peers (i.e., family, close friends) approve the purchase of fairness-oriented food products.	14.40%	31.20%	27.50%	13.20%	13.60%
I want to adapt to my peers that purchase fairness-oriented food products (i.e., family, close friends)	16.60%	32.20%	25.60%	11.90%	13.80%
I need more Information on fairness-oriented commercial practices among food chain actors	32.30%	33.80%	8.80%	11.80%	13.20%
Many like-minded people would prefer fairness-oriented food products	15.30%	34.80%	24.60%	14.40%	10.90%
There is no reason for me not to buy fairness-oriented food products if I want to	24.90%	35.70%	18.60%	14.10%	6.70%
If fairness-oriented food products were available everywhere, I would buy them more frequently	30.70%	33.80%	11.20%	11.10%	13.20%
Purchasing fairness-oriented food products has a positive influence on the working conditions of the farmers	38.10%	30.20%	9.40%	6.10%	16.20%
Choosing fairness-oriented food products contributes to the solution of food chain fairness issues	27.40%	33.70%	14.80%	10.70%	13.40%
Single consumer's purchasing decisions can improve the working conditions of the farmers	21.30%	32.80%	15.10%	14.60%	16.20%
When I do buy fairness-oriented food products, I feel hopeful	19.20%	36.00%	20.80%	11.10%	12.90%
When I decide to buy fairness-oriented food products, I feel satisfied	22.60%	37.70%	16.40%	9.40%	13.80%
I feel proud when I decide to purchase fairness-oriented food products	21.00%	31.60%	22.70%	9.90%	14.80%

farming was among Italians (50.75%), followed by Germans (43.48%), Greeks (15.28%), Algerians (12.08%), and Tunisians (7.23%). Alternatively, Tunisia had the highest preference (83.40%) for traditional farming, followed by Algeria (74.58%), Greece (69%), Italy (49.25%), and Germany (41.74%). Intensive farming received lower overall preference than the two other choices given above regarding extensive cultural practices in general or country of origin, respectively. These choices were preferred almost equally, except for a few insignificant variations among countries surveyed on those options, as observed from this analysis. In terms of company type preferences, family-owned companies were most preferred across all countries, whereas farmer association companies and enterprises were second best. The nationality of the participant influenced the choice of company type as well as the ability to pay, which is evident from significant differences between means. As far as packaging preferences are concerned, glass bottles were more preferable across all nations (70.49%); Greece also had the highest prevalence rates (26.2%) for biodegradable packaging, while Algeria scored lowest in ranking (5.42%).

For purchasing agricultural products, local small shops and markets rank first as places where they can be easily acquired. Priorities were different across countries in relation to the types of consumer information desired, with Italy having the primary interest in health claims (51.24%), and Greece expressed strong support for extensive nutrient content (42.36%). Regarding brand preferences, the "Not relevant" option was ranked first in all countries, while known brands had some effect, though not significantly different. Regarding price and quality preferences,

TABLE 5 Perceptions of fairness and practices in the agri-food value chain.

Please rate the following in terms of how much you agree or disagree with each statement:	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
Commercial practices among food chain actors should be trustful and respectful (no discrimination, respected labour rights, etc.)	68.80%	22.60%	3.60%	2.50%	2.40%
Fairness-oriented products come from fair contracts with farmers (such as long-run contract between agri-food actors)	33.10%	40.90%	19.60%	4.30%	2.10%
A fair price is a price that covers the production costs of each chain actors	45.80%	37.40%	10.40%	4.90%	1.60%
Farmers and processors have limited managerial skills causing their low economic performance	13.90%	29.10%	28.80%	17.30%	10.90%
Each chain actors (from farmer to consumer) should pay a price high enough to ensure each chain actor receives a fair price	24.50%	34.50%	22.00%	13.10%	5.90%
Farmers have lower revenue share and are in a worse-off position, compared to processors and retailers	51.00%	31.70%	8.40%	5.00%	3.90%
Small food producers' prices are higher than retailers' prices	15.10%	33.50%	26.20%	15.00%	10.20%
Small food producers' prices are fair	8.60%	30.10%	39.00%	15.60%	6.70%
Fairness-oriented products are expensive	12.60%	37.10%	32.30%	13.50%	4.50%
Fairness-oriented products (such as Fair-Trade) is just a marketing communication activity, with limited benefits for farmers	9.40%	26.30%	33.70%	22.40%	8.20%

consumers showed a high preference for products with fair prices and fair quality. However, Greece also stands out due to her second choice for low prices (18.06%). Income levels play a significant role in influencing the willingness to pay higher prices for better quality products.

Finally, results on fair business model questions signify that countries have separate perceptions. The importance (Extremely important/Important) of allowing farmers to renege contracts if market prices are sufficiently high is emphasized by Greece (51.87%) and Italy (51.97%), while Algeria and Tunisia show varied opinions. Germany appears to prioritize this aspect less. Examining a fair sharing cost of necessary materials between manufacturers and farmers, the importance highlighted again by Greek respondents (47.10%) followed by Italians (37.88%). In Tunisia the proportion who considered it extremely important stood at 39.16% while Algeria expressed uncertainty (21.19%) and 46.30% considered as not at all important. Germany has less emphasis compared with other nations in terms of manufacturers sharing costs involved in the production process. Overall results are shown graphically in the Table 6.

4 Discussion

In this study, an array of aspects that affect consumer decision-making were examined to reveal how these are shaped within the context of a fairer and more sustainable market across five nations. In addition, it expanded its scope to provide a wider understanding of consumers' willingness to pay for olive oil product by analyzing consumer preferences, from production to market, using a choice experiment. The countries examined in this study encompass diverse economic and cultural contexts, providing valuable insights into how fair-trade is perceived on a wide scale. The analysis highlights significant variations among countries in their responses and preferences concerning food products and agricultural practices. Investigating the significance of buying patterns and characteristics of key food products, analyzes show that consumers prioritize taste over packaging. This means that the sensory experience and flavor of the product play a more significant role in their decision-making process, and they are also more concerned with the actual quality and enjoyment of the food rather than being persuaded by the external appearance or design of the packaging, conclusions that stand opposite to previous studies (Hallez et al., 2023; Wyrwa and Barska, 2017). Consumer choice in this regard may be influenced by the broader context of the questionnaire content, which incorporates concepts such as fair-trade and sustainability. These definitions place consumer preferences on alternative bases. For instance, Thomas J. L. et al. reported that shoppers in 'green supermarkets' are less easily persuaded by packaging design (Van Rompay et al., 2016). Moreover, in this scenario, the prioritization of choices is consciously defined for the consumer. This results in the importance of the product taking on its true dimensions in consumer preferences. Subsequently, when exploring the economic aspects and their impact on consumer decisions, the examination revealed that financial constraints play a role in the selection of fresh and local options. However, this influence is not entirely comprehended, as the price of these products may not precisely correlate with the observed shift (Chapman et al., 2014; Gilbert et al., 2024). In contrast, packaging seems to remain unaffected in a similar context, as also shown by Khan and Lee (2020).

Effective supply chain management necessitates coordination and information sharing between supply chain actors (Shareef et al., 2021). Moreover, revenue-sharing allocations may increase supply chain profits (Feng et al., 2021), but our understanding of real revenue distributions is surprisingly limited. Consumers' unawareness of actual revenue distribution is demonstrated by the consensus responses of 42% 'Strongly unfair' and 45% 'Unfair', but also of the redistribution of 1€ across stakeholders. This comprises

TABLE 6 Consumer preferences for olive oil characteristics by country.

	Choice experiment—olive oil	Algeria	Germany	Greece	Italy	Tunisia	Grand Total
Origin	Imported	2.50%	3.48%	0.00%	1.00%	0.43%	**1.27%**
	Local	96.25%	94.78%	100.00%	99.00%	98.30%	**97.94%**
	Local, imported	1.25%	1.74%	0.00%	0.00%	1.28%	**0.78%**
Type	Extra virgin olive oil (EVOO)	56.67%	72.17%	79.91%	64.68%	56.60%	**65.20%**
	Extra virgin olive oil (EVOO), Monovarietal olive oil	0.83%	0.00%	3.93%	0.00%	1.28%	**1.37%**
	Extra virgin olive oil (EVOO), Monovarietal olive oil, organic EVOO	3.33%	0.00%	3.06%	0.00%	1.70%	**1.86%**
	Extra virgin olive oil (EVOO), organic EVOO	7.08%	3.48%	6.55%	0.00%	8.51%	**5.49%**
	Monovarietal olive oil	6.25%	0.00%	1.31%	3.98%	5.11%	**3.73%**
	Organic EVOO	25.83%	24.35%	5.24%	31.34%	26.81%	**22.35%**
Cultivation	Intensive	4.17%	3.48%	0.87%	0.00%	1.28%	**1.86%**
	Organic farming	12.08%	43.48%	15.28%	50.75%	7.23%	**22.84%**
	Organic farming, intensive	0.42%	0.00%	0.00%	0.00%	0.43%	**0.20%**
	Traditional	74.58%	41.74%	69.00%	49.25%	83.40%	**66.67%**
	Traditional, intensive	0.42%	0.87%	1.75%	0.00%	0.43%	**0.69%**
	Traditional, organic farming	6.67%	8.70%	12.66%	0.00%	6.38%	**6.86%**
	Traditional, organic farming, intensive	1.67%	1.74%	0.44%	0.00%	0.85%	**0.88%**
Company type	Enterprise	15.83%	5.22%	12.23%	3.48%	15.32%	**11.27%**
	Family company	42.50%	40.00%	48.03%	64.68%	32.77%	**45.59%**
	Family company, enterprise	2.92%	0.00%	1.31%	0.00%	0.85%	**1.18%**
	Farmer association	25.00%	36.52%	19.65%	31.84%	34.47%	**28.63%**
	Farmer association, enterprise	1.67%	0.00%	1.75%	0.00%	1.70%	**1.18%**
	Farmer association, family company	10.00%	17.39%	14.41%	0.00%	14.04%	**10.78%**
	Farmer association, family company, enterprise	2.08%	0.87%	2.62%	0.00%	0.85%	**1.37%**
Packaging	Biodegradable	5.42%	9.57%	26.20%	11.44%	9.79%	**12.75%**
	Glass bottle	78.33%	75.65%	40.17%	87.56%	74.89%	**70.49%**
	Glass bottle, biodegradable	5.00%	5.22%	8.73%	0.00%	5.96%	**5.10%**
	Plastic bottle	8.33%	7.83%	19.65%	1.00%	5.96%	**8.82%**
	Plastic bottle, biodegradable	0.83%	0.00%	1.75%	0.00%	0.00%	**0.59%**
	Plastic bottle, glass bottle	1.25%	1.74%	2.18%	0.00%	3.40%	**1.76%**
	Plastic bottle, glass bottle, biodegradable	0.83%	0.00%	1.31%	0.00%	0.00%	**0.49%**
Acquisition place	E-shop	3.75%	3.48%	0.87%	4.98%	1.28%	**2.75%**
	Local small shops—markets	58.75%	40.00%	39.74%	80.60%	45.96%	**53.73%**
	Local small shops—markets, E-shop	0.42%	3.48%	0.87%	0.00%	0.00%	**0.69%**
	Super market	22.50%	35.65%	37.55%	14.43%	30.64%	**27.65%**
	Super market, e-shop	0.83%	0.00%	0.44%	0.00%	0.43%	**0.39%**
	Super market, local small shops—markets	11.25%	15.65%	18.34%	0.00%	17.45%	**12.55%**
	Super market, local small shops—markets, e-shop	2.50%	1.74%	2.18%	0.00%	4.26%	**2.25%**
Labeling	Extensive nutrient content	20.83%	29.57%	42.36%	31.34%	22.55%	**29.12%**
	Extensive nutrient content, health claims	5.00%	8.70%	7.42%	0.00%	4.68%	**4.90%**
	Health claims	27.92%	20.87%	9.17%	51.24%	21.70%	**26.08%**
	Typical nutrient content	34.58%	32.17%	34.06%	17.41%	39.15%	**31.86%**
	Typical nutrient content, extensive nutrient content	3.75%	0.00%	1.31%	0.00%	1.28%	**1.47%**
	Typical nutrient content, extensive nutrient content, health claims	4.58%	2.61%	3.49%	0.00%	2.55%	**2.75%**
	Typical nutrient content, health claims	3.33%	6.09%	2.18%	0.00%	8.09%	**3.82%**

(Continued)

TABLE 6 (Continued)

	Choice experiment—olive oil	Algeria	Germany	Greece	Italy	Tunisia	Grand Total
Branding	Known brand	37.08%	14.78%	33.62%	17.91%	48.09%	**32.55%**
	Known brand, Not relevant	1.25%	0.00%	1.31%	0.00%	1.28%	**0.88%**
	Known brand, Unknown brand	2.08%	0.00%	1.31%	0.00%	1.28%	**1.08%**
	Known brand, Unknown brand, Not relevant	0.83%	0.00%	0.00%	0.00%	1.28%	**0.49%**
	Not relevant	46.25%	77.39%	38.86%	77.11%	41.28%	**53.04%**
	Unknown brand	10.00%	5.22%	24.45%	4.98%	5.96%	**10.78%**
	Unknown brand, Not relevant	2.50%	2.61%	0.44%	0.00%	0.85%	**1.18%**
Price to pay	Fair price (Indicative price for EVOO, 9 Euro/lt)	66.25%	76.52%	75.98%	80.10%	64.26%	**71.86%**
	High price for higher quality (Indicative price for EVOO Organic > 12,7 Euro/lt)	26.25%	16.52%	6.11%	19.40%	25.11%	**19.02%**
	Low price (Indicative price for Non EVOO, non-organic 7,80 Euro/lt)	7.50%	6.96%	17.90%	0.50%	10.64%	**9.12%**

Bold values represent the aggregated data across all countries.

an estimated average increase for farmers of 12.66%, a 0.2% drop for processors, and a 10.26% loss for retailers. This discrepancy highlights the importance of transparency and consumer education in the agri-food industry but also the need for a fairer distributed revenue.

Emphasizing the consumer buying intentions for fair-trade food products it is displayed a strong inclination for purchasing fairness-oriented products when they come across them. The willingness appears to be strongly driven by female consumers, as also revealed in prior studies (Taylor and Boasson, 2014; Lee et al., 2015). Social interactions can also influence people's intents (Ellison, 2014; Teyssier et al., 2015) which verified our findings that peer approval and conformity play a key role in influencing participants' decisions to buy fairness-oriented food products. They feel compelled to follow through to their peers' shopping habits and assume that a large number of like-minded people choose fair-trade food products. Another element influencing consumer purchase frequency is the availability of fair-trade products. Interestingly, participants did not provide specific reasons for refraining from buying fairness-oriented food products, suggesting that there were no major barriers or concerns preventing their purchase. Therefore, overall feelings expressed by the respondents were positive as well as intense experiences related to buying fair-products. Their decisions were accompanied by hopefulness and satisfaction suggesting that ethical considerations and values should come before any other considerations when making consumer choices.

Regarding consumers' awareness of technologies certifying authenticity and traceability of food products, the literature emphasizes that consumers seek authenticity in their consumption experiences, and brands have responded to this by leveraging authenticity for instrumental purposes in the marketplace (Napoli et al., 2014; Gannon and Prothero, 2022). The survey results indicate varying levels of knowledge across these technologies.

The choice of experiment gives the opportunity to create the most suitable or desired olive oil from the consumer's perception, regardless of the country of answer. This olive oil is depicted true to its local origination, incorporating traditional organic cultivation, processes by family or farmer association firms. It is packaged in a glass bottle, describing the nutrient content, no matter of brand and acquired from local small businesses and markets. Finally, a fair price that corresponds with the quality of the product is preferable to a brand that emphasizes authenticity.

5 Conclusion

This research contributes twofold to the understanding of the agri-food chain, proving useful information to both stakeholders and consumers.

For businesses operating in the food market, the study offers guidance on consumer preferences for essential goods, but also highlights the need for transparency in trading practices. The establishment of fair business models, such as contract farming, is imperative in the value chain to ensure fair revenue distribution among stakeholders but also its long-term sustainability. By addressing key barriers and leveraging motivators, stakeholders can expand the influence and impact of fair-trade products and adopt a global culture of ethical consumption. At the same time, consumers are developing a better understanding of the food value chain and becoming more familiar with concepts of fairness and sustainability. Fair-trade choices by consumers could provide a new dimension to addressing imbalances in the food value chain. From a policy perspective, the findings suggest that governments and regulatory bodies should actively promote fair-trade principles through supportive legislation and financial incentives. Moreover, public awareness campaigns highlighting the social and environmental benefits of fair-trade products can further empower consumers to make informed decisions.

Last but not least, this study is not without limitations. The scope of the research was constrained by regional focus, which may limit the generalizability of the findings to other geographic contexts. Additionally, the study primarily relied on qualitative data, which, while rich in insights, could be complemented by quantitative analyses to enhance robustness. Future research could explore longitudinal impacts of fair-trade practices, investigate consumer behavior in diverse cultural settings, and develop predictive models to assess the scalability of sustainable value chains. By addressing these limitations,

subsequent studies can build on the groundwork laid by this research to drive further advancements in the field.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Author contributions

EM: Data curation, Formal analysis, Validation, Visualization, Writing – original draft, Writing – review & editing. IM: Methodology, Validation, Writing – review & editing. MG: Data curation, Resources, Validation, Writing – review & editing. KK: Data curation, Validation, Writing – review & editing. SF: Data curation, Validation, Writing – review & editing. TE: Data curation, Validation, Writing – review & editing. AB: Data curation, Funding acquisition, Validation, Writing – review & editing. AK: Data curation, Validation, Writing – review & editing. LA: Data curation, Funding acquisition, Validation, Writing – review & editing. AD: Data curation, Funding acquisition, Validation, Writing – review & editing. AG: Data curation, Funding acquisition, Validation, Writing – review & editing. AS: Conceptualization, Data curation, Investigation, Methodology, Resources, Validation, Writing – review & editing. GA: Conceptualization, Data curation, Funding acquisition, Project administration, Validation, Writing – review & editing. AA: Conceptualization, Data curation, Funding acquisition, Investigation, Methodology, Supervision, Validation, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declare that no Generative AI was used in the creation of this manuscript.

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Supplementary material

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