

AN ENVIRONMENTAL PERSPECTIVE ON THE ORGANIC FOOD MARKET IN TURKEY

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(Preliminary version)

Abstract Alternative systems to the conventional agricultural system have been sought to solve problems such as environmental pollution, reduction and degradation of domestic seed species, soil erosion, reduction of animal welfare. Organic agriculture and food market constitute one of the most important alternative systems to conventional agriculture. The purpose of our study is to look into the demand for organic food in Turkey from an environmental perspective in order to understand whether organic consumption is driven by environmental friendliness and consciousness. Socio-demographic factors, attitudes and habits and contextual factors regarding environment and food consumption are analyzed together with organic food consumption patterns in order to search for the relationship of environmental consciousness on the demand side. A consumer questionnaire including questions about attitudes and habits and contextual factors regarding environment and food consumption has been designed and conducted to 251 organic food consumers living in Istanbul. Our results show that frequent organic food consumers may properly differ organic food products from other products such as GMO containing and ionized food products, strongly believe that there is a difference between organic products that are produced in Turkey and abroad in terms of quality. They are anxious about the environmental degradation and concerned about scarcity of resources, but they do not have adequate knowledge on environmental issues and sustainability.

Keywords: *organic food, green demand, information, environmental awareness, sustainability, responsibility, environmental concern*

1. Introduction

Ecological concerns related to preserving biodiversity, eliminating climate change effects are substantial discussions in the world today. Use of artificial inputs, greenhouse systems in farming affecting the ecosystem and inappropriate use of resources e.g. water use in agriculture are also under discussion. Several NGOs and international organizations underline the problem of unsustainability in conventional agriculture and look for more effective ways of food production. Sustainable ways to produce food with the minimum use of artificial inputs, local production, ecofriendly use of resources are mostly encouraged.

Sustainable agriculture is a wide terminology that includes organic agriculture as it follows the same patterns including ecofriendly use of resources, biodiversity, quality of land and animal welfare (Rehber and Grega, 2008). Both sustainable and organic agriculture techniques have similar principles, closer objectives while organic agriculture is the mostly known and applied one in sustainable agriculture practices (Rigby and Cáceres, 2001). Organic agriculture corresponds to the principles of Good Agriculture Practices (GAP) and sustainability. FAO underlines the term of “Good Farming Activities” (GAP) as a wider term to define sustainable agricultural, post harvesting production process aiming food safety and quality ecofriendly environment and healthy food (FAO, 2004). The organic standards are like reference points explicitly defining the practical and technical requirements in organic production thereby guiding producers. A control and certification body accredited by the government must certify both raw and processed agricultural products. Wild collected products are grown similarly with organic products. For instance, in India, 65% of agricultural lands are organic by default (Rehber, 2011). Wild collected and organic by default products are not certified thereby contributing to the problem of asymmetric information in the market. Many producers who do not have the opportunity to get certification promote their

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products as organic; indeed they can refer to be organic by default, however products without organic certification create a dual understanding of organic products.

Recently, there is also an increasing trend in environment-friendly purchasing or green purchasing referring to the purchase of products with lesser or reduced effect on human health and environment (Chan, 2001). Environment-friendly consumption is an intrinsically motivated behavior when driven by altruism (Andreoni 1990). In this context, Welsch and Kühling (2010) study the optimality of environment-friendly consumption and find that the net marginal utility of environment-friendliness is significantly positive; thereby contradicting its individual optimality. Similarly, several studies suggest a gap between consumers' intentions and actions referred to as 'green purchasing inconsistency' or 'green attitude-behaviour gap' (Chen and Chai, 2010; Wheale and Hinton, 2007). This gap might result from the impact of other factors such as price and availability of the product, and social influences. Green purchasing behaviour is based on both ecological perspectives and evaluation of the various product attributes. The impact of the more environment-friendly behaviors of friends, neighbors and relatives ('peers') decreases the green under-consumption suggesting a process of social learning of environment-friendly habits (Welsch and Kühling, 2010). In a similar vein, Nyborg et al. (2006) showed that environmentally responsible consumption depended on others' behaviour.

Blankenberg and Alhusen (2019) have classified the determinants of environment-friendly behavior into four categories: socio-demographic factors; attitudinal (psychological) factors; habits^{SEP} and contextual factors (individual, social and institutional) based on their study of recent related economic and psychological works published up to 2017 and underlined the complex workings of environment-friendly behavior given the interplay of its determinants and that the consideration of more than one or two behaviors are necessary to adequately measure it. One can also distinguish private vs. public sphere behaviors and environmental activism.

Kanchanapibul et al. (2014) investigates the sensitivity of young consumers from an environmental perspective and shows the significance of the ecological affect and knowledge on green involvement and purchasing behaviour. Ethical values have also become increasingly relevant in food purchase decisions (Miele and Evans, 2010; Newholm and Shaw, 2007; Vermeir and Verbeke, 2006). Although fair trade and organic production are part of the solution, ethical concerns are not limited to those according to Zander, Stolz and Hamm (2013). Their research on five European countries showed that 'higher animal welfare', 'local production' and 'fair producer prices' were preferred in all countries and that "there is substantial potential for product differentiation in the organic sector through making use of production standards that exceed existing minimum regulations".

As consumers become recently more environment-friendly, environmental advantages of organic farming over conventional methods need to be emphasized as organic products have become more and more important in consumption basket (Venkat, 2011). Zhu et al. (2013) study green food consumption intention, behaviors and influencing factors among Chinese consumers and show that consumption intention can be affected positively with promotion if consumers have environmental value. In the literature, there are conflicting results on the environmental effects of organic and conventional farming systems due to differences in the methods employed (Lee, Choe and Park, 2015). Organic farming have been found to be more likely to result in less energy use and lower GHGE per unit of land but higher energy use and emissions per unit of output (Bertilsson et al., 2008; Gomiero et al., 2008; MacRae et al., 2011; Mondelaers et al.; 2009). Lee, Choe and Park (2015) made a meta-analysis based on 107 studies and 360 observations published from 1977 to 2012 to compare energy efficiency and greenhouse gas emissions for organic and conventional farming. The results show that "data sources, sample size and product type significantly affected energy efficiency, whereas product type, cropping pattern and measurement unit significantly affected the green house gas emissions of organic farming compared to conventional farming".

Food products have unknown characteristics by their nature and Nelson (1970) defines food

products as experience and credence goods. McCluskey (2000) categorizes food products into 3 types; (1) *search goods*, there is a perfect information about the product quality as it can be identified before the consumption by its freshness, appearance; (2) *experience goods*, the quality of the product can be noticed after the consumption; (3) *credence goods*, like organic foods, the product quality cannot be directly determined by consumers during the consumption and even after the consumption. McCluskey (2000) also adds that by the credence-good nature of organic products, a profit-maximizing producer is able to earn more from deceiving consumers with false quality claims. This incentive creates skepticism on consumer side, which, in turn lowers customers' environmental knowledge and environmental concern (Goh and Balaji, 2016).

In this study, we explore the relationship of environment-friendly behaviour and organic product consumption in dealing with perception of organic products. We use data from survey made to consumers living in populated regions of Istanbul in Turkey. An emerging organic food market in a developing economy such as Turkey can provide insight on the strategies to develop and improve a market oriented towards sustainability of resources. The choice of location is not arbitrary as Istanbul constitutes nearly 20% of total population and environmental challenges become more tangible in cities. As a result, the environment where the survey is made is more suitable to study the relationship of environmental preferences and organic products. In our effort to explain this relationship, we have included a wide range of questions under several categories; the questions in our survey are aimed to acquire information on consumers' organic food consumption patterns together with their environmental awareness, willingness to act, attitude, ability to act and sustainability orientation.

This paper is structured as follows: section 2 presents the survey and our methodological approach. In section 3, we present results. Section 4 concludes the paper with its limitations and implications.

2. Methodology

We have conducted a consumer survey of 97 questions to 250 participants living in Istanbul and consuming organic products. The sample was chosen from 5 central and populated districts in Istanbul: Beşiktaş, Fatih, Bahçelievler, Beykoz, Maltepe. The selection is made using a stratified random sample of consumers by quotas based on *age, gender, education and district populations* (Turkish Statistical Institute referred to as TURKSTAT, 2016). A private survey and data research company has conducted the survey. Table 1 shows socio-demographic characteristics of our sample. From descriptive statistics, Table 1 summarized that majority of the respondents in sample are male, married, educated, with a family size of three persons, and a monthly household income lower than 4,000 TL. Most of the sample fell in 35-44 age group.

Table 1: Socio-demographic characteristics (share %)

Districts		Age	
Beşiktaş	23.90	18-24 years	9.96
Fatih	19.92	25-34 years	26.29
Bahçelievler	19.92	35-44 years	31.87
Beykoz	16.33	45-54 years	17.93
Maltepe	19.92	55-64 years	13.94
Employment Status		Children	
Public officer	4.80	0	39.84
Private sector employee	46.80	1	17.93
Self-employed	6.80	2	33.07
Unemployed	2.00	3	7.17
Housewife	27.60	4	1.59
Student	4.00	5+	0.40
Retired	8.00	Gender	
Marital Status		Male	70.00

Single	28.80	Female	30.00
Married	63.60	Household size	
Widow	7.60	1 person	8.40
Education		2 people	26.40
Primary and Middle School	12.00	3 people	22.80
High School	44.40	4 people	31.60
College and Master/PhD	43.60	5 people and more	10.80

Our aim is to find the impact of environment- and sustainability-oriented behavior with organic food consumption. We measured organic food consumption intensity by the frequency of organic food consumption and studied the relationship of organic food consumption with several variable groups³.

1. Shopping patterns: We have implemented first an ordered logistic regression (**model 1**) to understand the relationship of the intensity of organic food consumption with socio-demographic variables and shopping patterns. Results of this first regression are given in Table 2. Results suggest that the more frequent organic food consumption becomes, the more local and targeted shopping is. Frequent organic consumers choose organic bazaars and open neighborhood markets as shopping places as well as online alternatives. These results confirm Zander, Stolz and Hamm (2013) as organic food consumption supports local production thereby sustainability in agriculture. Fresh and locally grown organic alternatives are looked as organic food alternatives as the insignificance of organic shops suggests as well. We see that apart from Bahçelievler, all regions consume less frequently than Beşiktaş region and consumers in Bahçelievler region consume significantly more frequently than those in Beşiktaş region (reference region). Relative availability of organic bazaars and open neighborhood markets in these different regions may be the reason for this result. Another important remark is that as other shopping places for organic food, some consumers replied unanimously their hometown (village). These answers confirm the preference for and trust of local alternatives and raise at the same time the question of whether organic food definition is well understood and green skepticism is still a major problem in the market as Goh and Balaji (2016) suggests.
2. Organic knowledge and preferences: We have implemented second an ordered logistic regression (**model 2**) to understand the relationship of the intensity of organic food consumption with socio-demographic variables and organic food knowledge and preferences in order to have a better understanding of the demand. Results of this second regression are given in Table 2. Results suggest that frequent organic food consumers look for organic alternatives of conventional products. The use of genetic engineering, or **genetically modified organisms (GMOs)**, is prohibited in organic products and we see that organic consumers are sensitive to that aspect. The application of **ionizing radiation to food** to improve safety and extend shelf life by reducing or eliminating microorganisms and insects is prohibited in organic production. This is a specific technical aspect that we do not expect most consumers to know, however there is a significant relationship with the knowledge of this aspect and the likelihood of the frequency of consumption. Frequent consumers significantly make the difference between local and organic production and see that locality is not an aspect of organic products as well as small size farming and organic production although the significance is less pronounced. Frequent consumers states that choosing organic consumption is out of their budget although there is no significant relationship with the perception of organic products as overpriced alternatives. We might conclude that although the organic food prices are found fair, consumers think that they are not compatible with their budget. Another characteristic of

³ For all econometric models, we have checked for multicollinearity using variance inflation factors (VIF) analysis. To do that, we have set an upper limit of 10 for individual VIF levels for each variable and an upper limit of 6 for the mean value of VIF. In addition, we have looked at the tolerance levels.

organic demand about local and foreign organic food is that perceiving these of same quality decreases the likelihood of frequent consumption. Although frequent consumers accept that locality is not aspect of organic products, they perceive non-local organic alternatives of less quality. A general conclusion is that knowledge of organic production technique are known by more frequent organic consumers and they can especially differentiate organic alternatives from locally produced products or small farm produce.

3. Environment-friendliness: We have implemented third an ordered logistic regression (**model 3**) to understand the relationship of the intensity of organic food consumption with socio-demographic variables environmental preferences. This regression accentuates differences among different regions of Istanbul. Apart from Bahçelievler, all regions consume significantly less frequently than Beşiktaş region. Although there are conflicting results on the environmental effects of organic and conventional farming systems in the literature, consumers thinking that organic production helps mitigating climate change are significantly more likely to more frequently purchase organic goods. There was a question related to recent environmental challenges in Turkey more specifically the gold mining projects in Mount Ida. Those consumers who stated that the environmental impact of this project would only be short term were significantly less likely to be frequent consumers. A very high and significant relationship is related to the impact of current lifestyle on environment. For those who think that our current lifestyle is headed to an environmental disaster are more likely to be frequent consumers as well just like consumers who would like to change their lifestyle to stop environmental degradation and boycott companies polluting the environment. However, consumers attending meetings of environmental protection groups such as Green Peace, TEMA and WWF are less likely to be frequent consumers. The last environmental attitude is a more dramatic one including a group identity and must be studied more in detail. There is also a significant relationship between environmental attitude and intensity of organic production related to littering. Consumers supporting the punishment of littering with a very high amend consume more frequently organic food. Again it is not very significant but consumers feeling worried about future generations are less likely to be frequent consumers. We can interpret this as people feeling more in control when they are acting out on their environmental concern for example by green consuming. The general comment on the relationship between environmental attitude and organic food consumption is that general anxiety related to environmental pollution is linked with more intense organic consumption but there are less significant links between activism through environmental protection.
4. Environmental action: We have implemented fourth ordered logistic regression (**model 4**) by extending the previous estimation by including variables related to environmental actions. Environmental action variables are related to the frequency of a specific action so just like the variable organic consumption under consideration, we are referring to the intensity of an action. We observe that some of the significance results are lost and some new appear. By adding variables related to actions taken to reduce environmental damage, we see that:
 - although the coefficient of the variable reflecting the perception of organic consumption as a way to mitigate climate change is positive, it becomes insignificant.
 - consumers thinking that residential construction should be restricted are now significantly less likely to be frequent consumers.
 - consumers feeling worried about future generations were less likely to be frequent consumers, the significance was low, now it become insignificant.

Regarding environmental action, frequent recycling, car-pooling and use of public transportation are associated with less frequent organic consumption levels. These activities are mostly associated with the creation of pollution by humans not very much with the protest of polluting agents. The careful use of water on the other hand is associated with frequent consumption of organic food. The activity here is oriented towards the preservation of resources. Therefore, we can classify environmental actions according to intentions behind them and some are more in line with the support of organic agriculture.

5. Ethical concerns and social influence: We have implemented fifth an ordered logistic regression (**model 5**) to understand the relationship of the intensity of organic food consumption with social responsibility. Frequent consumers think that it is their responsibility to consume environment-friendly products and that their immediate surroundings, people who matter and friends think like that as well. Ethical values have also become increasingly relevant in food purchase decisions (Miele and Evans, 2010; Newholm and Shaw, 2007; Vermeir and Verbeke, 2006). Although fair trade and organic production are part of the solution, ethical concerns are not limited to those according to Zander, Stolz and Hamm (2013). Similarly, several studies suggest a gap between consumers' intentions and actions referred to as 'green purchasing inconsistency' or 'green attitude-behaviour gap' (Chen and Chai, 2010; Wheale and Hinton, 2007). This gap might result from the impact of other factors such as price and availability of the product, and social influences. Green purchasing behaviour is based on both ecological perspectives and evaluation of the various product attributes. The impact of the more environment-friendly behaviors of friends, neighbors and relatives ('peers') decreases the green under-consumption suggesting a process of social learning of environment-friendly habits (Welsch and Kühling, 2010). In a similar vein, Nyborg et al. (2006) showed that environmentally responsible consumption depended on others' behaviour.

Table 2 Econometric Models

	Model 1	Model 2		Model 3		Model 4		Model 5
Fatih	-0.336 (0.575)	-1.474*** (0.517)		-1.639*** (0.489)		-2.860*** (0.769)		-0.927* (0.496)
Bahçelievler	1.042* (0.569)	0.0895 (0.520)		0.219 (0.601)		0.199 (0.769)		-0.0731 (0.598)
Beykoz	-1.390** (0.546)	-2.035*** (0.581)		-3.743*** (0.778)		-3.910*** (1.013)		0.486 (0.689)
Maltepe	-0.479 (0.778)	-0.600 (0.570)		-2.012*** (0.590)		-1.869** (0.809)		-2.062*** (0.546)
age	0.0186 (0.132)	0.0435 (0.143)		-0.0721 (0.143)		-0.162 (0.154)		-0.118 (0.150)
gender	-0.578** (0.274)	-0.323 (0.304)		-0.546* (0.300)		-0.175 (0.319)		-0.515* (0.302)
education	-0.0996 (0.190)	0.0908 (0.203)		-0.137 (0.207)		-0.0191 (0.222)		0.0218 (0.205)
hincome	0.0333 (0.0480)	0.0179 (0.0511)		-0.0468 (0.0547)		-0.00387 (0.0586)		0.0363 (0.0579)
2.civil	0.193 (0.380)	0.635 (0.410)		0.642 (0.410)		0.779* (0.442)		0.720* (0.417)
3.civil	0.692 (0.585)	0.934 (0.629)		0.618 (0.608)		0.596 (0.632)		0.898 (0.684)
family size	-0.0913 (0.135)	0.0364 (0.137)		0.0380 (0.141)		-0.0703 (0.150)		-0.163 (0.148)
children	-0.490*** (0.186)	-0.372* (0.195)		-0.316 (0.193)		-0.193 (0.209)		-0.285 (0.205)
shopping1	-0.153 (0.295)		envprefer1	0.596** (0.284)	envprefer1	0.141 (0.310)	social1	0.477** (0.210)
shopping2	-0.272 (0.439)		envprefer2	0.0236 (0.251)	envprefer2	0.187 (0.262)	social2	0.210 (0.229)
shopping3	0.462 (0.315)		envprefer3	-0.0295 (0.110)	envprefer3	-0.0130 (0.115)	social3	0.788*** (0.239)
shopping4	0.941*** (0.309)		envprefer4	0.132 (0.245)	envprefer4	-0.0141 (0.269)	social4	0.384* (0.212)
shopping5	1.418*** (0.310)		envprefer5	-0.623*** (0.159)	envprefer5	-0.457*** (0.171)	social5	0.470* (0.271)
shopping6	0.681		envprefer6	0.205	envprefer6	0.252	social6	-0.484*

	(0.655)			(0.147)		(0.163)		(0.259)
shopping7	3.007***		envprefer7	-0.0105	envprefer7	0.0418	social7	-0.721***
	(0.937)			(0.146)		(0.155)		(0.242)
shopping8	-0.175		envprefer8	-0.00924	envprefer8	0.129	social8	0.844***
	(0.361)			(0.130)		(0.139)		(0.276)
orgprefer1		0.794***	envprefer9	0.174	envprefer9	0.110	social9	-0.304
		(0.275)		(0.159)		(0.164)		(0.290)
orgprefer2		0.169	envprefer10	1.498***	envprefer10	1.447***	social10	-0.156
		(0.294)		(0.281)		(0.299)		(0.302)
orgprefer3		-0.270	envprefer11	-0.262	envprefer11	-0.343*	social11	-0.0134
		(0.205)		(0.183)		(0.204)		(0.293)
orgprefer4		0.152	envprefer12	-0.0832	envprefer12	0.107	social12	0.315
		(0.232)		(0.130)		(0.146)		(0.323)
orgprefer5		-0.580***	envprefer13	0.574***	envprefer13	0.476**	social13	-0.0608
		(0.142)		(0.169)		(0.185)		(0.290)
orgprefer6		-0.373	envprefer14	-0.349*	envprefer14	-0.468**	social14	-0.411**
		(0.227)		(0.181)		(0.195)		(0.176)
orgprefer7		0.594***	envprefer15	0.362**	envprefer15	0.527***	social15	-0.517***
		(0.175)		(0.180)		(0.189)		(0.123)
orgprefer8		0.0646	envprefer16	0.0640	envprefer16	-0.0298	social16	-0.350
		(0.253)		(0.159)		(0.180)		(0.216)
orgprefer9		-0.379*	envprefer17	-0.154	envprefer17	0.180	social17	-0.0846
		(0.202)		(0.240)		(0.266)		(0.140)
orgprefer10		-0.351***	envprefer18	-0.182	envprefer18	-0.403	social18	0.148
		(0.128)		(0.238)		(0.265)		(0.191)
orgprefer11		0.202	envprefer19	-0.1000	envprefer19	0.0120	social19	1.080**
		(0.222)		(0.138)		(0.144)		(0.545)
orgprefer12		0.109	envprefer20	0.496**	envprefer20	0.472**	social20	-0.276
		(0.183)		(0.209)		(0.221)		(0.672)
orgprefer13		-0.248	envprefer21	-0.442*	envprefer21	-0.317		
		(0.232)		(0.238)		(0.260)		
orgprefer14		0.218	envprefer22	0.00570	envprefer22	0.450		
		(0.224)		(0.274)		(0.292)		
orgprefer15		-0.113	envprefer23	-0.0514	envprefer23	-0.0373		
		(0.215)		(0.223)		(0.254)		
orgprefer16		0.294	envprefer24	-0.176	envprefer24	-0.334		
		(0.222)		(0.269)		(0.286)		
orgprefer17		-0.351***	envprefer25	0.0801	envprefer25	-0.0286		
		(0.128)		(0.292)		(0.296)		
orgprefer18		0.202	envprefer26	0.00565	envprefer26	0.0358		
		(0.222)		(0.253)		(0.265)		
orgprefer19		0.109	envprefer27	0.139	envprefer27	0.168		
		(0.183)		(0.243)		(0.244)		
orgprefer20		-0.248			envaction1	-0.371**		
		(0.232)				(0.170)		
orgprefer21		0.218			envaction2	0.314		
		(0.224)				(0.191)		
orgprefer22		-0.113			envaction3	0.0909		
		(0.215)				(0.152)		
orgprefer23		0.294			envaction4	0.155		
		(0.222)				(0.188)		
					envaction5	0.668***		
						(0.243)		
					envaction6	-0.250**		
						(0.0987)		
					envaction7	0.200*		
						(0.104)		
					envaction8	-0.269**		

						(0.128)	
					envaction9	-0.174	
						(0.179)	
					envaction10	0.00197	
						(1.263)	
					envaction11	-0.841	
						(0.545)	
Constant cut1	-4.524***	-1.552		0.225		3.603	-1.362
	(1.289)	(1.975)		(1.977)		(2.941)	(2.667)
Constant cut2	-3.089**	0.194		1.722		5.204*	0.635
	(1.252)	(1.991)		(1.978)		(2.954)	(2.684)
Constant cut3	-1.363	2.297		3.721*		7.412**	2.963
	(1.234)	(1.997)		(1.998)		(2.995)	(2.699)
Constant cut4	-0.226	3.594*		5.084**		8.949***	4.416
	(1.231)	(1.997)		(2.009)		(3.015)	(2.702)
Constant cut5	1.715	5.936***		7.452***		11.51***	7.093***
	(1.240)	(2.019)		(2.035)		(3.044)	(2.725)
Observations	249	249		249		249	249

5. Conclusion

Environmental concerns and sustainability issues are highly debated at a global level since the last decade. IPCC announced that 1.5 degree Celsius temperature rise is inevitable, whereas efforts must be taken to slow down the temperature rise until 2030 (IPCC, 2019). We see nations supporting and promoting sustainable agricultural activities and put deadlines for the transition to sustainable practices from conventional agriculture. Moreover, Paris Agreement provides a guide for a low carbon future.

The consumption patterns and consumer behaviors have reacted to the ecological concerns. While consumers tend to purchase more sustainable and green products given their environmental concerns, sustainable food products have become more popular and trendy. Existing literature shows the link between environmental concerns and consumer intentions. Moreover, organic food consumption is highly motivated by several concerns: environment, health and sustainability. The current study aims to reveal the relationship between organic food consumption and the environmental behavior of consumers in Turkey. Our results align with existing literature as we see a linkage between organic food consumption and environmental concerns in Turkey. It is noteworthy to mention that more frequent consumers tend to consider environmental issues in a more concrete way than less frequent consumers: pollution, climate change. We also see that organic food consumers in Turkey are well informed about recent environmental challenges and concerned about long-term effects.

Our results indicate that Turkish organic food consumers do not mostly prefer participating in environmental activism, and group action is lacking. Therefore, we suggest that policies to improve group acting can be essential to sustain group behavior among environmentally concerned consumers. NGOs may disseminate the information on sustainability and improve the knowledge among consumers. Since we prove environmentally concerned consumers can

act more environmentally friendly, public policies may target to expand sustainable activities such as energy saving, recycling, and reducing waste behaviors' dissemination.

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