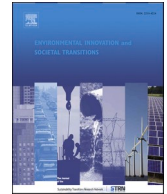




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Environmental Innovation and Societal Transitions

journal homepage: www.elsevier.com/locate/eist

Fruta Feia cooperative: Examining the influence of income on sustainability value and agency among alternative food network consumers

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ARTICLE INFO

Keywords:

Alternative food networks
CBIs
Sustainability transition
Inequality and marginalization
Portugal
Consumer agency

ABSTRACT

Alternative Food Networks gain increasing importance in sustainability transitions of food production, retail, and consumption. This paper explores the role of AFN consumers as critical food sustainability change agents, with a special focus on low-income consumers. It challenges pre-conceived notions that associate sustainable living exclusively with affluent communities, highlighting the substantial influence of economically disadvantaged individuals in shaping sustainable food consumption patterns. Based on a survey of the Portuguese *Fruta Feia* cooperative, the paper examines how perceived income affects sustainable food values, decisions, and practices. Results highlight low-income consumers' significant, yet often overlooked, role in driving changes towards environmentally responsible food systems and practices. This research shifts the focus of sustainability change agency, underscoring the critical role of diverse, particularly financially disadvantaged, consumer groups in championing sustainability in the food sector. It also confirms the importance of AFNs and their members as critical transition stakeholders.

1. Introduction

Global food system sustainability is unattainable whilst it depends on non-renewable resource depletion causing non-internalised negative environmental and social impacts throughout its production, distribution and consumption cycles (FAO, 2017; Holden et al., 2018; Rockström et al., 2020; Willett et al., 2019). It is widely acknowledged that the current food system needs radical reform (Caron et al., 2018; Frank et al., 2020; Gabler et al., 2013; IPCC, 2022; United Nations, 2015; Webb et al., 2020; Willett et al., 2019). However, there is hardly any consensus on how to reform it. Conflicting reform agendas mirror different values, beliefs, worldviews, norms, and 'rules in use' across all stakeholders (Ostrom, 1992; Robbins, 2019; Dasgupta, 2021; Armitage et al., 2020). These manifest in both institutions and infrastructure, constituting specific socio-material orderings guiding people's practices (Reckwitz, 2002; Shove et al., 2012). When such orderings become institutionalised and self-reinforcing, we speak of "regimes". Well-aligned, fairly stable and path-dependent, a regime evolves either through incremental changes of 'rules in use' or by exogenous shocks introduced by radical practices (Rip and Kemp, 1998; Smith et al., 2005).

To deliver desired regime change, transformative pathways towards sustainability (Geels and Schot, 2007; Geels, 2011; Linnér and

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<https://doi.org/10.1016/j.eist.2024.100850>

Received 12 July 2023; Received in revised form 31 March 2024; Accepted 17 April 2024

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Wibeck, 2020) focus on the systemic multilevel interplay between different societal subsystems across space and time. In other words, they focus on the causalities of influence between micro-level actors and macro-level structures. Multiple authors argue that triggers of regime change mostly emerge at its fringes, at the niche level where community-based initiatives (CBIs) form, evolve and spread innovative practices (Geels and Schot, 2007; Göpel, 2016; Smith et al., 2005). CBIs are considered crucial for societal change towards sustainability due to their bottom-up nature and direct impact on local communities. They often build strong community ties and raise awareness about sustainability issues, influencing mindset, value systems and behavioural changes towards sustainability (e.g. Signori and Forno, 2019). By directly involving community members, these networks empower individuals to contribute to and shape sustainable practices, creating a ripple effect of sustainability change at the local level. Moreover, by responding to the specific interests and values of the involved communities, they alleviate unmet societal needs (Molina-Betancur et al., 2021). In addition, CBIs support dignified livelihoods, potentially reducing wider social inequality (Dubé et al., 2015; Hossain, 2016).

Alternative Food Networks (AFNs), a type of CBIs, have emerged as a response to the unsustainability of the dominating food system regime (Holloway et al., 2006; Maye, 2013). They advance sustainable food practices by promoting local, organic, and ethical food production and consumption whilst fostering social equity and democratic practices among their members (Feenstra, 2002, 1997; Michel-Villarreal et al., 2019). AFNs encompass community-supported agriculture, solidarity purchasing groups, farmer's markets or food cooperatives, etc. (Fonte, 2013; Seyfang, 2006); the support of short food supply chains (Jarzebowski et al., 2020); the consumption of locally produced organic and seasonal products (Seyfang, 2007); the avoidance of products generating packaging waste (Beitzen-Heineke et al., 2017); the consumption of plant-based products (Sabaté and Soret, 2014) or production processes that respect social standards (e.g. fair trade, no child-labour, fair wages) (Goworek, 2011). They envisage the localisation of food production and retail and aim to shift consumer practices, potentially reducing resource wastage and environmental impacts of food systems (Fonte, 2008).

A specific type of AFNs are food cooperatives aiming to connect consumers and food producers of a local region. Perceived as increasingly important food system actors, food cooperatives reduce actual and perceived food-miles, food waste and forward more sustainable ways of food production, such as organic and seasonal agriculture (Forsell and Lankoski, 2015; Katchova and Woods, 2013; Phillips, 2012). This article's focus is the Portuguese zero food-waste-oriented non-profit food cooperative *Fruta Feia* ("Ugly Fruit"). The aim is to test the potential of *Fruta Feia* and its member-consumers to turn into critical sustainability transition agents. Moreover, while prevailing myths identify predominantly the wealthy as sustainable citizens, failing to account for the unseen but significant sustainability agency of lower income citizens, this paper sets out to empirically examine the influence of perceived economic condition (comfort) on change agency, challenging the below-mentioned sustainable citizenship myths:

Myth 1: Sustainable citizenship depends on economic capacity.

Myth 2: Sustainable consumption is an upper-class privilege and practice.

Myth 3: CBIs can only have a marginal impact on a wider transition to sustainability.

The remainder of this article is structured as follows. Section 2 reviews the literature on sustainability transition change agency, focusing on critically assessing inequality issues related to change agency. Section 3 outlines the methodological framework. Section 4 breaks down and systematises the main survey results. Section 5 discusses these in light of a set of myths regarding sustainable change agency related to food consumption and sustainability transitions in general. Section 6 concludes focusing on the future role of CBIs/AFN and their consumers as change agents towards a societal sustainability transition.

2. Theoretical framework: sustainability transition agency

Sustainability Transition Agency refers to the capacity of individuals, groups, and institutions to influence and drive sustainability transitions via their actions and choices. Following Göpel (2016), individual and shared practice changes linked to this transition agency are driven by changes in dominant mindsets and value systems. Therefore, it is critical to analyse individuals' daily life values and worldviews, and the routines and practices based on them which sit at the root of their *sustainability transition agency*.

2.1. The role of consumers as change agents

In this light, this paper looks beyond the AFN *Fruta Feia* to focus on its member consumers. As it is known, consumers can play a critical role as transition stakeholders towards sustainable food systems. This claim emerges within the 'ethical consumerism' concept, attributing a positive societal change agency to consumers via their market transactions (Johnston, 2008; Korthals, 2015). Their daily consumption choices influence production and supply chain dynamics with potentially wide impacts. By opting for local, organic, or fair-trade products, consumers contribute to the economic viability and growth of sustainable production systems (Seyfang, 2009; Haider et al., 2022; Velenturf and Purnel, 2021; Schröder et al., 2020) because their purchasing power ultimately influences producers.

At the root of sustainability changes in consumption practices sit shifts in individual and collective values, visions, and material infrastructures (Fonte, 2013; Warde, 2014). Such consumer value shifts include, for example, greater awareness of the negative impacts of dominant industrial food production, greater ecological consciousness or ethical responsibility. These shifts can drive market and collective consumption practice changes, normalising sustainable food production (O'Rourke and Lollo, 2015). This – in turn – can be a catalyst for a greater transformation of food systems (Jackson, 2005). Knowledge spread, awareness raising, and political interventions and incentives can lead to a redefinition of 'food culture' that engrains such value changes (Akenji, 2014).

The transition literature proposes to see individual food consumption change agency embedded in wider food practice systems (e.g. Tukker et al., 2017; Shove, 2020), combining practical know-how, material objects, and socially determined meanings (Geels et al., 2015). Transitions would emerge through new system configurations. For example, transition literature has focused on how AFNs,

through changing consumer-producer relations, potentially foster sustainable food regimes transitions (e.g. Fonte, 2013; Randelli and Rocchi, 2017). Other avenues include the assessment of ecological citizenship and sustainable consumption in organic food producer cooperatives (Seyfang, 2006; Rana and Paul, 2017). This paper focuses specifically on the *change agency* of a specific food cooperative and its members in contributing to the sustainability transition in terms of changed individual food consumption values and practices as well as changes in the respective food system landscape. It also highlights the role of education, knowledge dissemination, and collaborative efforts in empowering sustainability change agency. This adds to the growing social practices approach in transition literature, complementing the predominantly socio-technical take on food system transitions (e.g. Hinrichs, 2014; Gazdecki et al., 2021; Goodman, 2003).

2.2. A critical approach to sustainability transition agency

Moreover, there are increasing calls for transition research to engage critical studies on diversity, gender, justice, inequality, inclusion or poverty (e.g. Kaljonen et al., 2021; Preuß et al., 2021; Tirado-Herrero and Fuller, 2021). The post-materialist view suggests that as societies become more affluent, they increasingly prioritise non-material values such as environmental conservation, quality of life or social equity, implying a move towards more environmentally conscious and responsible consumption (Inglehart, 1977; Jackson, 2005). A narrative emerged sustaining that sustainable consumerism is mainly driven by the wealthier societal demographic (Baker, 2003; Franzen and Meyer, 2010). Only privileged white elites would have the necessary environmental awareness, willingness and means to make sacrifices to adjust their lifestyles (Inglehart, 2000; Sublette and Martin, 2013), perceiving their consumption of higher-priced sustainable products as a marker of social distinction (Paddock, 2016). Quite the opposite, recent research has shown that higher income combined with higher education is associated with more *unsustainable* lifestyles, including dramatically high carbon emissions (Kartha et al., 2020; Otto et al., 2019), and specifically in Portugal the highest ecological footprint values (Ferreira et al., 2023). This adds to an alternative narrative of unsustainable consumption being driven by the privileged higher social classes.

On the contrary, recent studies underline the importance of paying more attention to the increasing sustainability agency of 'the poor', for instance, in the areas of agroecology (Martinez-Alier, 2000; Phannan, 2020), energy transition (Luque-Ayala, 2018; Pilloni et al., 2020), waste management (Nawaz et al., 2021), sustainable land/resource management (Dawson et al., 2021; Fröcklin et al., 2018) and local food systems (Chebrolu and Dutta, 2021). This can be read in the tradition of the early environmental movement by poor peasants and indigenous people, mostly from the Global South, opposing environmental destruction and resource depletion (Davey, 2009; Guha, 2017; Martinez-Alier, 2002). Today, marginalised communities in urban areas have turned into critical environmental change agents by establishing projects in neighbourhood revitalisation, urban farming, (urban) gardens and playgrounds, community centres or waste management (Anguelovski and Martínez-Alier, 2014). However, mainstream discourse has largely ignored this. Often, these communities are still perceived as unable to engage with and become active on environmental or sustainability issues because they are deemed too overwhelmed by survival and coping needs (Anantharaman, 2018). Therefore, it is crucial to assess such twisting *mythologies* that influence individuals' worldviews upon which reality is understood and – unsustainable – ways of life are maintained (see Dake, 1992).

3. Methodological framework

This paper presents evidence from the Portuguese *Fruta Feia*, a key AFN food cooperative in the Lisbon Metropolitan Area (LMA). It aims to critically assess sustainability values and practice change regarding food consumption decision-making and everyday life linked to the membership in *Fruta Feia*. We test the influence of perceived income on sustainability transition change agency and practices and give a special focus on the change agency of the self-perceived low-income category. Thereby, we challenge existing sustainable citizenship myths (Blythe et al., 2018). In a nutshell, we contribute to closing an information gap on AFN consumer values and practices with regards to sustainability, with a special focus on the change agency of the above-mentioned category and discuss the role of CBIs/AFNs in enabling the transition to a just and sustainable food consumption system.

The following hypotheses were derived:

Hypothesis 1: Level of perceived income does not influence the importance given to sustainability criteria in shopping decision-making.

Hypothesis 2: Level of perceived income does not influence the importance given to food waste criteria in shopping decision-making.

Hypothesis 3: Level of perceived income does not influence the frequency of performing sustainability practices in daily life.

Hypothesis 3a: Self-perceived low-income consumers reduce energy consumption more frequently than medium/high income consumers.

Hypothesis 3b: Self-perceived low-income consumers reduce water consumption more frequently than medium/high income consumers.

Hypothesis 3c: Self-perceived low-income consumers buy less frequently organic products than medium/high income consumers.

Hypothesis 3d: Self-perceived low-income consumers eat plant-based meals more frequently than medium/high income consumers.

3.1. Overview

To test the before mentioned hypotheses, this mixed methods empirical study combines a case study and quantitative analysis through an online survey to the members of the consumer cooperative *Fruta Feia (FF)*, a key AFN in the Lisbon Metropolitan Area (LMA). *FF* was born in 2013 and is among Portugal's biggest AFNs and still under-researched (Morais Mourato and Bussler, 2019; Ribeiro et al., 2018). Its main goal is to raise awareness, reduce the food waste problem and foster sustainable (food) consumerism. This is achieved by adding value to fruits and vegetables not commercialisable through conventional food supply chains because they don't comply with market requirements in terms of shape or size. *FF* buys currently unsellable "ugly" fruits and vegetables from local farmers and distributes them directly to consumers. It can be described as a sustainable CBI for several reasons. First, reducing food waste prevents resource and energy waste and ultimately environmental degradation and climate change (Helander et al., 2020). Since its beginnings, *FF* prevented over 3920 tons of food waste, about 0.4 % of annual food waste in Portugal (Brito et al., 2019). Second, their direct distribution channels decrease the physical and perceived distance between consumers and producers, fostering short local food supply chains with reduced transport and storage-related emissions and harvest loss. It cooperates with 314 smallholders, engaged in both organic and conventional agriculture,¹ situated in a local radius of less than 70 km of the distribution points. Third, paying smallholders fair prices for otherwise "worthless" products fosters their efficiency vis-à-vis intensive agriculture. Lastly, their business and management model build social sustainability, materialising as horizontal, sociocracy-based working conditions strengthening their employees' rights, and fair wages with flexible working conditions (see Shreck et al., 2006). With 3.60€ for a 3–4 kg and 7.20€ for a 6–7 kg basket, *FF* is considerably cheaper than conventional (super)markets or community-supported agriculture schemes whose baskets range from 19.50€ to 39.99€ (Alpendre Marques, 2021). Thereby, it promotes social entrepreneurship making healthy and sustainable food affordable to individuals otherwise excluded by this market segment due to prohibitive prices. Altogether, *FF* leverages more sustainable ways of food production and consumption in addition to preventing food waste. Currently, *FF* has 16 delegations in 7 cities across Portugal serving nearly 9000 consumers.

3.2. Participants and procedure

The LMA, as the research geographic focus, allowed for the highest possible density and diversity of consumers and is where most of them reside. Furthermore, LMA's food planning strategy 'Foodlink' has called for a greater mobilisation of local AFNs, growingly streamlining them as key food governance actors (CCDR, 2022). In the spirit of knowledge co-production (Fine et al., 2021), survey planning and development took place with *FF*'s management. The survey was developed with the Qualtrics software and had two versions, one in Portuguese and one in English.² The 8 *FF* distribution points in the LMA (Fig. 1) were repeatedly visited during their weekly food basket deliveries during October 2020. The survey was introduced to each consumer individually, who then could freely opt-in. This strategy envisioned reducing sampling biases and guaranteed random selection and representativeness (Schofield, 2006). The questionnaire remained online over one month.

3.3. Analytical parameters

The questionnaire started with informed consent, followed by questions of different types, including yes/no questions, multiple choice questions, open questions and five-point Likert rating scales on importance (range: 1–5; minimum "not important", maximum "very important") and frequency (range: 1–5; minimum "never", maximum "always") including an opt-out possibility "I don't know/I don't answer" (Chen et al., 2015; Chyung et al., 2017). It finished with a set of demographic questions.

A total of $n = 498$ participants filled out the questionnaire, representing about 18 % of the *FF* consumers in the LMA and about 8 % of the national *FF* universe. With a population of 6700, requiring a 95 % level of confidence ($p < .05$) and a maximum error in terms of the standard deviation of 5 %, the estimated necessary sample size was calculated as 364 (see Al-Subaihi, 2003). Responses were geographically evenly spread. The Rato neighbourhood was excluded due to only two valid responses. To check for the influence of income on sustainability agency, the dataset was separated into three perceived income subsets: low-income, medium-income and high-income consumers using the variable "respondent's self-perception of their economic situation" as a proxy for perceived income. Although personal net monthly income was also reported, the subjective assessment of one's economic well-being can be a better indicator for truly measuring economic situations and happiness (see Alartartseva and Barysheva, 2015; Correa, 2017). Current income might fail to represent a person's subjective well-being because it lacks other components, such as assets, real estate, informal income, or debt (D'Ambrosio et al., 2019). Also, considerably less respondents ($n = 370$) reported their income but instead felt more comfortable to indicate their economic self-perception ($n = 427$). The correlation between both variables in our sample is positive and highly significant ($p < .01$; $s.e. = 0.05$; $CI = [0.4; 0.56]$). Statistical analysis and graphic representations were carried out with the help of the software Jamovi, RStudio, QGIS and Excel.

As a first step, we compared basic descriptive statistics from our *FF* sample (age, gender, occupation, education, etc.) to general population statistics (EUROSTAT, 2022; PORDATA, 2021a; b, c, 2020) (Section 4.1).

Second, we assessed if the respondent's sustainability perceptions and beliefs manifested in changes in their daily behaviour and

¹ Since the main focus of the cooperative is to reduce food waste, they do not exclude any type of production methods. However, they preferably cooperate with organic farmers but also obtain their products from conventional agriculture.

² The full English version of the questionnaire can be found in Table 7 in the Appendix.

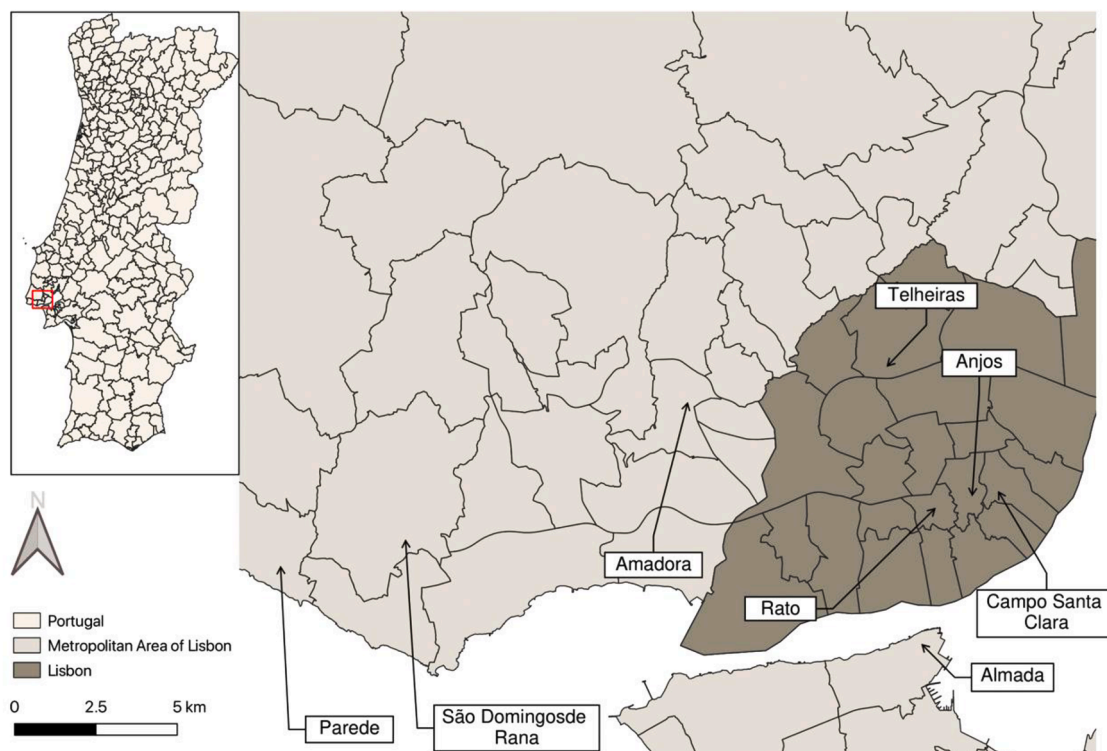


Fig. 1. Fruta Feia distribution points

Caption: Visualisation of the 8 Fruta Feia distribution points in Lisbon Metropolitan Area: Anjos; Campo de Santa Clara; Parede; Rato; Telheiras; Amadora; São Domingos de Rana; Almada (as of 2020).

practices. To this end, we asked the respondents whether their participation in the *FF* cooperative 1) had changed the value they accrued to “ugly” food, and 2) had turned their daily behaviour to become more sustainable (Section 4.2). Finally, we analysed sustainability levels in the respondents’ daily live practices and food shopping decision-making (Section 4.3).

For our specific interest in checking for the influence of perceived income on sustainability change agency, we performed a set of statistical analyses. This first required to derive our model and factor structure. The large sample size ($n = 498$) allowed for the creation of structural equation models comparing and testing different theory-derived factor structures with Confirmatory Factor Analysis (CFA). Based on theoretical considerations, we built the first model with three factors containing the main score items building the survey. The CFA revealed high residual covariance between the items “local” and “national” as well as “animal.industry” and “plant-based.meals”, besides unsatisfactory model fit. After several rounds of comparative model fitting, the final model (Fig. A4) allowed for residual covariance between these factors and excluded several statistically critical items. The final model fit improved a lot, resulting in good fit statistics (Table 5 in the Appendix): normed $\chi^2/df=3.18$, $RMSEA=0.07$, $SRMR=0.06$ and $CFI=0.911$, compared to recommended values (cf. Hu and Bentler, 1999; Browne and Cudeck, 1992). Internal consistency was tested with Cronbach’s alpha (George and Mallery, 2003). Although the alphas could be more satisfactory, the other CFA model fit parameters provide general robust support for our 3-factor conceptualisation of sustainability change agency, including the following scores:

shopping score: The respondents were asked to attribute levels of importance to sustainability criteria in grocery shopping decision-making. The *sustainability shopping criteria score* includes the item responses of the following criteria: *to be local*; *to be from non-intensive animal agriculture*; *to be produced in Portugal*; *to be sustainable*; *to be socially sustainable*. It represents an overall score for the level of sustainability in food shopping decision-making and focuses on testing hypothesis 1.

foodwaste score: The respondents were asked to attribute levels of importance to food waste criteria in grocery shopping decision-making. The *food waste in shopping criteria score* includes the following items: *expiry date*; *look*; *to be available at any time of the year (even if imported/non-seasonal)*. It measures the importance given to food waste reduction and focuses on testing hypothesis 2.

dailyhabits score: The respondents were asked with which frequency they engaged in general day-to-day sustainability practices. The *sustainability in daily practices score* includes: *recycling*; *eating plant-based meals*; *buying sustainable products*; *buying organic products*. It represents the level of sustainability in terms of how often sustainable daily practices are performed and focuses on testing hypothesis 3. The items of *energy* and *water consumption reduction* were intentionally excluded because they are believed to be highly driven by economic income.

The scores were calculated by adding up, for each respondent, the item response scores [1–5] divided by the number of items for each score, resulting in an overall score ranging from [1–5], with 1 indicating the lowest and 5 the highest possible level of sustainability (Fig. 2). The scores for responses with missing values for single items were adjusted manually.

$$\frac{Item_1 + Item_2 + \dots + Item_n}{\sum Item_{1-n}}$$

Fig. 2. Equation for score calculation.

$$\frac{Item_1 + Item_2 + \dots + Item_n}{\sum Item_{1-n}}$$

The second step was the statistical analysis in two blocks. First, testing hypotheses 1–3 on the influence of perceived economic situation levels on the sustainability criteria and practices in daily life with ANOVA, looking for statistically significant differences in the mean scores of our three sustainability scores (*shopping_score*; *foodwaste_score*; *dailyhabits_score*) between the three perceived income groups measured by *comfort* (low, medium, high). Second, testing hypotheses 3a–3c inquiring into expected particular income effects on single items composing the sustainability scores. An ANOVA was performed on the items *buying ecologic products*, *reducing water consumption*, and *reducing energy consumption* to check for statistically significant differences in the mean scores between perceived income groups (*comfort*). Furthermore, when we initially observed outstanding mean score differences between perceived income levels for single items, we decided to check for specific statistically significant differences. Explorative ANOVAs were performed for *buying sustainable products* and *eating plant-based meals*.

4. Results

4.1. Descriptive statistics: Fruta Feia consumers

Table 1 shows that most respondents are female and Portuguese. The median age is 39 years, the age span varying little across distribution points. Generally, FF consumers are younger than LMA residents. This makes sense because older demographics might be unaware of new phenomena like AFNs/CBIs. Most consumers are long-time members for over 2 years (35 %) and receive a small basket (71.9 %). Most respondents hold a university degree (83.1 %). To avoid bias, we cross-checked the self-perceived economic comfort and education level, and we found that effectively the 36.4 % of lowest self-reported well-being respondents 14.9 % (Hardship + Signs of Hardship conditions) have the lowest education levels (2^o cycle or secondary school level). Moreover, the correlation between self-reported comfort and education level is highly significant ($p < .01$). *Anjos* is by far the neighbourhood where most consumers (94 %) are highly educated and younger. In contrast, *Parede* has the highest proportion of older as well as low-educated consumers (32.4 %). The majority of respondents are employees (53 %) and have a net monthly income after taxes of 951–1158€ (22.4 %), representing the Portuguese middle class.⁴ Our sample is skewed towards higher incomes compared to the general population. However, about 29 % are low-income earners with 0–950€.

Anjos is the richest distribution point: 26.5 % earn between 1643€ and over 3083€. However, *Anjos* also has the widest income distribution. *Telheiras* and *Almada* also have elevated shares of high-income consumers (23.6 % and 22.9 %). *Almada*, traditionally a left-wing workers neighbourhood on the south bank of Tejo River, has the highest proportion of low-income consumers earning 0–767€ (18.8 %). However, about 25 % of the respondents did not specify their net income. Some reasons associated with income-nonresponse are, i.e., genuine uncertainty about amounts (Moore et al., 2000), or embarrassment or fear that this information could reflect poorly on respondents with both lower as well as higher occupational positions (Ross and Reynolds, 1996; Schröpfer, 2016). We included a less invasive question on the subjective perception of how comfortable the respondent's household was able to get along with its total monthly income: *comfort*.⁵ Most consumers (46.5 %) situated themselves in the middle ("medium comfort"), similar to the income statistics. However, more respondents (38.6 %) situated themselves at the higher end of economic well-being ("high comfort"). "Signs of hardship" (14 %) and "hardship" (0.9 %) together represent the self-perceived low-income category. "Hardship" was only reported in *Anjos* and *Almada*, indicating that these distribution points have a higher socio-economic consumer diversity. Generally, self-perceived low-income is most represented in *Almada* (19.6 %). The self-perceived medium-income category is by far most prominent in *Parede*, *São Domingos de Rana* and *Campo Santa Clara* (65.7 %). Self-perceived high-income is by far most represented in *Telheiras* (48.4 %), *Anjos* (46.9 %), *Amadora* (41.4 %) and *Almada* (37.5 %).

Anjos, *Telheiras*, *Amadora* and *Campo Santa Clara* have mainly two beneficiaries per basket. *Almada*, *Parede* and *S. Domingos de Rana* are dominated by over four beneficiaries per basket. Hence, in central Lisbon, FF serves mainly higher-income two-person households, while in the suburbs it supports larger low-income groups of people, presumably extended families. Moreover, 58 % of the beneficiaries are economically dependent on the FF consumer bringing the basket home. About 43 % of them are dependent children and about 15 % dependent adults,⁶ indicating that FF indirectly supports economically dependent and vulnerable or deprived individuals through their affordable food baskets.

⁴ In 2020, the gross average income per person in Portugal was 1326€ monthly, turning into around 1086€ after deductions (INE, 2020).

⁵ The survey question was: "Please indicate which of the descriptions below best illustrates the income situation of your household": a) The current income allows me to live comfortably; b) The current income allows for a reasonable living; c) It is difficult to live with the current income; d) It is very difficult to live with the current income."

⁶ Such as for instance old-age family members or people with disabilities.

As is the case with many CBIs (Dinnie and Holstead, 2018), *FF* relies on volunteerism for its functioning. Besides the two full-time employees managing each distribution point there are on average three volunteers (personal communication, October 20, 2020). About 11.7 % of the respondents are involved in other CBIs, such as *Refood* or *Coopérnico*, with themes ranging from food, agriculture, culture, environment to energy or arts (Table 6 in Appendix). About 80 % have persons in their social networks (friends, work colleagues or family members) who are also members of the cooperative.

To resume, the average *FF* consumer is a 39-year-old Portuguese female holding a Bachelor's degree and working as an employee earning 951–1158€. They are a long-time member, their basket serves 2–3 beneficiaries, and they have acquaintances in the cooperative. This seems to reinforce the literature claiming that CBI members are mainly well-educated and middle-class citizens (e.g. Khandekar, 2021; Seyfang, 2006). It also correlates with the literature on short food supply chains, suggesting that certain socio-demographic characteristics may have an influence on consumers to prefer local products, such as i.a. higher age, feminine gender, higher level of education and higher income (Kiss et al., 2020).

Table 1
Socio-demographic information Fruta Feia consumers versus general population.³

	Survey results		General population	
Gender (n = 433)	Female	65.8 %	Female	53 %
	Male	34.2 %	Male	47 %
Age (n = 431)	Median (years)	39 (SD=10.5)	Median (years)	44.7
Nationality (n = 434)	Portuguese	89.4 %	Portuguese	99.7 %
	Foreign	10.6 %	Foreign	0.3 %
Educational attainment (n = 432)	2nd cycle (6 years)	0.5 %	No degree	5 %
	3rd cycle (9 years)	0.9 %	1st cycle	19 %
	Secondary (12 years)	15.5 %	2nd cycle	9.9 %
	Bachelor's degree	41.7 %	3rd cycle	19.7 %
	Master's degree	35.9 %	Secondary and post-secondary	23.8 %
	PhD	5.6 %	Superior (BSc, MSc, PhD)	21 %
Professional situation (n = 427)	Retirees	4 %	Retirees	18.1 %
	Students	3 %	Students	7.8 %
	Unemployed	5 %	Unemployed	8 %
	Domestic workers	0.5 %	Domestic workers	3.3 %
	Independent workers	19 %	Independent workers	5.5 %
	Employees	53 %	Employees	38.9 %
	Public employees	13 %	Public employees	6.8 %
	Employers	1.4 %	Employers	2.1 %
	n.a.	1.1 %		
Income (n = 371)	Personal Net Income/month		Gross Family Aggregate Income/month	
	0–413€	2.4 %	0–416€	12.5 %
	414–600€	3.5 %	417–833€	26.7 %
	601–767€	6.5 %	834–1125€	15.6 %
	768–950€	16.7 %	1126–1583€	14.5 %
	951–1158€	22.4 %	1584–2291€	12.7 %
	1159–1375€	16.2 %	2292–2708€	4.4 %
	1376–1642€	11.9 %	2709–3333€	4.4 %
	1643–2038€	13.5 %	3334–4166€	3.5 %
	2039–3083€	5.7 %	4167–8333€	4.8 %
	>3083€	1.3 %	>8333€	1 %
Self-perceived economic comfort (n = 427)	Hardship	0.9 %		
	Signs of hardship	14 %		
	Medium comfort	46.5 %		
	High comfort	38.6 %		
Basket type (n = 474)	Small (3–4 kg)	72 %		
	Big (6–7 kg)	28 %		
Membership time (n = 371)	>2 years	35 %		
	18–24 months	15.7 %		
	12–18 months	16.6 %		
	6–12 months	16.1 %		
	0–6 months	16.6 %		
Consumer structure (n = 433)	One beneficiary	22.5 %		
	Two beneficiaries	33 %		
	Three beneficiaries	18 %		
	>Four beneficiaries	26.5 %		

³ Sources: (EUROSTAT, 2022; PORDATA, 2021a, 2021b, 2021c, 2020)

4.2. FF as a platform for value and practice change towards sustainability

Practice has been defined as a complex composition of different behavioural elements such as, i.e., *competences* and *meanings* (Reckwitz, 2002; Shove et al., 2012; Warde, 2014). *Meanings* include primarily ideas and emotions but also cultural norms. Most importantly, they form the basis of people's awareness, perceptions and worldviews. Practice change is, therefore, deeply rooted in people's beliefs and perceptions. AFNs are viewed as crucial platforms where societal change via value and practice change can take place (see Introduction). Here, we inquire into the potential of FF as a place where consumers' sustainability values and practices are positively shaped. To this end, the respondents were asked to indicate whether they perceive their adherence to the association had meaningful impacts on their personal food sustainability-related values and behaviour. The results show that the majority of respondents assert that both their values and practices regarding sustainability and food waste have been positively influenced by their FF membership. 61 % claim the value they attributed to "ugly" food has changed since they joined the cooperative (Fig. 3). 66 % affirm their daily behaviour has become more sustainable (Fig. 4). For those negating an impact of FF membership on values and behaviour, we asked for the reasons. Concerning "ugly" food, 78.3 % explained they already valued "ugly" food beforehand or that beauty was never a standard. Concerning behaviour change, 77.7 % said they had already adopted more sustainable values and practices previously and FF was just another step on their way to a more sustainable life. This shows that for most respondents, becoming a member of the AFN FF increased both their sustainability values concerning food and their sustainable behaviour in daily life, thus adding evidence to FF as a crucial platform where positive change towards a sustainability transition can take place.

4.3. Sustainability in the daily life of FF consumers

Hypotheses 1–3 critically assess the influence of perceived income on the level of sustainability in food consumption decision-making and general daily-life practices. This section presents the results 1) on the extent to which sustainability values and concerns are embodied in FF consumers' daily live practices, and 2) of the statistical analysis of the perceived income effect on the latter. Whenever possible, we compared our results to the baseline scenario of sustainability values and practices among the general Portuguese society represented by the most recent Eurobarometer on environmental attitudes (European Commission, 2017) as well as several Portuguese studies on general sustainability and consumption (Guiné et al., 2022; Magalhães, 2018).

4.3.1. Shopping criteria

The results from the mean item scores in Table 2 show that *sustainability*, *social sustainability* and *national (Portugal)* are the three most important sustainability shopping criteria. For most items, self-perceived low-income category has the highest mean score and the highest percentages of rating them as "very important". The calculated *shopping score* (see Section 3.2) shows that, after all, a high importance is attributed to sustainability criteria in grocery shopping decision-making. Furthermore, the *shopping score* mean is highest for self-perceived low-income consumers: 4.22 ($SD=0.08$); self-perceived medium-income 4.11 ($SD=0.05$); self-perceived high-income 4.1 ($SD=0.05$) (see Fig. A1 in the Appendix). Neutral answers average 15.2 % and are highest for *to be from non-intensive animal farming*. They are generally higher for medium and high income. Choosing a neutral answer might be linked to the fact that 'new green consumerism' is slowly becoming a societal trend (Monteiro, 2020). When confronted with concrete questions on their sustainability concerns, respondents with no intrinsic environmental consciousness and convictions might tend to answer neutrally because their beliefs are founded on mainstream discourse. Another common explanation is that respondents do not know the answer (Chyung et al., 2017). The ANOVA for Hypothesis 1 yields no significant difference in the importance attributed to sustainability shopping criteria between the three comfort levels [$F = 1.28, p=.279$]. In other words, low-income consumers give no significantly different importance to sustainability criteria in grocery shopping than medium- or high-income consumers. This indicates that Hypothesis 1 is supported by our results.

Our questionnaire asked for the importance of further criteria: *fair price* (Ø4.3), *nutritional value* (Ø3.5) and *good taste (inverted)* (Ø1.4). Since they are not directly relatable to our inquiry about sustainability practices, they are not shown in Table 2. However, we observe that *fair price* is among all respondents a remarkably important shopping criterion. The results show that considering sustainability criteria in daily grocery shopping is a highly prioritised, important and internalised practice and does not only remain in the abstract realm of values and worldviews of the FF consumers. Furthermore, self-perceived low-income consumers seem to have similarly serious sustainability concerns in daily shopping decision-making than self-perceived higher incomes.

4.3.2. Food waste

The results from the mean item scores in Table 3 show that the shopping criteria supporting FF's intrinsic mission to reduce food waste (*expiry date*; *good look*; *freshness*; *availability*) receive overall quite low importance levels ranging from 1.4 to 3.7. Bearing in mind that these are inverted scales, a low value means that the criterion is in fact important in decision-making. The calculated *foodwaste score* (excluding *freshness* because it is not significant) indicates that, overall, consumers still accrue rather lower importance to food waste-opposing criteria. However, for all items, the self-perceived low-income category seems to have the highest mean score and the highest percentages of opposing them by rating them as "very important". Furthermore, the calculated *foodwaste score* mean is highest for low-income consumers: 3.17 ($SD=0.09$); self-perceived medium-income 3.04 ($SD=0.05$); self-perceived high income 3.05 ($SD=0.06$) (see Fig. A2 in the Appendix). Our results align with the Flash Eurobarometer, finding that 62 % of the Portuguese agree it is not safe to consume food products after the "best before" date and even 98 % agree that the lifespan of a product should be indicated (European Commission, 2013). Neutral answers average 20.6 % and are highest for *good look*. There is no clear perceived income

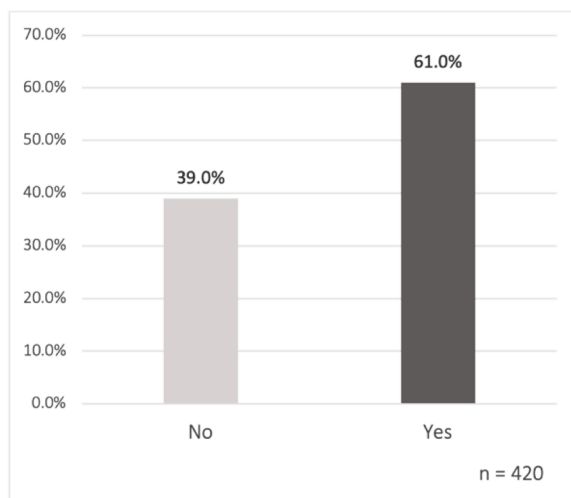


Fig. 3. FF membership and value change "ugly" food

Caption: Did your values of 'ugly' food change by participating in Fruta Feia?.

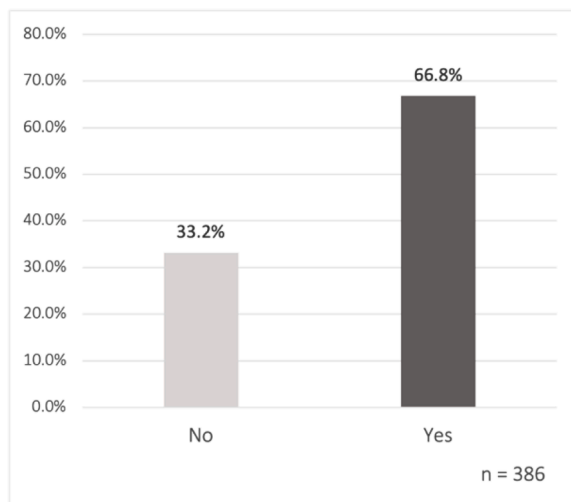


Fig. 4. FF membership and change in daily behaviour

Caption: Did your day-to-day behaviour become more sustainable participating in Fruta Feia?.

pattern for neutral answers. The ANOVA for Hypothesis 2 yields no significant difference in the importance attributed to food waste-opposing shopping criteria between the three comfort levels [$F = 0.733, p = .481$]. This supports Hypothesis 2 that perceived income does not significantly influence the importance given to food waste criteria in shopping decision-making. The results indicate that shopping principles opposing food waste seem to rank among the least important for all consumers, independent of perceived income. Food waste reducing criteria are not highly internalised criteria in daily grocery shopping. Low-income consumers do not give significantly different importance to food waste opposing criteria in grocery shopping than medium or high-income. This is a second sign that the self-perceived low-income group of respondents seem to have similarly high sustainability standards than self-perceived higher incomes.

4.3.3. Daily life practices

In Table 4, the mean scores ranging from 3.0 to 4.8 show that all single practices are rather performed frequently. The most frequent items are 1. *bringing their own shopping bag*, 2. *recycling waste* and 3. *reducing energy consumption*, followed by 4. *reducing water*, 5. *buying sustainable products*, 6. *plant-based meals (vegetarian/vegan)*, 7. *buying organic products*. The four most frequent practices are the easiest and most accessible to change without high expenses or alterations of deeply rooted habits or behaviour. For five out of seven items, low-income respondents have the highest mean scores. The calculated *dailyhabits_score* (excluding *energy* and *water consumption*; *bringing their own shopping bag* due to statistical issues) indicates that, overall, consumers perform sustainable practices in their daily life

Table 2

Frequency distribution of the importance attributed to sustainability criteria in grocery shopping decision-making by perceived income levels (scale: 1–5; not important to very important).

	Income level	Not important	Slightly important	Moderately important (neutral)	Important	Very important	Mean score
		Frequency distribution (%)					
To be a local product	low income	3,1	4,7	9,4	32,8	50,0	4,2
	medium income	0,0	2,5	15,6	44,2	37,7	(0.11)
	high income	1,2	4,3	14,6	43,3	36,6	4,2
							(0.06)
To be from non-intensive animal farming	low income	1,6	3,3	16,4	32,9	45,7	4,2
	medium income	2,1	7,7	22,2	42,8	25,3	(0.13)
	high income	1,9	7,0	23,6	31,8	35,7	3,8
							(0.07)
To be produced in Portugal	low income	0,0	4,7	14,1	28,1	53,1	4,3
	medium income	1,0	3,5	9,6	33,8	52,0	(0.11)
	high income	1,2	3,1	13,0	30,9	51,9	4,3
							(0.06)
To be sustainable (e.g. no plastic wrapping, locally produced etc.)	low income	1,6	1,6	9,4	29,7	57,8	4,4
	medium income	0,0	3,5	14,6	37,7	44,2	(0.11)
	high income	0,0	4,9	14,6	33,5	47,0	4,2
							(0.06)
To be socially sustainable (e.g. fair wages)	low income	1,6	0,0	14,1	35,9	48,4	4,3
	medium income	0,0	2,1	17,1	32,6	48,2	(0.11)
	high income	0,0	3,8	19,7	32,5	43,9	4,3
							(0.06)
						4,2	(0.07)

Caption: “When you buy grocery products, how important are the following criteria in your choice?”.

*inverted scale; Standard deviation in parentheses ().

rather frequently (Fig. A.3 in the Appendix). The *dailyhabits_score* mean is highest for self-perceived low- and high-income consumers: 3.7 ($SD=0.07$) and 3.7 ($SD=0.05$) respectively, followed by self-perceived medium-income ones 3.6 ($SD=0.04$). The ANOVA for Hypothesis 3 yields no significant difference in the frequency with which sustainable daily practices were performed concerning the three comfort levels [$F = 1.40, p=.247$]. In other words, low-income consumers have no significantly different performance of sustainability practices in daily life than medium- or high-income consumers. This indicates that Hypothesis 3 is supported by our results.

However, even if the ANOVA resulted in no significant influence of perceived income on the frequency of performing sustainable practices, there are some observations we want to share with the reader when exploring the results of the single items. First, the high mean score for *bringing their own shopping bags*, independently of perceived income, might be related to the combined impact of introduced taxes on the use of plastic bags and *FF*'s advocacy against food waste and packaging. This aligns with a general trend of reduced plastic bag usage in Portugal: 36 % of the respondents of the Eurobarometer had cut down single plastic bag usage in the past year and even 50 % before that (European Commission, 2017; Martinho et al., 2017; The Portugal News, 2016). *Waste recycling* mean scores are very high, even 79 % state to “always” recycle. A very low percentage of “rarely” or “never” recycles. Overall, it seems to be a primary sustainability practice across all perceived incomes. This might be partly attributed to the cooperative’s mission to reduce food waste, consistently transmitted through informational material and events, communications, and their workers. Compared to the Portuguese population, these numbers are significantly higher. In the Eurobarometer, only 63 % had recycled their waste in the past six months (European Commission, 2017). Furthermore, 57 % of respondents “very often” buy sustainable products, also low-income consumers despite their economic constraints. *FF* consumers seem to buy sustainable products substantially more often than the average Portuguese. For instance, only 29 % bought local products and 24 % avoided single-use plastic/bought reusable plastic goods in the past six months (European Commission, 2017). Only 25 % declared to “often” buy environmentally friendly products, and 57 % “sometimes” (European Commission, 2013). In our sample, only a few “always” buy sustainable products, no respondent “never” does so and only 6 % “rarely”.

FF consumers seem to eat plant-based meals remarkably more often than the Portuguese population, where the Portuguese Vegetarian Centre estimates only 1.2 % follow a vegetarian and 0.6 % a vegan diet (Magalhães, 2018; p. 17; 33). Furthermore, the mean score difference between self-perceived low- and higher income consumers seemed to be remarkable. Therefore, we decided to run an explorative ANOVA for this single item to test hypothesis 3d A significant difference in mean scores by perceived incomes was found [F

Table 3

Frequency distribution of the importance attributed to food-waste criteria in grocery shopping decision-making by income levels (scale: 1–5; not important to very important).

	Income level	Not important	Slightly important	Moderately important (neutral)	important	Very important	Mean score
		Frequency distribution (%)					
To have a good look*	low income	9,4	14,1	40,6	21,9	14,1	3,2
	medium income	4,5	30,3	41,4	19,7	4,0	(0.12)
	high income	5,5	22,1	47,2	19,0	6,1	2,9
							(0.07)
The expiry date*	low income	20,3	23,4	32,8	17,2	6,3	3,0
	medium income	15,6	41,7	32,7	8,5	1,5	(0.12)
	high income	16,0	36,2	33,1	11,0	3,7	2,4
							(0.07)
To have food available at any time of the year (imported and non-seasonal)*	low income	6,4	11,1	17,5	33,3	31,8	2,5
	medium income	1,5	6,1	23,2	39,9	29,3	3,7
	high income	1,3	7,0	24,1	41,1	26,6	(0.12)
							(0.07)
<i>To be fresh*</i>	low income	60,3	30,2	7,9	1,6	0,0	3,3
	medium income	59,1	36,9	4,0	0,0	0,0	(0.08)
	high income	55,5	39,0	4,9	0,6	0,0	1,5
							(0.04)
						1,5	(0.05)

Caption: “When you buy grocery products, how important are the following criteria in your choice?”.

*inverted scale; Standard deviation in parentheses (); *italics* not included in the foodwaste_score.

= 5.06, $p=.007$, $\omega^2=0.019$). A Post-hoc-test revealed that the mean score for low-income is significantly higher than for medium-income [$F = 2.91$, $p=.011$, *Cohen's d* = 0.418]. There is no significant difference in mean scores between self-perceived medium- and high- or high- and low-income. This reveals the interesting result that self-perceived low-income consumers *eat vegetarian or vegan meals* at least as often as high- and even more often than medium-income consumers. The results are not able to fully support hypothesis 3d 33 % of the respondents “*very often*” buy relatively expensive *organic products*. Shares are similar for all perceived incomes. Especially for low-income consumers, it surprises that they have the lowest shares of “*rarely*” doing so and no response “*never*”. Yet, [Beagan et al. \(2016\)](#) obtained similar results for Canadian low-income consumers. These numbers stand out compared to a recent explorative survey on organic food consumption in Portugal finding that only 21.2 % eat organic food frequently ([Guiné et al., 2022](#)). To test hypothesis 3c, we performed an explorative ANOVA for this single item. It showed no significant difference in mean scores by perceived incomes [$F = 0.544$, $p=.581$]. This means that low-income consumers do have not significantly different mean score for *buying organic products* than those self-perceived higher incomes; they actually have similar organic buying patterns. The results are unable to support hypothesis 3c. Finally, we looked at *reducing energy* and *water consumption* more closely. [Rodrigues et al. \(2019\)](#) found that 87.3 % of Portuguese households experiencing severe material deprivation were unable to keep their houses adequately heated, low-income representing an intrinsic incentive to reduce energy to reduce bills. To *reduce energy consumption*, expensive energy efficient appliances need to be bought. Unable to afford those, low-income households must rely on older energy-intensive equipment and renounce to heating/cooling ([Bird and Hernández, 2012](#)). In this case, we would be talking of energy poverty due to monetary constraints instead of a sustainability practice rooted in environmental consciousness. The same rationale applies to *reducing water consumption*. Low-income consumers have higher shares of “*often*” and “*always*” doing so. Also, *FF* consumers seem to reduce energy and water consumption more often than the general population, of which only 32 % cut down water and 21 % energy in the past six months ([European Commission, 2017](#)). To account for this possible distortion, we decided to exclude them from our *dailyhabits_score*, which was supported by model fit statistics. We calculated explorative ANOVAs for the two items to test hypotheses 3a+b. There is no significant difference in the frequency of *reducing energy* [$F = 1.25$, $p=.287$] and *reducing water consumption* [$F = 0.706$, $p=.494$] by perceived income levels. Hence self-perceived, low, medium, and high-income consumers have no significantly different water & energy saving practices. Our results were unable to support our hypotheses.

To summarise: 1) Generally, *FF* consumers seem considerably more sustainable in their daily lives than the rest of the population. Even the least common practices are still very frequent: 51.1 % follow a *vegetarian/vegan diet* and 35.7 % *buy organic products*. Many of these practices require profound changes in values and habits linked to specific expenses, capacities, equipment, or knowledge. 2) Self-perceived low-income respondents have the lowest shares of “*rarely*” or “*never*” performing sustainable daily practices. 3) Self-perceived low-income consumers do have not significantly different sustainability practices in their daily lives than their medium- and high-income counterparts, even though this represents much higher economic burdens for them. This adds evidence to studies

Table 4

Frequency distribution of performed sustainability practices in daily life by perceived income levels (scale: 1–5; never to always).

	Income level	Never	Rarely	Half the time (neutral)	Very often	Always	Mean score
		Frequency distribution (%)					
How often do you recycle your waste?	low income	0.0	6.3	3.1	18.8	71.9	4.6
	medium income	0.0	1.0	4.5	15.1	79.4	(0.08)
	income	0.6	0.6	0.6	15.2	82.9	4.7
	high income						(0.04) 4.8 (0.05)
How often do you buy sustainable products (e.g. no plastic wrapping, locally produced etc.)?	low income	0.0	6.4	24.2	62.9	6.5	3.7
	medium income	0.0	6.0	32.7	56.3	5.0	(0.09)
	income	0.0	5.5	34.1	51.8	8.5	3.6
	high income						(0.05) 3.6 (0.05)
How often do you buy products from organic agriculture?	low income	0.0	27.0	38.1	30.2	4.8	3.1
	medium income	3.0	32.3	28.3	35.4	1.0	(0.12)
	income	1.9	32.1	30.2	33.3	2.5	3.0
	high income						(0.07) 3.0 (0.07)
How often do you eat vegetarian/vegan meals?	low income	1.6	18.8	21.9	34.4	23.4	3.6
	medium income	9.5	23.6	23.1	33.2	10.6	(0.14)
	income	4.9	21.3	20.7	37.2	15.9	3.1
	high income						(0.08) 3.4 (0.09)
<i>How often do you bring your own shopping bag?</i>	<i>low income</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>28.1</i>	<i>71.9</i>	4.7
	<i>medium income</i>	<i>0.0</i>	<i>0.5</i>	<i>1.5</i>	<i>22.7</i>	<i>75.3</i>	(0.06)
	<i>income</i>	<i>0.0</i>	<i>0.6</i>	<i>1.2</i>	<i>17.7</i>	<i>80.5</i>	4.7
	<i>high income</i>						(0.04) 4.8 (0.04)
<i>How often do you apply measures to reduce your energy consumption?</i>	<i>low income</i>	<i>0.0</i>	<i>0.0</i>	<i>11.1</i>	<i>50.8</i>	<i>38.1</i>	4.3
	<i>medium income</i>	<i>0.0</i>	<i>2.0</i>	<i>14.6</i>	<i>52.0</i>	<i>31.3</i>	(0.09)
	<i>income</i>	<i>0.0</i>	<i>3.0</i>	<i>14.0</i>	<i>52.4</i>	<i>30.5</i>	4.1
	<i>high income</i>						(0.05) 4.1 (0.06)
<i>How often do you apply measures to reduce your water consumption?</i>	<i>low income</i>	<i>0.0</i>	<i>9.4</i>	<i>17.2</i>	<i>48.4</i>	<i>25.0</i>	3.9
	<i>medium income</i>	<i>1.5</i>	<i>8.5</i>	<i>22.1</i>	<i>49.2</i>	<i>18.6</i>	(0.11)
	<i>income</i>	<i>1.2</i>	<i>9.1</i>	<i>25.0</i>	<i>43.9</i>	<i>20.7</i>	3.7
	<i>high income</i>						(0.07) 3.7 (0.07)

Caption: “Depending on your daily habits, please answer by indicating how often you...”. Standard deviation in parentheses (); italics not included in the *dailyhabits_score*.

finding that economic income can, if at all, only be a partial explanatory factor for sustainable consumption (Aschemann-Witzel and Zielke, 2017; Hansmann et al., 2020). Thus, sustainable lifestyles and habits do not statistically depend on economic factors. It further adds evidence to the claim that the self-perceived low-income consumers of FF are at least as relevant change agents in the transition towards more sustainability in food consumption systems as self-perceived high- and medium-income consumers.

5. Discussion: demystifying sustainable agency

The debate on sustainability transitions often locks-in between radically opposed views. For some, technology and markets are the solution. For others, radical societal values change. Dake’s (1992) work on risk perceptions *vis-à-vis* technological advance illustrates how such positioning emerges through the social construction of *myths*. These myths are not demonstrably true but rather a system of shared narratives, supporting and enhancing specific worldviews (Holling, 1979). Thus, the negotiation about which future we want to live in engages different, often mutually exclusive, beliefs and myths about society, how it shall evolve and where this will ultimately lead to. This paper’s findings challenge a set of *myths* related to change agency and practice change in the realm of sustainability transitions.

Myth 1: Sustainable citizenship depends on economic capacity

People living in hard and precarious economic conditions have often been side-lined in the sustainable citizenship and

sustainability transition discourse, because they are perceived to be overwhelmed by survival and coping (e.g. [Anantharaman, 2018](#); [Baker, 2003](#); [Franzen and Meyer, 2010](#); [Inglehart, 2000](#)). [Section 4.3](#) challenges this assumption and has a critical look at sustainability change agency. Results show that even self-perceived low-income citizens can be actively engaged in sustainability initiatives, such as *FF*, and have sensible sustainability concerns and practices. Moreover, low-income consumers show not significantly different sustainability levels in their daily lives as medium and high-income consumers in our sample, despite higher economic burdens. This holds true for sustainability concerns in food shopping criteria, daily habits outside the cooperative, and food waste practices. Our results add evidence that economic income can only be a partially explanatory factor for sustainability concerns and practices related to food consumption.

Myth 2: Sustainable consumption is an upper-class privilege and practice

In the context of *just sustainabilities*, [Anantharaman \(2022\)](#) argues that when higher income classes allegedly claim cultural authority over sustainable consumption, this further stigmatizes and excludes people living in hard and precarious economic conditions from any meaningful sustainability agency, monopolising the sustainability legitimacy. In short, it reproduces social inequality and veils that the self-perceived low-income individuals do well perform daily environmental practices, such as sustainable consumption. The AFN *Fruta Feia* aims explicitly to give extended low-income families, retirees, students, or unemployed people the possibility to participate in sustainable consumption. Furthermore, local smallholder farmers benefit from *FF* because they can earn a revenue from otherwise unsaleable products. *FF*'s baskets have a significantly lower cost compared to conventional markets/supermarkets. To this extent, *FF* removes or reduces, the economic income restriction to sustainable food consumption for its members. Our study shows unquestionably that sustainable food consumption-schemes like *FF* are not an exclusively upper-class phenomenon – or rather – it actively includes even the self-perceived low-income citizens/consumers.

Myth 3: CBIs can only have a marginal impact on a wider transition to sustainability

FF can be viewed as a platform initiating and contributing to value and practice change towards sustainability. It reaches more and more individuals nationwide, already nearly 9000, across diverse social and cultural backgrounds and geographies. This growth is fuelled mainly through close peer-to-peer networks, as social influence from others is a key driver of behaviour change (e.g. [Cialdini and Goldstein, 2004](#); [Haun and Over, 2015](#)). About 80 % of *FF* consumers have friends, work colleagues or family members in the cooperative. Our results identify *FF* as an inclusive platform for value and practice change towards “sustainable citizenship”. Daily sustainability practices by *FF* members are higher than for the general Portuguese population (see above). The absolute number of *FF* members and distribution centres may draw criticism when discussing the actual *FF* impact. Although legitimate, this is a reductionist narrow-minded argument. CBIs like *FF* have become widely known due to increasing national and international media coverage on their mission. According to [Google Trends \(2023\)](#), since its establishment in 2013, the search volume on *FF* has steadily increased and reached its highest in Portugal in March 2023. *FF* has become a national food sustainability transition ambassador. It is impossible to calculate its true reach. Recent institutional recognition seems indicative of growing acknowledgement. In 2021, it received the EU LIFE prize for the best environmental project and the citizen’s prize ([Carvalho, 2020](#)). In addition, it currently integrates the advisory body of the food waste reduction strategy of the municipality of Lisbon, FoodLink, Lisbon Metropolitan Area’s food planning network, besides being a member of the EU Platform on Food Losses and Food Waste, helping the design of key recommendations for action. *FF* has exited its original niche innovation space and now explicitly engages with socio-political governance at the regime level (see [Morais Mourato and Bussler, 2019](#)).

6. Conclusion

This paper examined the value and practice change of the consumers of the Portuguese AFN and food cooperative *Fruta Feia*, with a special focus on the change agency of people living in hard and precarious economic conditions. We discussed how CBIs/AFNs and their members contribute to the sustainability transition, in the food sector and beyond, and studied the extent of their impact. There are unavoidable limitations. Arguably, our findings are context-dependent. However, similar results have been found in other contexts ([Fonte, 2013](#); [Seyfang, 2007](#); [Signori and Forno, 2019](#); [Chebrolu and Dutta, 2021](#)). Also, using an online survey comes with a set of trade-offs (see [Evans and Mathur, 2005](#); [Nayak and Narayan, 2019](#)). Furthermore, the questionnaire represents only a first attempt to address our research question. It has not yet been validated in terms of content. The results should be seen as a first association rather than giving final answers. The statistically significant results reveal differences and relationships, not causality. Despite these limitations, our results are a rich source of discussion for further critical research on sustainability change agency.

Our results show that *FF* consumers are highly diverse across different distribution points in terms of perceived income, education and employment. They display higher levels of sustainability in grocery shopping criteria and daily life practices than what is known about the average Portuguese consumers. Self-perceived low-income *FF* consumers have no significantly different sustainability levels than self-perceived medium- and high-income ones when it comes to grocery shopping criteria, food waste concerns and daily life practices, despite the additional economic burden to bear. This supports the critical literature on economic income not being a central explanatory factor for sustainable practices as well as on the underestimated sustainability change agency of the people living in self-perceived hard and precarious living conditions.

CBIs are concrete and viable platforms for societal change towards sustainability. Their potential impact is nevertheless still underexplored. *FF* consumers stated how their membership clearly triggered both value and practice change towards higher sustainability concerning food shopping decision-making and general practices in their daily lives. Our analysis confirms they seem, in fact, more sustainable than the average Portuguese population. Moreover, *FF* facilitating affordable sustainable food consumption for individuals living in hard and/or perceived as precarious economic conditions adds evidence for CBIs potential as social supporting systems, especially in deprived communities (see [Andrée et al., 2017](#)). *FF* consumers pointed out that, especially during the aggravated

conditions of the COVID-19 lockdowns, their demand for CBIs like *FF* increased, linked to increased economic concerns impacting their access to food.

To conclude, *FF* was born out of the opposition to the structural problem of food waste with the mission to challenge how food is discarded because of its “ugliness” and to contribute to a more localised, seasonal and sustainable short-food supply chain. Already today, it is possible to say that it contributed to minimising the negative externalities of the current food regime in LMA because of its impacts on sustainability values and practice changes of its members. In other words, *FF* has come of age as a CBI. First, by increasing its food waste reduction capacity, thus contributing to climate change mitigation, and second by gradually gaining visibility in the national and international food waste policy arena.

Future research should try to consider the evaluation of a questionnaire for social agency in sustainable food consumer behaviours. Another research avenue would be to test for causal relationships between demographics and sustainable values and practices, especially to surface other contextual factors, such as the relevance of cultural or social capital, that might influence sustainability transition agency. Finally, the rich data of our survey allows for further forthcoming qualitative research analysing motivations, meanings, points of view, and practices underpinning membership and how concretely the membership has triggered value and practice change in their consumers.

CRedit authorship contribution statement

Alexandra Bussler: Writing – original draft, Visualization, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Francesco Vittori:** Writing – review & editing, Methodology, Conceptualization. **João Morais Mourato:** Writing – review & editing, Supervision, Resources, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Acknowledgements

We want to express our deepest gratitude to Mariana Pires de Miranda, Thomas Michels, Lena Pfeifer, Monica Truninger and Tim O’Riordan for their support, helpful discussions and insightful suggestions to help improve this article. The final version is our sole responsibility.

Funding

This work was supported by the Portuguese Foundation for Science and Technology (SFRH/BD/143942/2019 and 7/2019/NT-GH-01).

Appendix

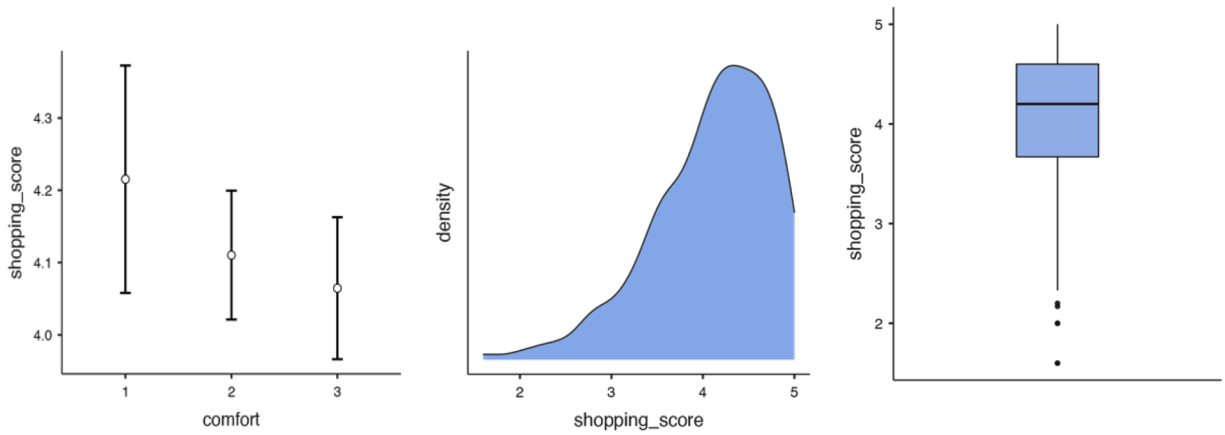


Fig. A1. SEQ Figure * ARABIC 7 shopping_score distribution, confidence intervals and Box-Plot.

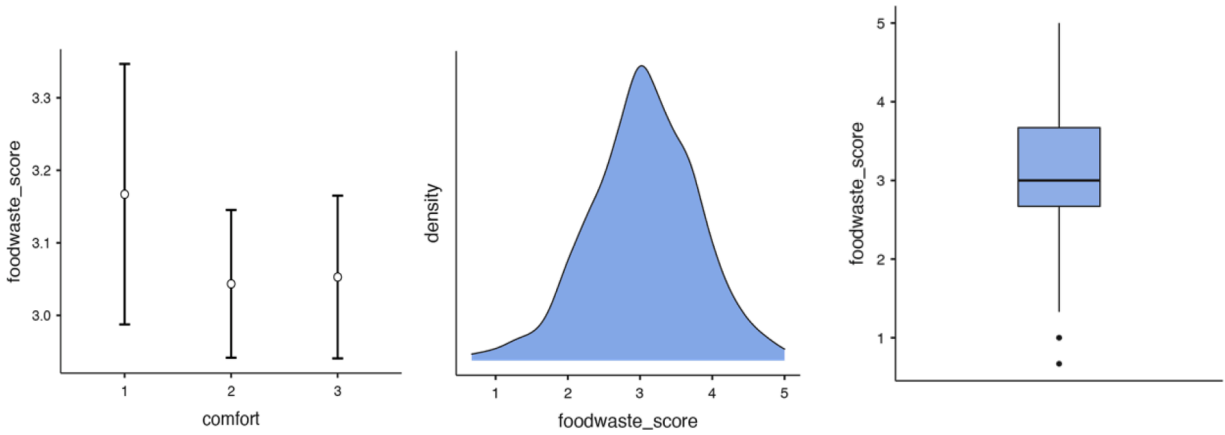


Fig. A2. SEQ Figure * ARABIC 8 foodwaste_score distribution, confidence intervals and Box-Plot.

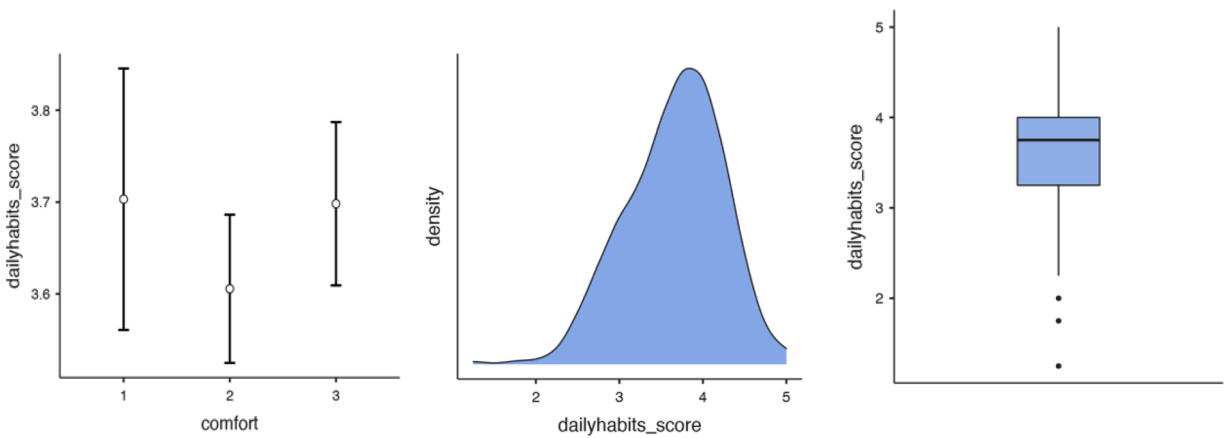


Fig. A3. SEQ Figure * ARABIC 9 dailyhabits_score distribution, confidence intervals and Box-Plot.

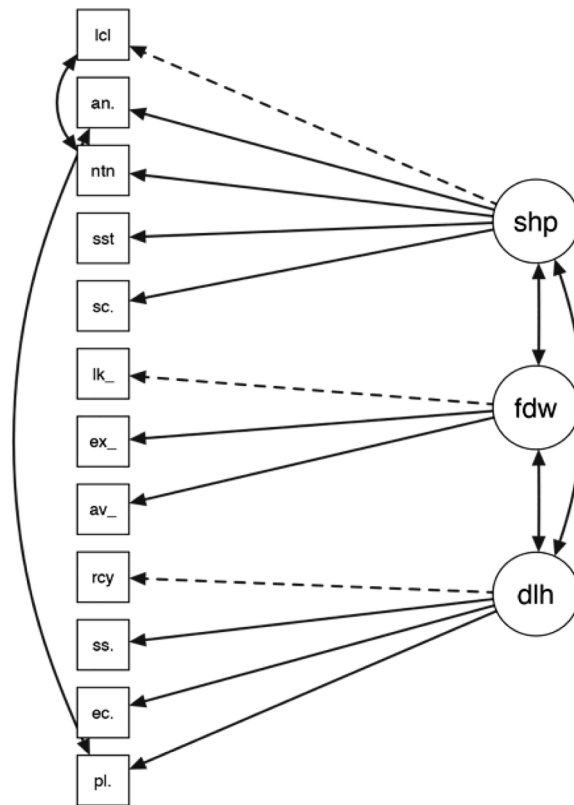


Fig. A4. SEQ Figure * ARABIC 10 Path diagram final model CFA.

Table 5
Model fitness CFA: Final Model.

Final Model Variables/constructs	Indicator items	Stand. estimators	Standard deviation	Confidence Interval		p	Cronbach's Alpha	McDonald's omega
				lower	upper			
shopping_score	local	0.48*					0.78	0.79
	animal.industry	0.56	0.17	1.03	1.69	< .001		
	national	0.41	0.10	0.70	1.08	< .001		
	sustainable	0.84	0.18	1.37	2.08	< .001		
	socially.sustainable	0.81	0.17	1.30	1.98	< .001		
foodwaste_score	look_inverted	0.52*					0.57	0.57
	expiry_inverted	0.63	0.25	0.75	1.73	< .001		
	availability_inverted	0.51	0.18	0.66	1.37	< .001		
dailyhabits_score	recycling	0.29*					0.55	0.59
	sustainable.	0.72	0.54	1.71	3.84	< .001		
	shopping							
	ecologic.shopping	0.55	0.59	1.57	3.90	< .001		
	plantbased.meals	0.50	0.70	1.84	4.58	< .001		

Model Fitness: Chi2=156, df=49, Chi2/df=3.18, RMSEA=0.069, SRMR=0.056, CFI=0.911, AIC=12,780, BIC=12,949.

* = fixed parameters.

Table 6
Membership in other Community-based Initiatives besides Fruta Feia.

Name of CBI	Action focus	Number of respondents
Refood	Food	13
Too good to go	Food	8
Cabaz do Peixe	Community-supported fishery	1
Associação Caracol	Culture/Community	1
Rizoma	Food/Agriculture/Community	3
LGC	Sports	1
Zero	Environment	2
Cabaz Terra Boa	Food/Agriculture	1
Zona Franca dos Anjos	Community/Culture/Arts	1
Gartencoop (Freiburg, Germany)	Nature/Urban gardening	1
Coopérnico	Energy	4
Freixo do Meio	Community	1
Banco Alimentar	Food/Community	1
Associação de Pais	Community	1
Associação Bairros	Community	1
Escuteiros	Nature/Community	2
Cabaz de Peixe	Community-supported fishery	3
Associação de Moradores	Community	1
Música nos Hospitais	Community	1
Associação SCOS do Festival BONS SONS	Culture/Arts	1
Cultura no Muro	Culture/Arts	1
Share waste	Waste	1
ART - Associação Residentes Telheiras	Arts	2
Fábrica dos Sonhos (Cova do Mar)	Culture/Arts	1
FESCOOP	Economics/Finance	1
Jardins Abertos	Nature/Urban gardening	1
Colectivo O Bosque	Nature/Environment	1
	Total	56

Table 7
Full survey in English.

Welcome!

This survey is coordinated by a research group from the Institute of Social Sciences of University of Lisbon and the department of Human Sciences of the University of Verona.

This survey addresses consumers of the FRUTA FEIA cooperative in the realm of a research project on Alternative Food Networks in Portugal. **We would like to know more about the reasons why you chose to be part of this cooperative.**

All your **answers are anonymous**. The data is exclusively used for research, maintaining your privacy at any moment.

The participation is voluntary, and you **are able to stop it at any point**. It is possible to fill out the form online on your own device using the link or QR code. After starting the study - and in order to guarantee your anonymity -, it is not possible to erase your answers. Your participation in this study will not cause you any harm.

Filling out the study takes about **6 minutes**. **Compulsory** questions are **marked with ***.

If you have any questions or comments, please feel free to contact alexandra.bussler@ics.ulisboa.pt

Participants consent *

I read and agree with the terms of the questionnaire.

Participation in Fruta Feia

How long have you been **member** of Fruta Feia? *

0 to 6 months

6 months up to 1 year

1 year up to 1,5 years

1,5 years up to 2 years

More than 2 years

In which **delegation** do you pick up your basket? *

Anjos

Telheiras

Amadora

Rato

Almada

Campo de Santa Clara

Parede

São Domingos de Rana

(continued on next page)

Table 7 (continued)

What **type of basket** do you receive? *

Small (3-4 kg)

Big (6-8 kg)

Have you ever participated as a **volunteer** at Fruta Feia in exchange of a basket?

Yes

No

How often do you use to do so?

1 time per week

1 time per month

Less than 6 times per year

Are there any **persons in your social network** (family, friends, colleagues etc.) that are Fruta Feia members?

Yes

No

I don't know/ I don't respond

How do you relate to these people?

Family

Friends

Coworkers/Colleagues

Other _____

Are you member of **any other social community-based initiative** like Fruta Feia?

Yes

No

I don't know / I don't respond

Could you share the **names of thes initiatives**, please?

(continued on next page)

Table 7 (continued)

FRUTA FEIA						
In this section we would like to get to know your reasons for becoming a member of the Fruta Feia.						
The following is a list of reasons to become a member of Fruta Feia .						
Please state the level of importance each reason had in your decision-making: *						
	Very important	Important	Moderately important	Slightly important	Not important	Don't know / Don't answer
The shorter distance between producer and consumer.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The higher quality of their products.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fruta Feia reduces food waste.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The principles of sustainability.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Higher prices paid to farmers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The price of a basket being cheaper in relation to supermarkets.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Initiatives like the Fruta Feia help the society to become more sustainable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Which among these was the **major motivation** in deciding to become a member of Fruta Feia?

- Closeness between consumer and produce
- Quality of products
- Reduction of Food Waste
- Sustainability principles
- Extra income provided to farmers
- Price of the basket
- Contribution to a more sustainable society
- Other _____

(continued on next page)

Table 7 (continued)

Sustainability Perceptions

You have certainly heard about the current **environmental problems** that our planet suffers from and the risks we run as a society if we do not change our current course of action. We would like to ask you a few questions about your understanding of sustainability:

With which of these phrases do **you identify most?**
(there is no right or wrong answer)

- Humankind has the ability to achieve sustainable development and we are already on the right path. We do not need to worry too much.
- Humankind has the ability to achieve sustainable development but following the current path this object seems impossible to attain.
- Humankind has the ability to achieve sustainable development but we are still far from reaching this goal.
- Humankind does not have the ability to achieve sustainable development.

Which of the following possibilities best reflects your opinion on **how we can achieve a truly sustainable future?**

- To achieve a sustainable future it is fundamental to develop new technologies and sustainable production methods and materials. This way we do not need to give up our current standard of living.
- To achieve a sustainable future it is fundamental to change all aspects of our behavior, such as our consumption and mobility patterns.
- To achieve a sustainable future it is fundamental that profound and transformative changes take place in all dimensions of our life as well as on a structural level, such as in the world economy and political processes.

(continued on next page)

Table 7 (continued)

Sustainability in your daily life						
In this section we are interested in your daily behavior related to sustainable practices. Please be as honest as possible, there is no right or wrong answer.						
When buying food , how important are the following criteria in your choice?						
	Very important	Important	Moderately important	Slightly important	Not important	Don't know/ Don't answer
The regionality of the product.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The look of the product.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The fair price of the product.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The product comes from non-intensive animal production.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The freshness of the product.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The taste of the product.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The product comes from Portugal.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The sustainability of the product. (eg without plastic packaging, reduce food waste, local production etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The social sustainability of the product. (eg workers are well paid and working conditions fair)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The expiration date of the product.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The availability of the product, even if imported from afar and out of season.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The nutritional information of the product.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(continued on next page)

Table 7 (continued)

Did the participation in Fruta Feia **change your daily habits** to be more sustainable?
(e.g. reduce food waste in your daily life)?

- Yes
- No
- I don't know / I don't respond

If yes, how did they change?

If not, why did they not change?

Did the participation in Fruta Feia **change the value you attribute to "ugly" food?**

- Yes
- No
- I don't know / I don't respond

If yes, in which sense did it change?

If not, why did it not change the value of "ugly"?

Thinking of your **daily habits**, please state **how often you ...** *

	Always	Very often	About half the time	Rarely	Never	I don't know / I don't answer
Recycle your waste? (e.g. glass, batteries, paper, plastic containers)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Buy sustainable products? (e.g. local products; products that avoid plastic packaging)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Buy products from organic agriculture?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Apply measures to reduce your energy consumption? (e.g. efficient appliances or lamps reducing energy consumption)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Apply measures to reduce your water consumption? (e.g. shower heads reducing water flow)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bring your own bag when you go shopping?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat vegetarian/ vegan meals to reduce your ecological footprint?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(continued on next page)

Table 7 (continued)

Demographics

In this last section, we would like to know a bit more about you:

What is your **year of birth**?

What **gender** do you identify with most?

- female
- male
- other
- I don't know / I don't answer

What is your situation regarding **residency in Portugal**?

- I am Portuguese
- I am not Portuguese but Permanent Resident
- I am neither Portuguese nor Permanent Resident
- I don't know/ I don't answer
-

What is your **postal code** in Portugal?

What is the **highest level of education** you have completed?

- Less than 1st cycle basic education (4 schooling years)
- 1st cycle of basic education (4 schooling years)
- 2nd cycle basic education (6 schooling years)
- 3rd cycle basic education (9 schooling years)
- Secondary school (12 schooling years)
- Bachelor degree / graduation
- Masters degree
- PhD/Doctoral degree
- I don't know/ I don't answer

(continued on next page)

Table 7 (continued)

Which of the following options best describes your **situation in relation to work**?

- Student
- Pensioner
- Domestic worker
- Public employee
- Employee
- Self-employed/Free-lance
- Unemployed
- Employer
- I don't know/ I don't answer

In which interval is your **monthly net salary** situated, once taxes are deducted?

- I don't know / I don't respond
- between 414 - 600€
- between 601 - 767€
- between 768 - 950€
- between 951 - 1158€
- between 1159 - 1375€
- between 1376 - 1642€
- between 1643 - 2038€
- between 2039 - 3083€
- >3083€

Finally, we would like to know something more about your household:

(continued on next page)

Table 7 (continued)

Which best describes the **situation in your household**:

- Single household
- Single-family home
- Couple household
- Single-parent household
- Extended family household
- Multiple family household
- Shared flat with friends / housemates

Including you, **how many people** form your **household**?

Please indicate which of the descriptions best illustrates the **situation of your household in relation to its income**:

- The current income allows me to live comfortably.
- The current income is enough to live reasonably.
- It is difficult to live on the current income.
- It is very difficult to live on the current income.

How many people in your household, besides you, **eat from the basket** of Fruta Feia? *

- None
- 1
- 2 or more
- 3 or more
-

The following questions refer to the **total number of household members who eat from the Fruta Feia basket**.

☑How many are **dependent children**?

- None
- 1
- 2
- 3 or more

(continued on next page)

Table 7 (continued)

☑ How many are **dependent adults**?

(in the sense: people without personal income or who depend on you for their livelihood)

- None
- 1
- 2
- 3 or more

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