32nd International Conference of Agricultural Economists
2-7 August 2024 I New Delhi I India

Assessing Downstream and Upstream Stakeholders' Preferences for Sustainability Attributes in the Tomato Value Chain

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Abstract

Effectively implementing innovations in agri-food supply chains (AFSCs) is contingent upon stakeholders' preferences. Using the analytic hierarchy process (AHP), the objective of this research was to ascertain the degree of willingness among farmers, consumers, and various stakeholders (including processing companies, restaurants, and retailers) in the tomato supply chain of Catalonia (Spain) to shorten the chain and promote local procurement. Based on a set of social, economic, and environmental criteria encompassing sustainability in AFSCs, the results showed that economic factors, particularly profitability and affordability, were the key driving factors in the decisions of stakeholders. However, the considerable importance placed on strategic attributes, including local production, environmental sustainability, and product quality, particularly among consumers, seemed to present a chance to advocate for sustainable alternatives, such as short food supply chains (SFSCs). The AHP methodology facilitates differentiation with respect to the criteria of the decision-making process and serves as a valuable instrument for evaluating the reception of innovations within the AFSC and categorizing the stakeholders who exhibit the greatest interest in them. In order to improve the sustainability of agri-food systems, our findings may be incorporated into strategic plans developed by policymakers.

JEL Codes: Q11 Aggregate Supply and Demand Analysis. Q13 Agricultural Markets and Marketing

1. Introduction

Agri-food economics is increasingly turning to the analysis of the agri-food supply chain (AFSC) as the fulcrum for introducing sustainability-oriented innovations [1], on the basis that increased stakeholder engagement would facilitate chain management [2]. Hence, tools are needed to measure and link the strategies, preferences, and expectations of the different stakeholders [3]. Stakeholder engagement and the willingness of stakeholders to collaborate within the chain have been the subject of numerous methodologies that have been put forth in recent studies [4], although the majority of research remains concentrated on a single link within the AFSC. However, the introduction of sustainability-focused innovations in the AFSC is a multi-criteria decision-making (MCDM) problem involving multiple actors. This provides a suitable context for the application of multi-criteria approaches to supply chain innovation challenges. In this context, in this research, we assess stakeholder preferences in the AFSC concerning sustainability using the analytic hierarchy process (AHP), a widely used MCDM method of analysis [5].

Academic research and development programs are paying increasing attention to sustainable supply chain management practices in AFSCs [6] to address the major challenges of the agri-food sector, especially in the Mediterranean region. These include farmers' access to markets, food security, the maintenance of regional production systems, and climate change adaptation. In this context, the shortening of agri-food supply chains has been increasingly discussed over the last two decades [7,8]; however, the share of short food supply chains (SFSCs) in total food expenditure in Europe is very low, being only 5% in Spain [9]. The economic benefits of adopting SFSCs, as identified by some authors, include an increase in bargaining power, the elimination of intermediaries, and a higher perceived price among farmers [10], although some barriers may discourage this business model, such as high related costs and regulatory hurdles [11]. Considering all dimensions of sustainable development (economic, social, and environmental) [12,13], and coinciding with an increased awareness of the social and environmental impacts of food supply [14], SFSCs are reported to increase peer-to-peer interactions and trust within the community [15], reduce the amount of asymmetric information [14], and diminish the carbon footprint [16].

Consequently, how can we ascertain that the consent and voluntary cooperation of every agent involved are secured for these actions? To address these challenges, it is critical to implement an "integrated methodological approach for the optimization of the entire [agri-food] supply chain" [17] (p. 47). This entails aligning the interests of all stakeholders. Trust is a pivotal factor in stakeholder engagement, which is ultimately one of the most significant AFSC drivers in achieving sustainability [18,19]. Nevertheless, AFSCs of fruits and vegetables are distinguished by, among other features, high product differentiation, perishable and seasonal products, food safety and environmental regulations, and high supply and demand volatility [17,20]. These characteristics make them difficult to manage from both stakeholder management and sustainability perspectives. AFSCs are networks in which the parties are required to interact with respect to products, finances, information, processes, and energy flows [17]. As a result, every node possesses a distinct decision-making process, which can be elucidated by specific factors. In this context, the identification and prioritization of these factors are emerging as key elements in AFSC management, which must, therefore, be considered when promoting more sustainable alternatives.

By employing the AHP methodology, this study seeks to ascertain the degree to which stakeholders are inclined to implement strategies that facilitate local procurement and shorten the supply chain, with a specific emphasis on their preferences. Next, we examine the relationship between these preferences and the characteristics of stakeholders in order to determine which profiles are most inclined to engage in SFSCs. These are the two primary inquiries that underpin this work: (1) To what degree do the preferences of the various supply chain stakeholders provide an optimal circumstance for the advancement of SFSCs? and (2) Does a particular category of stakeholders, including farmers, consumers, and others, exhibit greater acceptance of sustainable alternatives for agri-food distribution?

To gain insight into how farmers incorporate economic, social, and environmental considerations into their agri-business decision-making, we initially assessed the relative importance of various factors that influence their choices. Prior research has concentrated on the marketing decision-making processes of farmers concerning the initial link in the chain. In inadequately organized markets, farmers placed greater emphasis on the attributes of the traders rather than the price being offered, according to the findings of Gelaw et al. [21]. Conversely, Ochieng et al. [22] directed their attention towards the contractual conditions within supermarket procurement channels. Other researchers have assessed participation in sustainability programs [23–25], quality promotion strategies [26], or fair-trade certification schemes [27]. These researchers have generally used market surveys or choice experiment approaches. In addition, the AHP methodology has been applied in identifying farmers' agri-business preferences [28], or in assessing the adoption of climate change adaptation and mitigation actions [29].

Secondly, we explored the attributes that the place of purchase of fruit and vegetables should have to adjust consumers' preferences. Several studies have indicated that the challenge of achieving a more sustainable agri-food system is closely related to consumers' willingness to purchase more products with sustainable claims [30]. The meta-analysis of Li and Kallas [31] showed a growing demand for sustainable fruit and vegetables in Europe, although organic attributes were the most appreciated, while environmental and proximity criteria were represented by a slightly decreased willingness to pay (WTP). This is in line with the research of Lami et al. [9], who found that preferences for sustainable products did not translate into increased preferences for SFSC purchasing. Other researchers have found that consumers valued local production [32], particularly in terms of food safety and environmental concerns [33], while Meyerding [34] claimed that pricing played a more significant role than social and climate issues. Moreover, consumers are increasingly requesting a greater diversity of products, better-quality packaging, quality services, and locally produced food [12]. In the case of consumers, MCDM analyses have also been applied, such as the use of AHP for consumers' acceptance [35], or for measuring the impact of eco-labeling [36].

Thirdly, we examined the primary factors that processing companies, retailers, and restaurants consider when selecting fresh fruit and vegetable suppliers. The utilization of MCDM instruments by stakeholders in the intermediary nodes of the chain has been the subject of extensive discussion [37]. Lin and Wu [38] utilized fuzzy AHP to examine retailers' preferences with respect to their fresh fruit and vegetable suppliers, whereas Liu and Hai [39] suggested the voting AHP method for supplier selection. Lopes and Rodriguez-Lopez [40] applied the preference ranking organization method for enrichment of evaluations (PROMETHEE) for supplier selection. In

general, the most commonly highlighted criteria are procurement price, product quality, delivery, responsiveness, and innovative capability. Local procurement is highlighted as a restaurant's preference as a proxy for quality and commercial prestige [41]. Although these factors are mainly economic criteria, various authors have increasingly been proposing the addition of social and environmental criteria [42]. However, recent research has warned that companies are still not very aware of either environmental or food safety issues [40].

Two main hypotheses were developed in light of the aforementioned research questions. Initial hypothesis (H1): An evaluation of stakeholder preferences regarding the relative importance of criteria related to local procurement and direct sales can yield a potential scenario for the promotion of SFSCs. Three sub-hypotheses help to support the initial main hypothesis. Farmers demonstrate a notable inclination towards resolving distribution obstacles in order to capitalize on the opportunity of selling directly to consumers (H1.1). SFSCs are highly compatible with the preferences of consumers who place a high value on seasonal and locally sourced goods (H1.2). Restaurants, retailers, and industries exhibit a notable inclination toward engaging in SFSCs due to their significant preference for local procurement (H1.3). The second hypothesis (H2) posits that SFSCs are of greater interest to a particular stakeholder profile. Three sub-hypotheses help to support this main hypothesis. The greater emphasis on local sourcing criteria is believed to be associated with a less market-oriented business model among producers (H2.1). Regarding demand, it is believed that a stronger focus on local sourcing requirements is associated with a decreased concern for both affordability and convenience of purchase (H2.2) The preference for SFSCs criteria should be supported by a more ecocentric and critical perspective of the supply chain (H2.3).

This research adds to the body of current literature by examining the AFSCs through an assessment of stakeholders' preferences and the potential acceptance of sustainable innovations based on their needs in the tomato value chain in Catalonia, Spain. In this regard, it should be noted that the Spanish agri-food industry has seen a concentration of its major players [43], with large retailers emerging as the primary conduit between producers and consumers. This scenario of an unbalanced relationship between producers and distributors [9] has not been translated into lower final prices for consumers [43]. The peri-urban horticultural sector in the Barcelona Metropolitan Region (BMR) in particular has trouble competing in traditional supply chains [44]. As a result, this case study depicts an AFSC dealing with issues related to environmental, social, and economic sustainability that call for coordinated action from all stakeholders. As tomato is a widespread crop with a wide range of uses, it is the second most produced vegetable in Catalonia, accounting for 17% of the region's total vegetable production and 11% of its cultivated area. Nevertheless, during the past 20 years, their output has decreased by half [45].

Section 2 describes the methods for data collection, the factor selection criteria, and the AHP and statistical analysis methodology. Section 3 provides the results of the AHP analysis and a definition of the profiles of the stakeholders most likely to participate in the SFSCs. Finally, the results are discussed, and a conclusion is presented, including the implications and recommended actions drawn from this study.

2. Materials and Methods

Figure 1 shows the research methodology workflow applied in this tomato case study (Section 2.1). The first phase of this research was criteria selection, resulting from the AHP survey design for each stakeholder (Section 2.2). The second phase was the comparative analysis of the AHP results (Section 2.3) and stakeholder profiling via bi-variate correlations (Section 2.4).

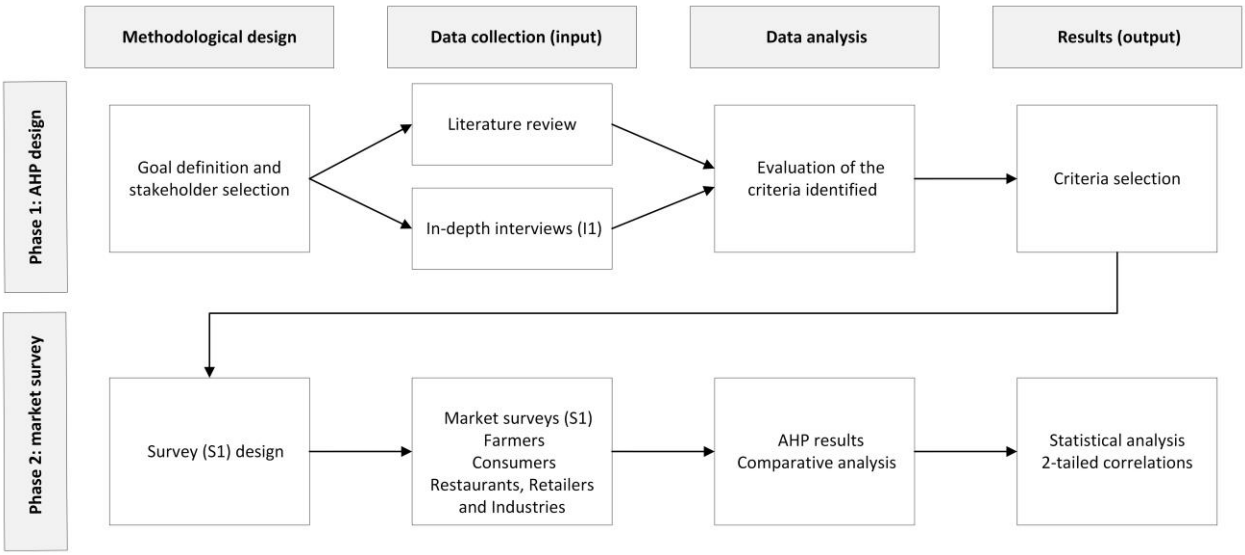

Figure 1. Research workflow (authors' elaboration).

2.1. Case Studies and Stakeholder Sampling

The Catalan tomato value chain analysis was based on 260 surveys carried out between May and October 2022. Respondents included 48 tomato growers, 105 consumers, and 107 additional stakeholders (45 restaurants, 54 retailers, and 8 processing industries). The process of gathering data involved conducting market surveys (S1). Tomato farmers were surveyed either in the field or responded via a digital form. The selected individuals, who were over the age of 18 and either entirely or partially responsible for buying fruits and vegetables for their households, completed an online questionnaire through the use of an online consumer panel. To complete the value chain analysis, other stakeholders were surveyed in the field using the online link of the designed questionnaire, including restaurants, retailers, and food-processing companies. In these surveys, the AHP was used as an MCDM technique [46] to estimate the relative importance of the criteria identified in the literature review. The main criteria were also discussed in the in-depth interviews (I1) with the key stakeholders in the tomato value chain.

2.2. Criteria selection

A comprehensive review of the literature and discussions with the important stakeholders influenced the process of selecting the important factors (I1). The questionnaire (S1) had to be modified in order to account for the unique needs of each stakeholder.

Based on in-depth interviews (I1), the main factors in farming business decision-making were identified, resulting in the selection of the most important farming objectives (Table 1). In this case, I1 showed a significant weighting in favor of economic factors [28]. Consequently, we decided to differentiate economic performance (GA), quality (GB), and commercialization (GC). The decision-making tree was completed with the addition of the social responsibility (GD) and environmental conservation (GE) criteria. Each main objective was decomposed into three secondary objectives, resulting in a set of fifteen farming activity objectives.

Table 1. Farming objectives criteria selection.

Main criteria	Sub-criteria	Rationale
A. Increase economic efficiency	A_1: Lower production costs A_2: Increase the selling price A_3: Improve productivity	Those related to improving the economic performance of the farm: costs, income, and productivity [28,47].
B. Improve production quality	B_1: Invest in knowledge and machinery B_2: Adopt traditional varieties B_3: Adopt commercial varieties	Farm innovation (technology and investment) is a key strategic decision for achieving the required quality [17]. Additionally, adaptation (change in crops) is disguised as a quality proxy [29].
C. Optimize distribution	C_1: Sell directly to consumers C_2: Get a pre-harvest sales contract C_3: Minimize distribution costs	Commercialization is focused on shortening the chain [7], contract farming [48], and the related logistics costs [44].
D. Social improvement	D_1: Contract and ensure decent working conditions D_2: Maintain the agricultural activity of my locality D_3: Ensure affordable food for the surrounding population	Improvement of the community in terms of human resources, community engagement, and food safety [13,28,47].
E. Environ-mental objectives	E_1: Reduce phytosanitary E_2: Maintain soil fertility E_3: Ensure rational use of water	Environmental factors focused on land and water use and pest control methods [13,28].

To ascertain consumers' priorities when selecting where to purchase fruits and vegetables, we applied a condensed triad of economic, social, and environmental factors [12] (Table 2).

Table 2. Consumers' place of purchase preferences.

Main criteria	Sub-criteria	Rationale
A. Economic factors	A_1: Cheap products and discounts A_2: Proximity to workplace/home A_3: Diversity of varieties and products	The economic decision factors can be summarized as economic and time-saving (convenience). Price is a dominant factor [34] and a main barrier to organic purchasing [49].
B. Social factors	B_1: Fair prices to farmers B_2: Job creation B_3: Good consumer services	Factors contributing to social welfare are fair remuneration to producers and local community support [50]. In contrast, consumers can prioritize better service.
C. Environmental factors	C_1: Purchase in bulk C_2: Organic production C_3: Seasonal and local product	Environmental factors include packaging reduction, organic production, a lower carbon footprint [33], and local production [32]. Local origin as a proxy to the SFSCs concept [43].

Regarding other stakeholders, four main categories of criteria concerning selecting tomato suppliers were identified (Table 3), based on the major AFSC performance criteria and their key indicators, as identified by Sufiyan et al. [51].

Table 3. Stakeholders' fruit and vegetable supply preferences.

Main criteria	Sub-criteria	Rationale
A. Affordability / availability	A_1: Low prices A_2: Quantity discounts A_3: Availability of product	Most businesses prioritize affordability [40], although others may prefer product availability [37].
B. Accessibility	B_1: Proximity of the supplier B_2: The same supplier for all products B_3: Quick delivery after ordering	Agility [51] or responsiveness [38] are major performance criteria, meaning that supplies must be accessible in terms of distance, time, and diversification.
C. Communication	C_1: Allowance of electronic ordering C_2: Transparent information on prices C_3: Close personal contact	Partnerships and services are key in stakeholders' decision-making [40], including means of communication (digital–personal) and transparency/trust [51].
D. Product quality	D_1: Quality (size, color, conditions, etc.) D_2: Freshness of the product D_3: Produced by local farmers	Quality is measured in terms of organoleptic qualities, product freshness, and proximity. Local procurement is included as a proxy for environmental concerns [41,42].

2.3. The Analytical Hierarchy Process (AHP) Method

The AHP methodology [46] was used to measure the relative importance of the proposed criteria for each stakeholder. In this research design, we prioritized providing stakeholders with a complete set of decision-making criteria over the evaluation of alternatives, which would have implied a greater effort for the respondents and would have jeopardized their participation. Since we only want to compare independent criteria, using AHP is a suitable way to produce adequate and comparable results when compared to other techniques like fuzzy AHP or the analytic network process [37]. Following the example in Figure 2, criteria were presented in two levels of a hierarchy. Through straightforward paired comparisons of every possible combination of criteria and sub-criteria, stakeholders were asked to make a series of decisions on a scale from 1 to 9 (Figure 3).

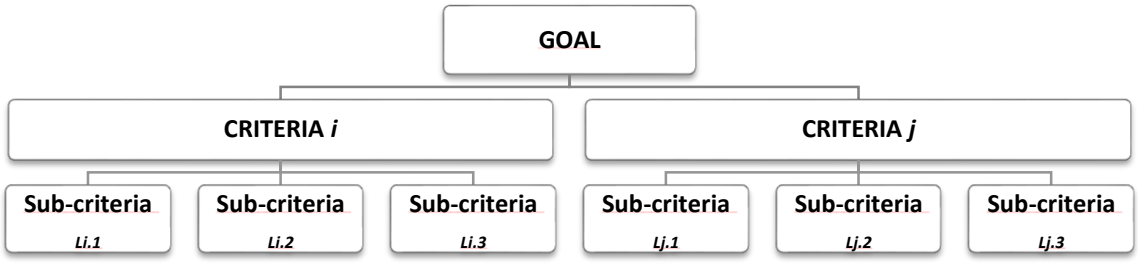

Figure 2. Decision-making hierarchy tree with two main criteria and six sub-criteria.

CRITERIA 1									CRITERIA 2							
9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9

	Definition	Explanation
1	Equal importance	Two criteria contribute equally to the objective
2	Weak importance	Between equal and moderate
3	Moderate importance	Experience and judgment slightly favor one criterion over another
4	Moderate plus	Between moderate and strong
5	Strong importance	Experience and judgment strongly favor one criterion over another
6	Strong plus	Between strong and very strong
7	Very strong importance	A criterion is favored very strongly over another
8	Very strong plus	Between very strong and extreme
9	Extreme importance	The evidence favoring one criterion over another is of the highest possible order of affirmation

Figure 3. Scale used in the pairwise comparison [46].

The results were plotted in a Saaty Matrix (Ak):

$$A_k = \begin{bmatrix} a_{11k} & a_{12k} & \dots & a_{1nk} \\ a_{21k} & a_{22k} & \dots & a_{2nk} \\ \dots & \dots & a_{ijk} & \dots \\ a_{n1k} & a_{n2k} & \dots & a_{nnk} \end{bmatrix} \quad (1)$$

where aijk represents the comparison value between criteria i and criteria j, resulting in a number ranging from 1/9 to 9 corresponding to the paired comparison answer. Note that aijk = 1/ajik, as both reflect the same paired comparison. Then, the row geometric mean (RGM) was calculated to obtain the relative importance of each criterion:

$$\hat{w}_{ik} = \sqrt[n]{\prod_{i=1}^{i=n} \hat{a}_{ijk}} \qquad \forall \quad i,\ j \in n \quad (2)$$

where its weight ($\hat{w}_{ik}$) was calculated as the geometric mean of the comparisons ($\hat{a}_{ijk}$) in the corresponding row of the Saaty matrix (Ak). Once the RGM weights were calculated, the results were normalized and expressed as a percentage:

$$\sum_{i=1}^{i=n} \hat{w}_{ik} = 1 \quad (3)$$

Finally, the results showed the geometric means of all the respondents in the sample.

2.4. Bi-Variate Correlations

We correlated the percentage-formatted AHP results with the sociodemographic factors and stakeholder opinions obtained from survey S1. We utilized confidence percentages of 10 percent, 5 percent, and 1 percent to compute Pearson's correlation coefficients (PCCs) in order to identify which stakeholders prioritize particular preferences over others according to their characteristics.

The sociodemographic variables included age, gender, and educational level. The economic position was proxied by the feeling of risk and uncertainty, in addition to the level of income in the case of consumers. In the case of farmers, we included variables related to the business model: years of experience, market knowledge, production methods (organic, greenhouse), and distribution practices. On the demand side, the attributes of tomatoes preferred by consumers and stakeholders when purchasing them were also added. To determine the opinions of the three segments of the chain, respondents were asked to agree with 8 statements about the current AFSC to determine their level of criticism. In turn, the new ecological paradigm (NEP) scale was used to determine whether the respondent had a more anthropocentric or ecocentric view [52]. Tables of frequencies and distributions of the qualitative and quantitative variables used in the analysis are included in Appendix A (Tables A1–A6).

3. Results

First, the average AHP results are presented, describing prioritized preferences by stakeholder type (Section 3.1). Second, the profiles of stakeholders most willing to participate in SFSCs are described based on their sociodemographic and other explanatory variables (Section 3.2).

3.1. AHP Results

3.1.1. Farmers' Agri-Business Objectives

When analyzing tomato farmers' agri-business preferences (Table 4), the AHP results showed that economic criteria and their sub-criteria are prioritized; thus, "Increase economic efficiency" (*GA* = 32.71%) and "Improve productivity" (A_3 = 17.30%) were the top criteria, and "Improve production quality" (*GB* = 22.47%) and "Invest in knowledge and machinery" (B_1 = 12.56%) were the second most prioritized criteria. However, in this regard, it is important to note that economic factors had the highest standard deviation, which implies a greater diversity among farmers' views. In contrast, objectives linked to "Optimize distribution" (*GC* = 12.31%) and "Social improvement" (*GD* = 14.61%) appeared in last place. Meanwhile, "Environmental objectives" (*GE* = 17.91%) were prioritized over social factors, with the "Rational use of water" (E_3 = 8.15%) as a remarkable factor. "Sell directly to the consumer" (C_1= 4.85%) was the key factor in inferring farmers' preferences for SFSCs and appeared to be one of the lowest. However, the standard deviation suggests that this preference may differ depending on the individual farmers' characteristics.

Table 4. AHP results for farmers' preferences.

AHP sub-criteria and main criteria	N	N. RGM [1]	Min	Max	GSD [2]
A_1. Lower production costs	48	8.03%	0.18%	40.90%	1.098
A_2. Increase the selling price	48	7.38%	0.18%	29.10%	1.048
A_3. Improve productivity	48	17.30%	1.43%	48.98%	1.103
B_1. Invest in knowledge and machinery	48	12.56%	1.15%	30.52%	1.068
B_2. Adopt traditional varieties	48	6.00%	0.43%	16.34%	1.034
B_3. Adopt commercial varieties	48	3,91%	0.70%	10.45%	1.019
C_1. Sell directly to the consumer	48	4.85%	0.20%	23,07%	1.051
C_2. Obtain a pre-harvest sales contract	48	2.29%	0.15%	8.12%	1.017
C_3. Minimize distribution costs	48	5.16%	0.31%	23.07%	1.045
D_1. Contract and ensure decent working conditions	48	6.34%	0.23%	15.75%	1.042
D_2. Maintain the agricultural activity of my locality	48	4.80%	0.59%	28.21%	1.042
D_3.Ensure affordable food for the surrounding population	48	3,47%	0.27%	12.79%	1.027
E_1. Reduce phytosanitary	48	4.99%	0.28%	27.75%	1.049
E_2.Maintain soil fertility	48	4.77%	0.34%	13.02%	1.029
E_3. Rational use of water	48	8.15%	0.27%	30.79%	1.069
GA. Increase economic efficiency	48	32.71%	1.96%	64.38%	1.143
GB. Improve production quality	48	22.47%	4.21%	41.86%	1.087
GC. Optimize distribution	48	12.31%	2.46%	51.91%	1.091
GD. Social improvement	48	14.61%	2.17%	39.66%	1.075
GE.Environmental objectives	48	17.91%	4.03%	58.58%	1.108

[1] N. RGM: normalized Row Geometric Mean. [2] GSD: Geometric Standard Deviation.

3.1.2. Consumers' Place of Purchase for Fruit and Vegetable Preferences

According to the findings, "Economic factors" (*GA* = 39.02%) and "Environmental factors" (*GC* = 32.84%) played a major role when consumers were deciding where to purchase fruit and vegetables (Table 5). Specifically, consumers preferred a purchasing place with a "Diversity of varieties and products" (A_3 = 17.15%), which is related to convenience. In contrast, the least significant requirements were related to social factors; for example, "Job creation" (B_2 = 6.36%), i.e., the idea that the business should ensure employment development in the area. However, the lowest-ranked criterion was "Organic production" (C_2 = 5.23%). "Cheap products and discounts" (A_1 = 10.0%), i.e., affordability, was the sub-criterion where consumer dissent was most evident. In terms of SFSCs, the preference for "Seasonal and local products" (C_3 = 13.91%) appeared as the second most preferred sub-criterion, while concern for "Fair prices to farmers" (B_1 = 12.54%) was a highlighted social factor. Both imply a considerable interest in the sustainable and local procurement of fruit and vegetables.

Table 5. AHP results for consumers' place of purchasing preferences.

AHP sub-criteria and main criteria	N	N. RGM [1]	Min	Max	GSD [2]
A_1. Cheap products and discounts	69	10.00%	0.28%	63.14%	1.188
A_2. Proximity to workplace or home	69	11.87%	0.73%	58.50%	1.132
A_3. Diversity of varieties and products	69	17.15%	0.39%	52.51%	1.123
B_1. Fair prices to farmers	69	12.54%	0.32%	55.02%	1.106
B_2. Job creation	69	6.36%	0.48%	52.26%	1.076
B_3. Good consumer services	69	9.24%	0.62%	63.69%	1.124
C_1. Purchase in bulk	69	13.69%	0.48%	39.57%	1.107
C_2. Organic production	69	5.23%	0.26%	50.00%	1.076
C_3. Seasonal and local products	69	13.91%	0.23%	59.00%	1.150
GA. Economic factors	69	39.02%	4.45%	78.70%	1.281
GB. Social factors	69	28.15%	6.67%	81.82%	1.225
GC. Environmental factors	69	32.84%	4.45%	79.14%	1.263

[1] N. RGM: normalized Row Geometric Mean. [2] GSD: Geometric Standard Deviation.

3.1.3. Restaurants, Industry, and Retailers' Supply Preferences

Regarding other stakeholders, it is important to highlight the predominant weight of the economic criteria "Affordability/availability" (*GA* = 35.5%) when stakeholders make their supply decisions (Table 6). This is in line with the importance attached to economic sustainability attributes by experts, as reported by Bappy et al. [47], which outweighs other criteria. In this research, the most preferred sub-criteria were "Low prices" (A_1 = 15.75%), "Availability of product" (A_3 = 13.85%), and "Quality (size, color, conditions, etc.)" (D_1 = 11.77%). Regarding SFSCs, the preference for "Production from local farmers" (D_3 = 8.18%) was in the middle of stakeholders' priorities.

Table 6. AHP results for stakeholders' supply preferences.

AHP sub-criteria and main criteria	N	N. RGM [1]	Min	Max	GSD [2]
A_1. Low prices	89	15.75%	0.20%	53.22%	1.178
A_2. Quantity discounts	89	5.85%	0.32%	40.19%	1.061
A_3. Availability of product	89	13.85%	0.23%	52.52%	1.149
B_1. Proximity of the supplier	89	7.34%	0.40%	37.94%	1.076
B_2. The same supplier for all products	89	5.53%	0.36%	24.95%	1.047
B_3. Quick delivery after ordering	89	8.21%	0.33%	43.44%	1.085
C_1. Allowance of electronic orders	89	5.05%	0.14%	40.41%	1.084
C_2. Transparent information on prices	89	3.98%	0.20%	17.35%	1.034
C_3. Close personal contact	89	5.87%	0.31%	41.93%	1.068
D_1. Quality (size, color, conditions, etc.)	89	11.77%	0.32%	49.43%	1.123
D_2. Freshness of the product	89	8.62%	0.63%	46.06%	1.098
D_3. Produced by local farmers	89	8.18%	0.29%	52.92%	1.115
GA. Affordability/availability	89	35.45%	3.20%	71.19%	1.303
GB. Accessibility	89	21.09%	3.90%	58.47%	1.135
GC. Communication channels	89	14.89%	2.83%	58.47%	1.133
GD. Product quality	89	28.56%	3.47%	70.00%	1.233

[1] N. RGM: normalized Row Geometric Mean. [2] GSD: Geometric Standard Deviation.

3.2. Profiling of Stakeholders Most Interested in Participating in SFSCs

3.2.1. Profiling of Farmers Most Likely to Participate in SFSCs

Focusing on sociodemographic variables (Appendix B, Table B1), female farmers attached greater importance to social (*GC*) ($p > 0.1$) and environmental (*GE*) ($p > 0.05$) factors and less importance to economic sustainability (*GA*, *GB*) ($p > 0.05$), while the oldest farmers attached greater importance to social factors (*GD*) ($p > 0.05$) and less importance to the selling price (A_2) ($p > 0.1$). Other variables, such as education level, uncertainty, and years of experience in tomato production, showed no remarkable results.

Depending on the farm characteristics, the greater the quantity and productivity of tomatoes produced, the greater the concern for environmental sustainability (*GE*) ($p > 0.01$). Organic tomato farmers attached greater importance to a higher selling price (A_2) ($p > 0.05$), while greenhouse tomato growers had a lower preference for direct sales (C_1) ($p > 0.05$). Farm size did not appear as an explanatory variable for greater interest in SFSCs, in contrast to other studies where a smaller cultivated area influenced this interest [53]. Farmers who were closer to the Central Market, i.e., based in the Baix Llobregat region, were more willing to sell directly to consumers (C_1) ($p > 0.05$). Regarding distribution channels, selling to wholesalers had no observed influence on preferences. Farmers selling directly to the consumer tended to attach less importance to social factors (*GD*) ($p > 0.05$) and had greater preferences for improvements in quality (*GB*) ($p > 0.1$).

Finally, a more critical opinion of the value chain was related to environmental sustainability preferences (*GE*) ($p > 0.01$) and less related to economic efficiency (*GA*) ($p > 0.05$). Regarding the NEP, a more ecological vision was correlated with a lower interest in distribution (*GC*) ($p > 0.05$), but a greater interest in economic efficiency (*GA*) ($p > 0.1$).

3.2.2. Profiling of Consumers Most Likely to Participate in SFSCs

Based on the sociodemographic variables (Appendix B, Table B2), women attached more importance to buying in bulk (C_1) ($p > 0.01$) and less to affordability (A_1) ($p > 0.1$) when selecting their place for purchasing fruit and vegetables. The better the economic position of the consumers (and the lower the perception of risk), the less concern for food affordability (A_1) ($p > 0.01$) and the greater the concern for a fair price from producers (B1) ($p > 0.05$). Thus, a greater interest in SFSCs may be linked to higher levels of economic welfare.

When asked which attributes consumers consider most important for tomatoes, those who attached the most importance to price tended to prioritize economic factors (*GA*) ($p > 0.01$) and prioritize environmental factors less (*GC*) ($p > 0.01$); meanwhile, affordability (A_1) was less prioritized by those consumers who valued local production more ($p > 0.05$) and specific brands ($p > 0.1$). Concerning consumers' opinions, a lower prioritization of economic factors (*GA*) was related to consumers' concern about the environmental impact of their purchases ($p > 0.1$), e.g., affordability (A_1) ($p > 0.1$) and convenience of purchase (A_2) ($p > 0.01$). This concern was also correlated with the preference for environmental factors (*GC*) ($p > 0.05$) and buying local and seasonal products (C_3) ($p > 0.05$). Regarding the NEP, the more significant the ecological paradigm, the lower the value of social factors (*GB*) ($p > 0.1$) and the higher the value of environmental factors (*GC*) ($p > 0.1$), especially ecological production (C_2) ($p > 0.05$).

As for purchasing habits, the higher the levels of direct purchase from the producer, the greater the interest in organic products (A_1) ($p > 0.05$), while the higher the number of purchases in large establishments, the greater the interest in proximity (convenience) (A_2) ($p > 0.05$), and the lower the interest in the local origin of the food (C_3) ($p > 0.05$). Consumers who tended to pay a higher average price for tomatoes were more likely to value organic production (C_2) ($p > 0.05$).

3.2.3. Profiling of Stakeholders Most Likely to Participate in SFSCs

When it comes to business characteristics (Appendix B, Table B3), the larger the business, the greater the preference for a single supplier (B_2) ($p > 0.05$) and the lower the preference for communication channels (*GC*) ($p > 0.1$). When stakeholders felt more uncertainty and worry about risk, they had a greater preference for a single supplier (B_2) ($p > 0.01$), i.e., better accessibility and convenience, and a preference for discounts (A_2) ($p > 0.01$) rather than lower prices (A_1) ($p > 0.1$).

In relation to their current supply system, having an external supplier and having no relationship with the agricultural sector were both related to an interest in electronic ordering (C_1) ($p > 0.01$) and a lower interest in local production (D_3) ($p > 0.05/0.01$). Businesses that preferred local production (D_3) tended to order more directly, e.g., via WhatsApp ($p > 0.05$) and the telephone ($p > 0.01$). When stakeholders were buying directly from producers, they preferred local procurement (D_3) ($p > 0.01$) and personal contact (C_3) ($p > 0.01$), with lower importance attached to electronic ordering (C_1) ($p > 0.05$). In contrast, specialized distribution was correlated with a higher preference for low prices (A_1) ($p > 0.05$) and a lower preference for local products ($p > 0.05$), personal contact (C_3) ($p > 0.01$), and transparent price information (C_2) ($p > 0.05$).

Based on stakeholders' assessment of tomato attributes, correlations with preferences for local production (D_3) were higher when they valued a specific brand ($p > 0.05$), indications of origin ($p > 0.01$), local production ($p > 0.1$), traditional varieties ($p > 0.1$), and lower levels of plastic ($p > 0.1$). Based on their opinions, the more significant the anthropocentric views were, the less interest was shown in the means of local supply (D_3) ($p > 0.05$), and the more significant the eco-centric views were, the greater the interest shown in the means of local supply ($p > 0.05$). Moreover, the greater the distance between ecocentric and anthropocentric views, the greater D_3 was ($p > 0.01$). The eco-centric view was also related to a lower interest in prices (A_1) ($p > 0.01$), and the anthropocentric view was related to an interest in electronic ordering (C_1) ($p > 0.01$).

4. Discussion

It is imperative to emphasize the prevalent significance of economic factors in the decision-making process of stakeholders regarding marketing within the AFSC. This is in agreement with the importance attached to economic sustainability attributes by experts, such as those reported by Bappy et al. [47] in their study, where economic criteria outweighed social and environmental criteria, with a total weight of 63% of priority, 46% of which was attributable to "profitability". In this research, most of the factors that were highly evaluated were linked to profit: productivity in farmers and affordability in consumers and other stakeholders. Other factors relating to the convenience of purchasing [54] were significantly considered by demand stakeholders: "diversity of fruit and vegetables" in the case of consumers, and "availability" in other stakeholders.

As far as producers are concerned, the tomato farmers involved in this study prioritized aspects of improved agricultural performance, with "improve productivity" and "invest in knowledge and machinery" at the forefront, rather than economic improvements related to distribution ("sell directly to the consumer", "obtain a pre-harvest sales contract", and "minimize distribution costs") and the price received ("increase the selling price"). In light of these results, distribution challenges appear to be relegated to the sidelines, which prevents us from confirming hypothesis H1.1. This can be seen as a general lack of interest in SFSCs, as "farmers are not eager to participate in newly established short food supply chains, especially if it involves selling large shares of their yield through these channels" [55] (p. 573). Regardless, producers prioritize other structural issues such as profitability, affordability, and efficiency. As Demartini et al. [10] (p. 204) put it, local AFSCs "may not be good per se", and should, therefore, be seen as an opportunity to improve producers' profitability and enhance the marketability of their products. This is in line with the ambiguous relationship between SFSC participation and economic performance noted by Chiaverina et al. [56] (p. 409): "policymakers and outreach agencies should be aware that SFSCs will not necessarily improve the purely economic performance of farms" but should consider other economic, social, and environmental benefits that make SFSCs attractive.

Aside from economic factors, other factors also affected demand-side purchasing decisions. Moreover, there was a considerable level of interest in local procurement, particularly among consumers, whereby 13.9% of the purchasing decisions are driven by "seasonal and local products", being the second-most prioritized sub-criterion. These results allow us to conclude that, as H1.2 claimed, consumers had a positive perception of the products' local origin, which is an important component of SFSCs [12] and a feature of supply chain sustainability [47]. On the other hand, restaurants, retailers, and processing companies had a more moderate interest in fruits and vegetables "produced by local farmers" (8.2%), though it was still a significant factor—ranking sixth in the tomato value chain. This is somewhat consistent with H1.3. According to an exploratory study conducted in the Italian region of Marche, there are logistical and communication barriers preventing restaurateurs from using more local and organic products, even though they are generally satisfied with their current suppliers in terms of quality and business prestige [41] (p. 1728). In summary, demand-side stakeholder responses indicate the existence of chain shortening potential [10,11], i.e., a chance to promote SFSCs, even though producer responses prevent H1 from being fully confirmed. Furthermore, the stakeholders placed a high value on the product's quality and freshness, which are crucial characteristics for the promotion of SFSCs. The fact that they were given a significant value suggests that sustainability actions should be connected to the quality of locally produced and sustainable products.

In relation to the farmers' business model, the data are insufficiently consistent to establish whether preferences for distribution are influenced by a less market-oriented model, which prevents H2.1 from being confirmed. As for the demand side, consumers and other stakeholders indicated that price plays a significant role in their decision-making process [34]. According to our research, consumers who placed a higher value on price were more likely to place a lower value on organic production and local origin when buying tomatoes [49], while convenience was given more weight, validating hypothesis H2.2. We can link these results to the fact that consumers with a better economic situation and financial security tended to prioritize affordability less and attach greater importance to social factors, such as the price received by farmers. Thus, the respondents'

convictions and purchasing power both have a significant impact on their likelihood of engaging in SFSCs [32]. Some research has highlighted how opinions play a relevant role in purchasing preferences and WTP [57], especially among more conscious consumers [9]. In this research, the more socially and environmentally conscious consumers demanded local products more often, with a higher WTP [57]. This demand for produce of a local origin was also correlated with consumers who usually tended to avoid purchasing from large retailers. In the case of other stakeholders, a critical opinion of the current AFSC was correlated with a higher interest in local procurement, as well as a more eco-centric view using the NEP. From the demand perspective, these results corroborate H2.3; however, the producer perspective yields not entirely consistent results.

Demand stakeholders made decisions about the supplier or the place of purchase based primarily on environmental rather than social criteria in terms of sustainability [33]. As a result, demand appears to prioritize aspects of sustainability such as organic production [31] over the social dimension of sustainability. This is consistent with the findings of Lami et al. [9], who found that consumers were more likely to associate SFSCs with producer proximity than with the number of intermediaries.

5. Conclusions

A holistic approach is necessary when examining the sustainability of AFSCs, as it affects every step in the value chain. In this study, we suggested incorporating a preference-based approach and taking into account the prioritization factors that influence the decision-making of all chain stakeholders, taking into account several sustainability dimensions. In assessing the degree to which sustainable innovations, including SFSCs, are applicable in the Catalan tomato value chain, we additionally delineated the profile of the actors most interested in SFSCs in accordance with stakeholder preferences for local procurement. Profitability and affordability were the primary determinants in this case study when it came to market decisions; nevertheless, additional factors including product quality, local procurement, environmental sustainability, and product affordability were also given substantial support. The results indicated that there is potential to promote SFSCs as a more sustainable alternative for the sector, provided that farmers take steps to ensure their profitability and competitiveness. The consumer and other stakeholder preferences for the local origin of food products represent a strategic opportunity to prioritize factors such as short chains and marketing decisions for the Catalan tomato farmers, as well as targeting the most interested stakeholders.

For a globally optimized analysis of the supply chain, the implementation of MCDM analysis techniques, such as AHP, proved to be appropriate. Nevertheless, due to the internal and external heterogeneity among consumers, stakeholders, and farmers, it is imperative to consider further factors that might have eluded this study. During the criteria selection process, we prioritized the understanding of different links in the AFSC, adapted to the Catalan tomato context. While maintaining an emphasis on the particulars of each case, future research should continue to develop the analytical framework necessary to standardize the chain's overall criteria. This approach has the potential to facilitate advancements in the investigation and implementation of sustainable alternatives within AFSCs that are acceptable to all stakeholders.

Author Contributions: Conceptualization, A.M.i.M., Z.K., and O.V.G.F.; data curation, A.M.i.M. and Z.K.; formal analysis, A.M.i.M. and Z.K.; funding acquisition, Z.K.; investigation, A.M.i.M., Z.K., and O.V.G.F.; methodology, A.M.i.M., Z.K., and O.V.G.F.; project administration, A.M.i.M., Z.K., and O.V.G.F.; supervision, Z.K.; validation, Z.K.; visualization, A.M.i.M.; writing—original draft, A.M.i.M.; writing—review and editing, A.M.i.M. and Z.K. All authors have read and agreed to the published version of the manuscript.

Funding: This study belongs to the project Lab4Supply, "Multi-agent agri-food living labs for new supply chain Mediterranean systems. Towards more sustainable and competitive farming addressing consumers' preferences and market changes", funded under the PRIMA—Partnership for Research and Innovation in the Mediterranean Area—programme-Section 2, Call 2020, Thematic Area Agri-food Value Chain. PRIMA Lab4supply received funding from participating National Research Agencies: in Spain, by "Ministerio de Ciencia e Innovación" (MCIN)—"Agencia Estatal de Investigación" (AEI) (DOI 10.13039/501100011033), under grant agreement PCI2021-121923. The PRIMA programme is supported by Horizon 2020, the European Union's Framework Programme for Research and Innovation. The content of this paper reflects only the author's view, and the funding agencies are not responsible for any use that may be made of the information it contains.

Institutional Review Board Statement: The study took place in Catalonia (Spain) and was carried out in the Spanish and Catalan languages. Ethical approval was obtained from the ethics committee of the Center for Agri-food Economics and Development (2022-5).

Informed Consent Statement: Informed consent was obtained from all subjects involved in this study.

Data Availability Statement: The data presented in this study are available upon request from the corresponding author.

Acknowledgments: The authors would like to thank the professionals who contributed to data collection and the respondents who participated in the study. We thank the editors and reviewers for their thoughtful comments and suggestions.

Conflicts of Interest: The authors declare no conflicts of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

Appendix A

Table A1. Frequencies of farmers' qualitative variables.

	Variables	Frequencies	N	Valid %	Cumulative %
Sociodemographic Data	Gender	Male	38	79.2%	79.2%
		Female	10	20.8%	100%
	Age group	18–25	7	14.6%	14.6%
		26–35	18	37.5%	52.1%
		36–49	19	39.6%	91.7%
		50–65	4	8.3%	100%
	Education level	Uncompleted primary studies	8	18.2%	18.2%
		Primary studies	21	47.7%	65.9%
		Secondary studies	15	34.1%	100%
		Missing	4		
	Uncertainty How uncertain do you feel?	Not at all	4	8.3%	8.3%
		Slightly	17	35.4%	43.8%
		Moderately	10	20.8%	64.6%
		Considerably	16	33.3%	97.9%
		Totally	1	2.1%	100%
	Years of experience in tomato production	Less than 5 years	4	8.3%	8.3%
		6–10	15	31.3%	39.6%
		11–15	12	25.0%	64.6%
		16–20	8	16.7%	81.3%
		21–25	3	6.3%	87.5%
		26–30	1	2.1%	89.6%
		31 or more	5	10.4%	100%
Farm	Organic tomato	No	20	41.7%	41.7%
		Yes	28	58.3%	100%
	Greenhouse-grown tomato	No	37	77.1%	77.1%
		Yes	11	22.9%	100%
Distribution	Supporting SFSC	No	6	12.5%	12.5%
		Yes	42	87.5%	100%
	Knowledge on tomato value chains	Poor	4	8.3%	8.3%
		Fair	14	29.2%	37.5%
		Good	22	45.8%	83.3%
		Very good	5	10.4%	93.8%
		Excellent	3	6.3%	100%
	Eco-labeled	No	41	85.4%	85.4%
		Yes	7	14.6%	100%
	Distance from central market	Baix Llobregat	18	37.5%	37.5%
		Other	30	62.5%	100%
	Problematic distribution	Low	18	37.5%	37.5%
		Medium	29	60.4%	97.9%
		High	1	2.1%	100%

Table A2. Distribution of farmers' quantitative variables.

	Variable	N	Min	Max	Mean	Std. Dev.
Farm	Total quantity (Kg)	48	48.00	54,000.00	2977.04	8352.54
	Productivity (Kg per m^2)	48	0.29	12.16	2.35	2.10
	Avg. cost of production of 1 kg of tomatoes	48	0.89 €	2.00 €	1.19 €	0.21 €
Supply Chain	% Wholesaler	48	0%	100%	22%	0.306
	% Direct sales	48	0%	100%	37%	0.376
	% e-commerce	48	0%	51%	2%	0.082
	% Retailers	48	0%	100%	24%	0.275
	% Supermarkets	48	0%	100%	9%	0.232
	% Industries	48	0%	15%	0%	0.023
	% Restaurants	48	0%	100%	4%	0.164
	% Cooperatives	48	0%	100%	3%	0.147
Opinion	Critical opinion on the current AFSC [1]	48	5	9	6.41	0.71
	NEP [2] Anthropocentric	48	6	22	15.88	3.21
	NEP Eco-centric	48	20	34	27.77	3.05
	Difference eco.–anthrop.	48	0	28	11.90	4.82

[1] The critical opinion on the current AFSC is constructed based on 8 statements (Likert scales of 1 to 9): (1) farmers do not receive a fair price for their product; (2) intermediaries do not ensure an adequate and efficient food supply; (3) local agriculture is losing importance because it cannot compete with imported foods; (4) subsidies of agricultural activities make the agricultural and food sector less competitive; (5) consumers do not pay a fair price for farm products; (6) price information is neither transparent nor available; (7) the elimination of intermediate marketing steps and direct access to the customer would simplify the chain and lower prices; (8) over-regulation hinders the efficient functioning of the food supply chain. [2] New ecological paradigm (NEP) [52] summarizes 4 anthropocentric opinions (the balance of nature is strong enough to deal with the impacts caused by economic development; over time, humans can learn how nature works to be able to control it; human ingenuity will ensure that we do not make the earth an uninhabitable place; humans have the right to modify the environment to adapt it to their needs) and 4 eco-centric opinions (plants and animals have as much right to exist as humans; the balance of nature is very delicate and easily alterable; if things continue as they are, we will soon face a major ecological catastrophe; despite our special abilities, humans are still dependent on the laws of nature), using Likert scales of 1 to 9.

Table A3. Frequency of consumers' qualitative variables.

	Variables	Frequencies	N	Valid %	Cumulative %
Sociodemographic Data	Gender	Male	43	47.3%	47.3%
		Female	44	48.4%	95.6%
		Other	4	4.4%	100%
		Missing	12		
	Age group	18–25	5	5.6%	5.6%
		26–35	14	15.6%	21.1%
		36–49	21	23.3%	44.4%
		50–65	42	46.7%	91.1%
		More than 65	8	8.9%	100%
		Missing	13		
	Education level	Primary studies	1	1.1%	1.1%
		Secondary studies	26	28.6%	29.7%
		University studies	64	70.3%	100%
		Missing	12		
	Economic position: Does the level of your monthly income cover your household expenditure?	Always	5	2.2%	2.2%
		Very Frequently	1	3.3%	5.5%
		Occasionally	2	2.2%	7.7%
		Rarely	3	8.8%	16.5%
		Very rarely	5	30.8%	47.3%
		Never	32	52.7%	100%
		Missing	12		

	Risk. How much do you worry about it?	Not at all	14	15.2%	15.2%
		Slightly	25	27.2%	42.4%
		Moderately	27	29.3%	71.7%
		Considerably	17	18.5%	90.2%
		Totally	9	9.8%	100%
		Missing	11		
Opinion	Environmental impact of food purchasing	Never (1)	3	3.3%	3.3%
		Rarely (2)	3	3.3%	6.7%
		Sometimes (3)	29	32.2%	38.9%
		Regularly (4)	15	16.7%	55.6%
		Often (5)	13	14.4%	70.0%
		Very often (6)	20	22.2%	92.2%
		Always (7)	7	7.8%	100%
		Missing	13		
	Social impact of food purchasing	Never (1)	3	3.3%	3.3%
		Rarely (2)	6	6.7%	10.0%
		Sometimes (3)	27	30.0%	40.0%
		Regularly (4)	14	15.6%	55.6%
		Often (5)	15	16.7%	72.2%
		Very often (6)	20	22.2%	94.4%
		Always (7)	5	5.6%	100%
		Missing	13		
Habits	Direct purchasing from farmers	No	93	90.3%	90.3%
		Yes	10	9.7%	100%
	Large retail	No	44	42.7%	42.7%
		Yes	59	57.3%	100%
	Small retail	No	43	41.7%	41.7%
		Yes	60	58.3%	100%

Table A4. Distribution of consumers' quantitative variables.

	Variable	N	Min	Max	Mean	Std. Dev.
Opinion	Critical opinion on the current AFSC	103	4.50	9.00	6.45	0.85
	NEP Anthropocentric	91	4	31	19.63	7.59
	NEP Ecological	90	6	40	32.94	6.32
	Difference eco.–anthrop.	90	−6	36	13.39	10.28
Tomato Attributes	Brand	103	1	7	3.23	1.81
	A specific variety	103	1	7	4.10	1.85
	Indication of origin	103	1	7	4.52	1.71
	Produced locally	103	1	7	5.41	1.44
	Seasonal product	103	1	7	5.67	1.27
	Organic product	103	1	7	3.86	1.69
	Product appealing	103	1	7	5.39	1.54
	No plastic packaging	103	1	7	5.07	1.94
	Price	103	1	7	5.50	1.42
Habits	Average paid price (€/kg)	82	1.50 €	5.00 €	2.82 €	0.75 €

Table A5. Frequency of stakeholders' qualitative variables.

	Variables	Frequencies	N	Valid %	Cumulative %
Sociodemographic	Gender	Male	54	52.4%	52.4%
		Female	49	47.6%	100%
		Other/Missing	4		
	Age	26–35	23	22.3%	22.3%
		36–49	59	57.3%	79.6%
		50–65	21	20.4%	100%
		Missing	4		
	Education level	Primary studies	8	7.8%	7.8%
		Secondary studies	57	55.3%	63.1%
		University studies	38	36.9%	100%
		Missing	4		
Business Characteristics	Size of the business	Extra-small	32	29.9%	29.9%
		Small	57	53.3%	83.2%
		Medium	16	15.0%	98.1%
		Large	2	1.9%	100%
	Who purchases tomatoes?	Someone in the company	86	79.2%	79.2%
		An external supplier	21	20.8%	100%
	Connection with agriculture	Yes	86	37.9%	37.9%
		No	21	62.1%	100%
	Supplying system (multiple answer)	WhatsApp	6	5.6%	
		Email	8	7.5%	
		Phone call	31	29.0%	
		Platform/web of supplier	29	27.1%	
		Integrated electronic order system	38	35.5%	
		Purchasing on site	23	21.5%	
Risk Perception	Uncertainty	Not at all	33	31.7%	31.7%
		Slightly	50	48.1%	79.8%
		Moderately	11	10.6%	90.4%
		Considerably	7	6.7%	97.1%
		Totally	3	2.9%	100%
		Missing	3		
	Risk—Worrying	Not at all	41	39.4%	39.4%
		Slightly	47	45.2%	84.6%
		Moderately	2	1.9%	86.5%
		Considerably	14	13.5%	100%
		Totally	0	0.0%	100%
		Missing	3		

Table A6. Distribution of stakeholders' quantitative variables.

	Variable	N	Min	Max	Mean	Std. Dev.
Tomato Attributes	A specific brand	107	1	6	4.54	1.42
	A specific variety	107	1	7	4.64	1.34
	Indication of origin	107	1	6	3.58	1.30
	Produced locally	107	1	7	4.79	1.38
	A traditional variety	107	1	7	3.66	1.15
	Seasonal product	107	1	7	5.39	1.20
	Organic product	107	1	7	3.22	1.43
	Product appealing	107	1	7	5.31	1.28
	No plastic packaging	107	1	7	4.30	1.42
	Price	107	1	7	5.48	1.06
Opinion	Critical opinion on the current AFSC	104	5	8	6.13	0.71
	NEP Anthropocentric	107	0	28	18.64	6.00
	NEP Ecological	107	0	36	26.55	5.99
	Difference eco.–anthrop.	107	-5	25	7.91	7.22

Appendix B

Table B1. Table of correlations of farmers' priority of sustainability attributes and characteristics.

	Sociodem. Data		Farm Characteristics				Distribution		
Variables	**Gender**	**Age Group**	**Total Quantity**	**Avg. Prod. cost**	**Organic Tomato**	**Green-house**	**Know-ledge**	**Eco-Label**	**Baix Llo-bregat**
A_1. Lower production costs							–0.259 *	–0.247 *	
A_2. Increase the selling price	–0.314 **	–0.280 *			0.292 **				
A_3. Improve productivity								0.246 *	
B_1. Invest in knowledge and machinery	–0.324 **							0.266 *	
B_2. Adopt traditional varieties							0.260 *		
B_3. Adopt commercial varieties				0.354 **	–0.248 *			–0.261 *	
C_1. Sell directly to the consumer						–0.292 **			–0.299 **
C_2. Obtain a pre-harvest sales contract									
C_3. Minimize distribution costs							0.255 *	–0.259 *	
D_1. Contract and ensure decent working conditions									–0.243 *
D_2. Maintain the agricultural activity of my locality		0.268 *							
D_3.Ensure affordable food for the surrounding population	0.494 **	0.295 **	0.299 **						
E_1. Reduce phytosanitary	0.308 **		0.622 ***						
E_2.Maintain soil fertility									0.251 *
E_3. Rational use of water	0.305 **		0.383 ***						
GA. Increase economic efficiency	–0.362 **			–0.271 *					
GB. Improve production quality	–0.266 *						0.279 *	0.243 *	
GC. Optimize distribution									–0.288 **
GD. Social improvement	0.242 *	0.336 **							
GE.Environmental objectives	0.364 **		0.512 ***						

Table B1 (continuation). Table of correlations of farmers' priority of sustainability attributes and characteristics.

	% To Aggregated Supply Chains					Critical Opinion and NEP			
Variables	**% Wholesaler**	**% Direct sales**	**% Retailers**	**% Supermarkets**	**% Restaurants**	**Critical opinion**	**NEP Anthropocentric**	**NEP Ecological**	**Difference Eco.–Anthrop.**
A_1. Lower production costs					0.397 ***				
A_2. Increase the selling price							–0.359 **		
A_3. Improve productivity						–0.328 **		0.350 **	0.247 *
B_1. Invest in knowledge and machinery		0.260 *							
B_2. Adopt traditional varieties								–0.246 *	–0.278 *
B_3. Adopt commercial varieties			0.340 **						
C_1. Sell directly to the consumer							0.245 *		
C_2. Obtain a pre-harvest sales contract									
C_3. Minimize distribution costs				0.258 *					–0.253 *
D_1. Contract and ensure decent working conditions		–0.382 ***		0.370 ***	0.311 **			–0.293 **	–0.244 *
D_2. Maintain the agricultural activity of my locality									
D_3.Ensure affordable food for the surrounding population		–0.349 **		0.300 **					
E_1. Reduce phytosanitary						0.260 *			
E_2.Maintain soil fertility									
E_3. Rational use of water						0.386 ***		0.296 **	0.253 *
GA. Increase economic efficiency						–0.290 **			0.256 *
GB. Improve production quality		0.276 *							
GC. Optimize distribution							0.275 *		–0.292 **
GD. Social improvement		–0.354 **		0.324 **					
GE.Environmental objectives						0.412 ***			

Table B2. Table of correlations of consumers' purchasing priorities and characteristics.

	Sociodemographic Data					
Variables	**Gender**	**Age**	**Education Level**	**Household Size**	**Economic Position**	**Risk—Worrying**
A_1. Cheap products and discounts	–0.235 *				–0.390 ***	0.385 ***
A_2. Proximity to workplace or home			–0.230 *			
A_3. Diversity of varieties and products						
B_1. Fair prices to farmers				–0.217 *	0.303 **	–0.304 **
B_2. Job creation		0.213 *		0.296 **		
B_3. Good consumer services		0.231 *				
C_1. Purchase in bulk	0.323 ***	–0.286 **				
C_2. Organic production						
C_3. Seasonal and local products						
GA. Economic factors					–0.256 **	0.241 **
GB. Social factors		0.256 **			0.239 *	
GC. Environmental factors			0.211 *			

Table B2 (continuation). Table of correlations of consumers' purchasing priorities and characteristics.

	Most Important Tomato Attributes								
Variables	**Brand**	**A Specific Variety**	**Indication of Origin**	**Produced Locally**	**Seasonal Product**	**Organic Product**	**Product Appealing**	**No Plastic Pack.**	**Price**
A_1. Cheap products and discounts	–0.332 ***			–0.259 **					
A_2. Proximity to workplace or home									
A_3. Diversity of varieties and products	0.341 ***			0.209 *					0.256 **
B_1. Fair prices to farmers									
B_2. Job creation									
B_3. Good consumer services					0.250 **				
C_1. Purchase in bulk		0.200 *	–0.276 **						
C_2. Organic production						0.327 ***			–0.321 ***
C_3. Seasonal and local products									–0.404 ***
GA. Economic factors									0.335 ***
GB. Social factors					0.229 *				
GC. Environmental factors									–0.358 ***

	Opinions, Concerns, and NEP						Purchasing Habits		
Variables	**Critical Opinion**	**Env. Impact**	**Social Impact**	**NEP Anthropocentric**	**NEP Eco-centric**	**Difference eco.–Anthrop.**	**Direct from Farmers**	**Large Retailers**	**Avg. Paid Price**
A_1. Cheap products and discounts	0.328 ***	–0.241 *							
A_2. Proximity to workplace or home		–0.318 ***	–0.370 ***					0.243 **	
A_3. Diversity of varieties and products									
B_1. Fair prices to farmers									
B_2. Job creation									
B_3. Good consumer services				0.223 *					
C_1. Purchase in bulk					0.247 **				0.245 *
C_2. Organic production				–0.230 *		0.273 **	0.241 **		0.263 **
C_3. Seasonal and local products		0.272 **						–0.279 **	
GA. Economic factors		–0.238 *	–0.262 **					0.270 **	
GB. Social factors						–0.201 *			
GC. Environmental factors		0.286 **				0.219 *	0.215 *	–0.283 **	0.283 **

Table B3. Table of correlations of stakeholders' supplying priorities and characteristics.

	Risk		Business	Opinions and NEP			
Variables	**Uncertainty**	**Risk—Worrying**	**Size of the Business**	**Critical Opinion**	**NEP Anthropocentric**	**NEP Eco-centric**	**Difference Eco.–Anthrop.**
A_1. Low prices	–0.208 *	–0.188 *				–0.299 ***	–0.263 **
A_2. Quantity discounts	0.227 **	0.291 ***					
A_3. Availability of product							
B_1. Proximity of the supplier	0.211 **						
B_2. The same supplier for all products	0.281 ***	0.476 ***	0.239 **				
B_3. Quick delivery after ordering							
C_1. Allowance of electronic orders				–0.203 *	0.279 ***		–0.208 *
C_2. Transparent information on prices			–0.181 *	0.179 *		0.223 **	
C_3. Close personal contact			–0.176 *	0.256 **	–0.212 **	0.177 *	0.275 ***
D_1. Quality (size, color, conditions, etc.)	-0.230 **	-0.183 *		–0.207 *	0.198 *		–0.196 *
D_2. Freshness of the product							
D_3. Produced by local farmers				0.285 ***	–0.252 **	0.253 **	0.354 ***
GA. Affordability/availability						–0.189 *	
GB. Accessibility	0.333 ***	0.334 ***					
GC. Communication channels			–0.196 *				
GD. Product quality							

	Tomato Attributes									
Variables	**A Specific Brand**	**A Specific Variety**	**Indication of Origin**	**Produced Locally**	**A Traditional Variety**	**Seasonal Product**	**Organic Product**	**Product Appealing**	**No Plastic Pack.**	**Price**
A_1. Low prices							–0.191 *			–0.244 **
A_2. Quantity discounts										
A_3. Availability of product										
B_1. Proximity of the supplier							0.207 *		0.189 *	
B_2. The same supplier for all products							0.295 ***	0.229 **	0.182 *	
B_3. Quick delivery after ordering	–0.224 **							0.210 **		
C_1. Allowance of electronic orders	–0.194 *	–0.315 ***		–0.205 *	–0.176 *	–0.218 **			–0.277 ***	
C_2. Transparent information on prices										
C_3. Close personal contact				0.211 **	0.223 **	0.215 **		0.197 *		
D_1. Quality (size, color, conditions, etc.)						–0.247 **	–0.202 *			
D_2. Freshness of the product		–0.225 **								
D_3. Produced by local farmers	0.249 **		0.290 ***	0.202 *	0.191 *				0.192 *	
GA. Affordability/availability										
GB. Accessibility	–0.190 *					0.190 *	0.254 **	0.293 ***	0.200 *	
GC. Communication channels										
GD. Product quality			0.176 *							

Table B3 (continuation). Table of correlations of stakeholders' supplying priorities and characteristics.

	Supplying System							Supplier		
Variables	**WhatsApp**	**Email**	**Phone Call**	**Platform/ Web of Supplier**	**Electronic Order System**	**Purchasing On site**	**Farmers (direct)**	**Specialized Distribution**	**Large Distribution**	**Small Retailers**
A_1. Low prices	–0.181 *							0.252 **		
A_2. Quantity discounts										
A_3. Availability of product										
B_1. Proximity of the supplier				–0.210 **		0.264 **				
B_2. The same supplier for all products										
B_3. Quick delivery after ordering		0.244 **								
C_1. Allowance of electronic orders				0.224 **		–0.195 *	–0.218 **			
C_2. Transparent information on prices					–0.247 **		0.206 *	–0.215 **		
C_3. Close personal contact		0.196 *			–0.194 *		0.315 ***	–0.293 ***		0.199 *
D_1. Quality (size, color, conditions, etc.)			0.205 *	0.193 *		–0.213 **				
D_2. Freshness of the product										
D_3. Produced by local farmers	0.212 **		0.281 ***	–0.187 *	–0.231 **		0.319 ***	–0.255 **	–0.181 *	
GA. Affordability/availability							–0.188 *			
GB. Accessibility										
GC. Communication channels										
GD. Product quality			0.229 **				0.180 *			

Sociodemographic data are not included in the correlation analysis, as the age, gender, and education level of the respondents showed no significant results. Pearson bilateral linear correlations: * Correlation is significant at the 0.1 level (2-tailed). ** Correlation is significant at the 0.05 level (2-tailed). *** Correlation is significant at the 0.01 level (2-tailed).

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