



Societal awareness of environmental certifications in Costa Rica

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ARTICLE INFO

Article history:

Received 29 March 2020

Received in revised form

29 September 2020

Accepted 3 November 2020

Available online 10 November 2020

Handling editor: M.T. Moreira

Keywords:

Voluntary approaches

Environmental programs

Environmental certifications

Environmental awareness

Corporate sustainability

ABSTRACT

The effectiveness of voluntary environmental programs and certifications to render social and private benefits depends on how aware consumers are, so that they can consider such initiatives when making their decisions. Consumers' awareness has been mostly addressed in developed countries, although the benefits of companies' environmental actions also take place in developing countries. This study is conducted in a developing country, such as Costa Rica. Using a large sample ($n = 1191$), consumers' awareness of environmental certifications is studied at a general level (being able to name some environmental certification or program) and at a specific level (ability to name certified firms). The results show that consumers who are younger, with higher household income, with a university or technical degree and those participating in environmental or community groups are more likely to be aware of environmental certifications on both levels. Moreover, aware consumers tend to be more willing to pay for a certified coffee or a coffee produced by a certified company.

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1. Introduction

Voluntary approaches to environmental policy are commitments from firms in improving their environmental performance, not formally required by a regulatory agency or law (Khanna, 2001; OECD, 2000). These approaches usually take the form of environmental programs and certifications, either for companies or specific products.¹

Voluntary environmental programs have been conceptualized as clubs in the sense proposed by Buchanan (1965). As noted by Prakash (2000) and Potoski and Prakash (2005), these programs aim at modifying members' behavior in order to produce public benefits. Although belonging to the club entails some costs, it also

renders some excludable and nonrivalrous benefits to participating companies, such as affiliation with the club's positive brand name, particularly, when they are signaled with a certification (see also Potoski and Prakash, 2009). Certified firms can obtain important side-benefits, such as getting technical assistance and information from environmental agencies (Darnall and Sides, 2008; Klooster, 2005), saving production costs and improving its green image and public recognition (Hillary, 2004; Mariotti et al., 2014; Ormazabal and Sarriegi, 2014; Zeng et al., 2005).

The effectiveness of voluntary initiatives depends, to a large extent, on the society being aware of environmental programs and its most visible expression, the environmental certifications (Chekima et al., 2016; Maniatis, 2016; Panwar et al., 2010; Van Loo et al., 2015). Thus, it seems relevant to investigate such awareness and the factors that determine it. Most studies on consumers' environmental awareness and concern have been conducted in developed countries (see, e.g., Civero et al., 2017, 2018; Diamantopoulos et al., 2003; Dodds and Ramsay, 2017; Murmura and Bravi, 2016; Paço and Lavrador, 2017; Thøgersen et al., 2010), where environmental policies tend to be better established. Nevertheless, many developing countries are fostering environmental policies and consumers in such countries are becoming more informed and concerned (Vignola et al., 2013). Moreover, the productive activity of certified companies (or companies producing

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¹ According to Global Ecolabelling Network (GEN, 2004) and The UN Office for Projects Services (UNOPS, 2014) ecolabels communicate the environmental performance of a product or service based on life cycle considerations and distinguish the certified products from the average ones in the same category (e.g., Fairtrade, USDA Organic, Rainforest Alliance). Company certifications provide a specific framework for the firm's environmental improvement (e.g., ISO 14001, ISO 14064, Carbon Neutral).

certified products) is also carried out in developing countries, where the environmental actions of those companies have direct domestic impacts. This is particularly clear in the case of some specific certifications, such as Fairtrade and Organic. Thus, it is especially relevant to investigate how aware the society of developing countries is about environmental programs and certifications.

To our best knowledge, no previous studies analyzing consumers' awareness of environmental certifications have been conducted in Latin America and virtually in any developing countries.² This is an important gap that this paper contributes to fill by studying this topic in a Latin American country, such as Costa Rica.³ Moreover, this study contributes to show how socioeconomic variables can be used as predictors of environmental awareness, and gives some novel insights that can help to public and private decision-making.

The aim of this paper is to assess how aware Costa Rican consumers are of environmental certifications and to establish a socioeconomic profile of the aware consumer. This is done on two different dimensions. The first one, called "general awareness", refers to how aware consumers are of environmental certifications in the sense of being able to name one or more of them without being prompted. The second one, labelled as "specific awareness" cares about consumers' ability to identify certified firms under some specific certification.

To determine what proportion and what profile of consumers are aware in a clean and simple way, no ad-hoc scales or constructs are used. Instead, a dichotomous characterization is performed between "being aware" or "not being aware" in the sense of consumers being or not being able to name some certifications (general level) and certified firms (specific level). Finally, awareness is connected to consumers' willingness to pay (WTP) for certified products by means of a non-parametric statistical test.

At the specific level, three particularly relevant certifications in Costa Rica are considered: Carbon Neutral (CN), ISO 14001, and Fairtrade (FT). CN is a domestic program aimed at reducing the carbon footprint (Musmanni, 2014). ISO 14001 is an international certification adopted by companies that want to implement or improve an Environmental Management System (International Organization for Standardization, 2015). FT is an ecolabel that guarantees that FT producers comply with certain environmental and social standards (World Fair Trade Organization and Fairtrade Labeling Organizations International, 2018).⁴ All three have in common that they are voluntarily adopted by companies, they require the fulfillment of certain environmental criteria that must be checked by a certifying entity or arbiter and they are internationally recognized. In all three cases, companies use the certification as a signaling mechanism by displaying the logo on their products, their stores or stands, and their web pages (see e.g. Adobe Rent a Car, 2020; CoopeAtenas, 2020; Kolbi Business, 2020).

Costa Rica is an interesting case study. Being considered as a developing country by the International Monetary Fund (Brandao-

Marques et al., 2020), it has a very active role in terms of environmental policy, especially in environmental education, climate change mitigation, ecotourism, and conservation (Blum, 2008; Flagg, 2018). The increasing role of environmental certifications and programs offers a channel for Costa Rican companies to improve their environmental and economic performance (André and Valenciano-Salazar, 2020; Birkenberg and Birner, 2018; Blackman and Naranjo, 2012; Blackman et al., 2014; Rivera, 2002).

This study aims to add some additional insights to the literature on Voluntary Environmental Engagement in Costa Rica, which, to a large extent, seems to be driven by a place-based view of corporate sustainability. For example, Rivera (2002) showed that the Costa Rican Certification for Sustainable Tourism (CST) is taking advantage of market incentives in the form of price premiums to promote superior environmental performance. Blackman et al. (2014) found that eco-certification in Costa Rica, and developing countries in general, can generate private benefits for tourism operators and has the potential to improve their environmental performance. Snider et al. (2017) showed that, in the coffee sector, certifications offer non-financial benefits to farmers and cooperatives, including better management and more resilient cooperatives. Blackman and Naranjo (2012) found that the organic coffee certification in central Costa Rica improves coffee growers' environmental performance, significantly reduces chemical input use and increases the adoption of environmentally friendly management practices. The Costa Rican cooperative 'Coopedota' was the first organization worldwide that achieved the Carbon Neutral certification in the coffee sector. Birkenberg and Birner (2018) showed that this certification created awareness on emission hot-spots along the coffee value chain. Flagg (2018) claimed that the Carbon Neutral certification can reinvigorate the national tourism industry and create opportunities for the continued growth of ecotourism and reduce the carbon footprint. Most of these studies are focused on the company side. The present one aims at complementing this literature by investigating consumer awareness.

Section 2 presents the suggested hypotheses in connection with the related literature. Section 3 elaborates on the methodological aspects, including the study area, data collection and model specification. The results are presented in Section 4 and discussed in Section 5. Section 6 offers some conclusions, policy implications and suggestions for future research.

2. Literature review and hypotheses

Awareness of environmental certifications can be seen as a particular dimension of *environmental knowledge*, understood as what people know about the environment, including key relationships, impacts and actions necessary for sustainability (Mostafa, 2007). Environmental awareness is expected to have a positive impact on ecological behavior and attitudes (Arcury, 1990; Haron et al., 2005; Laroche et al., 2001; Olli et al., 2001; Ritter et al., 2015; Schahn and Holzer, 1990).

Consumers' ability to acknowledge companies' initiatives and react positively to them depends on how aware they are about the existence of environmental certifications. But this "general awareness" may not be enough to generate reputational benefits for companies (see e.g. Civero et al., 2018), as some consumers may have heard of some certifications and not be able to identify certified companies. Thus, the second addressed dimension is "specific awareness", which refers to the ability to name certified companies. The hypotheses of the study mostly refer to the expected effect of some socioeconomic variables on consumers' awareness and are formulated in a double (general and specific) level.

The first considered variable is income. According to Maslow,

² An exception is Tan et al. (2019), with an application in China, also considered a developing country.

³ We are not aware of any similar study in Costa Rica. The closest one seems to be Aguirre (2007), who investigated the consumer profile of shoppers at the organic farmers market in Costa Rica, but does not focus on awareness of environmental certifications. In Latin America, Ritter et al. (2005) studied the consumer profile of green products in Brazil and found that information and knowledge were strongly correlated with green consumption.

⁴ A Fairtrade producer is a producer organization complying with Fair Trade standards, or a producer that is a member of World Fair Trade Organization. A Fairtrade producer describes a producer set-up located in a producing country as classified by Fairtrade International that has obtained product certification as per the relevant Fairtrade Standards." (FLOCERT, 2020).

1954 hierarchy of needs, humans seek to satisfy their vital needs before moving up to higher level needs, such as the concern for environmental quality. In the same line, Inglehart (1977, 1997) argued that environmental protection is primarily a post material concern, which can only develop in high-income countries. Consistent with this theory, Arcury et al. (1986), Arcury (1990), and McCright (2010) found a positive relationship between income and environmental knowledge. Based on this evidence, the two first hypotheses are the following:

H1(a). *Consumers with higher income are more likely to be aware of environmental certifications at the general level.*

H1(b). *Consumers with higher income are more likely to be aware of environmental certifications at the specific level.*

The second variable is consumers' age. Empirical studies show mixed evidence regarding this variable. While Arcury et al. (1987), Diamantopoulos et al. (2003), Hayes (2001), and McCright (2010) found that younger people have better environmental knowledge than older people, other studies such as Arcury et al. (1986), O'Garra et al. (2005), and Paço and Lavrador (2017) got the opposite result. The effect of age on environmental attitudes and behavior is also mixed. Some studies showed a positive effect (see e.g. Grubor and Djokic, 2016; Liu et al., 2019; Olli et al., 2001), but Loureiro and Lotade (2005) and Schwepker and Cornwell (1991) found that older consumers were less likely to buy ecologically packaged products. In Costa Rica, environment and ecological aspects have been introduced as 'transversal issues' to other subjects in the school curriculum in the 2000s (Blum, 2008). Accordingly, the second pair of hypotheses is stated as follows:

H2(a) and H2(b). *Consumers' age is negatively related to the probability of being aware of environmental certifications at the general (a) and the specific (b) level.*

In the literature, there is a difference between environmental attitudes and environmental knowledge attending to **gender**. Olli et al. (2001) concluded that women exhibit more environmentally friendly behavior than men. Aguirre (2007), Grubor and Djokic (2016), Pinheiro (2012), Laroche et al. (2001), Loureiro and Lotade (2005) and Yang et al. (2012) found out that women are more willing to pay for ecological products. Nevertheless, most authors conclude that males tend to be better informed about environmental aspects (Arcury et al., 1986, 1987; Arcury, 1990; Baral, 2018; Hayes, 2001; Mostafa, 2007; O'Garra et al., 2005; Paço and Lavrador, 2017; Schahn and Holzer, 1990). Based on these findings, the following hypotheses are introduced:

H3(a) and H3(b). *Men are more likely to be aware of environmental certifications at the general (a) and the specific (b) level.*

Another possible driver of environmental awareness is the education level. Vicente et al. (2013) showed that individuals with higher education tend to possess more environmental knowledge and pro-environmental behavior. Other studies have confirmed that the educational level is an essential determinant of environmental attitudes and preferences (Aguirre, 2007; Loureiro and Lotade, 2005; Liu et al., 2019; Ritter et al., 2015; Schwepker and Cornwell, 1991) and environmental knowledge, either related to environmental issues (Arcury et al., 1986, 1987; Arcury, 1990; Diamantopoulos et al., 2003; Grunert, 1993; Haron et al., 2005; Ostman and Parker, 1987; Zsóka et al., 2013), environmental features of some products (Baral, 2018; O'Garra et al., 2005), or scientific aspects of the environment (Hayes, 2001; McCright, 2010). Thus, the following pair of hypotheses is formulated:

H4(a) and H4(b). *Consumers with a university or technical degree*

are more likely to be aware of environmental certifications at the general (a) and the specific (b) level.

Given the geographical structure of Costa Rica, the place of residence may also matter, although the evidence in the literature is mixed again. Haron et al. (2005) found that the place of residence is a non-significant variable to explain the environmental knowledge, whereas Arcury (1990) and Arcury et al. (1986) concluded that urban residents tend to have a higher environmental knowledge. In Costa Rica, 75.7% of the population over 18 lives in the central provinces (San José, Alajuela, Cartago and Heredia) (see Fig. 1). The most important cities of the country are located in central provinces, in an area known as the Greater Metropolitan Area. Although this area comprises only 3.8% of the Costa Rican territory, it concentrates 52.7% of the total population of the country and around 70% of industry employment (Arias and Sánchez, 2012). Considering this concentration of population and economic activities, it can be expected that:

H5(a) and H5(b). *Consumers who live in central provinces are more likely to be aware of environmental certifications at the general (a) and the specific (b) level.*

Belonging to an environmentalist or community group can be a sign of environmental awareness. Nevertheless, the effect of such involvement has not been extensively studied in the literature. Schwepker and Cornwell (1991) did not find any relationship between the number of community organizations each person belongs to and their intention to purchase ecologically packaged products. Conversely, Olli et al. (2001) found that participation in environmental organizations is positively correlated with environmental behavior. Haron et al. (2005) found a positive correlation between participation in environmental activities and environmental knowledge. Many people in Costa Rica voluntarily participate in this type of groups, mostly aimed at improving the quality of the environment and encouraging the socioeconomic development of neighborhoods (Gumeta-Gómez et al., 2016). Accordingly, the following pair of hypotheses is formulated:

H6(a) and H6(b). *Consumers who participate or belong to environmentalist or community group are more likely to be aware of environmental certifications at the general (a) and the specific (b) level.*

The final considered variable is the marital status. Schwepker and Cornwell (1991), Laroche et al. (2001), and Grubor and Djokic (2016) found a positive relation between being married and environmental attitudes. Hayes (2001) found a positive effect of marriage on environmental knowledge of scientific issues in the United States and the United Kingdom. Diamantopoulos et al. (2003) and Haron et al. (2005) found no effect of the marital status. The following pair of hypotheses is formulated:

H7(a) and H7(b). *Marital status is not related to the probability of being aware of environmental certifications at the general (a) or the specific (b) level.*

Regarding purchase decisions, it is expected that aware consumers are more willing to pay a price premium for certified products (see e.g. Laroche et al., 2001), as stated in the following hypotheses:

H8(a) and H8(b). *Consumers who are more aware of environmental certifications at the general (a) or the specific level (b) are more willing to pay price premiums for environmentally certified products.*

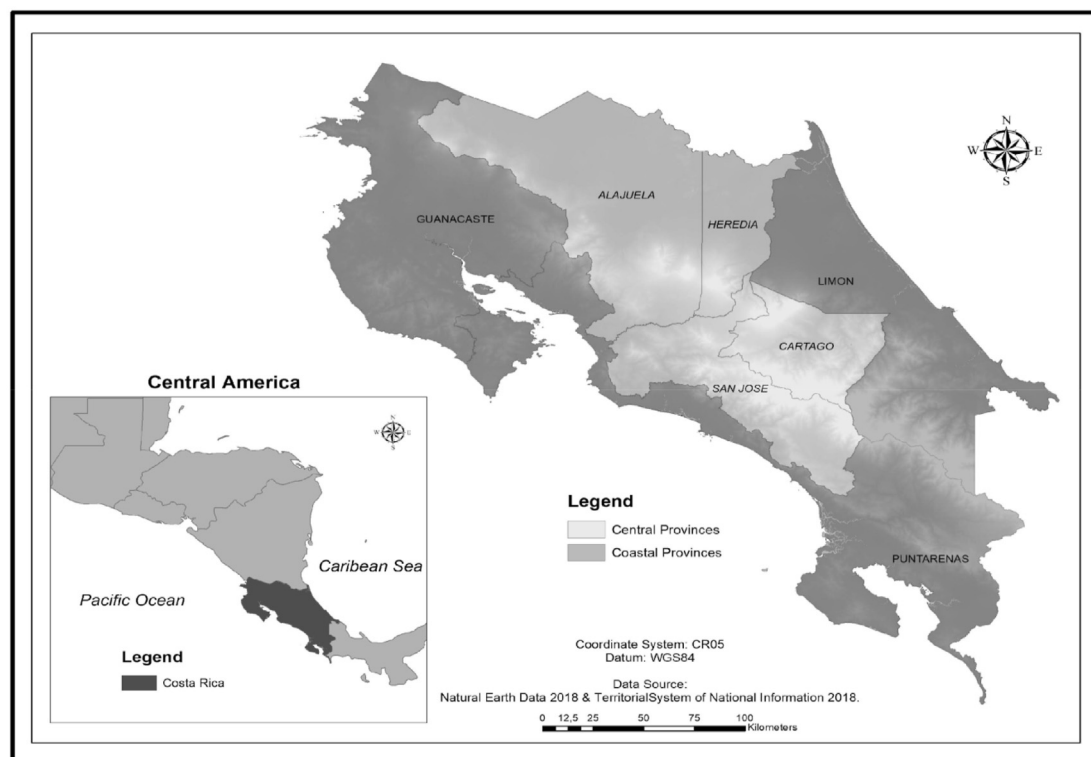


Fig. 1. Geographical location of the central and coastal provinces of Costa Rica.

3. Materials and methods

Costa Rica is a developing country in Central America. In 2017, the adult population (over 18 years) was 3,290,465 ([Tribunal Supremo de Elecciones de Costa Rica \(2017\)](#)). In the same year, according to [The World Bank Group, 2018](#), the Gross Domestic Product per capita was \$11,815 (current U.S. dollars), the second highest in Central America, after Panama. However, the relative poverty rate is around 22%, 11 percentage points higher than the average of OECD countries ([OECD, 2016](#)).

A questionnaire⁵ was built with two related purposes that determine its structure. The first purpose is to investigate the societal awareness of environmental certifications, which is the main focus of the present article. The second one is to measure consumers' WTP for certified products (more exactly, for a specific product, which is coffee). The latter is addressed in a companion article, although the present ones gives a glimpse of the connection between both dimensions (awareness and WTP). In accordance with this double purpose, the data collection follows standard survey protocols for contingent valuation studies, as suggested, e.g. in [Mitchell and Carson \(1989\)](#).

The questionnaire has three sections. The first part deals with socioeconomic and demographic features, the second one with awareness of environmental certifications, and the third one with WTP for a certified product (coffee). The respondents were randomly approached in a personal and casual way in public places. 1191 face-to-face surveys were completed between July 2017 and April 2018. A qualitative control of non-responses was performed to check that this problem did not represent a large proportion of the sample (roughly, below 35%), but the exact number of non-responses was not quantitatively controlled. To reduce the

possibility of biases, the sample is stratified by province and gender. See details in [Table 1](#).

Awareness at the general level was measured by an open question, as follows: "Could you name some voluntary environmental certifications that companies can adopt in Costa Rica? Name those that you remember now". The answers were coded by a dummy variable, GA ("General Awareness"), valued 1 if the respondent was able to correctly name one or more certifications and 0 otherwise.

At the specific level, the sample was randomly divided into three subsamples corresponding to CN, FT and ISO 14001 certifications. Each respondent was asked to name certified companies within one (and only one) of these certifications in an open format: "Could you name some companies or institutions that have the [CN, FT or ISO 14001] certification? Please, name them". This information was coded by another dummy variable, SA ("Specific Awareness"), equal to 1 if the respondent was able to correctly name one or more

Table 1
Costa Rican population over 18 years old and survey structure.

By province	Costa Rica ^a	%	CN	FT	ISO 14001	Total Sample	%
San José	1,114,779	33.9	132	130	130	392	32.9
Alajuela	630,990	19.2	76	76	78	230	19.3
Cartago	387,905	11.8	42	42	42	126	10.6
Heredia	332,859	10.1	41	40	73	154	12.9
Guanacaste	240,637	7.3	28	28	32	88	7.4
Puntarenas	310,662	9.4	36	35	34	105	8.9
Limón	272,633	8.3	32	32	32	96	8
By gender							
Men	1,638,577	49.8	205	218	204	627	52.6
Women	1,651,888	50.2	182	165	217	564	47.4
TOTAL	3,290,465	100.0	387	383	421	1191	100.0

^a Source: Electoral roll of the Supreme Election Tribunal of Costa [Tribunal Supremo de Elecciones de Costa Rica \(2017\)](#).

⁵ The questionnaire is available upon request.

Table 2
Variables and descriptive statistics.

Dependent variables		Mean	S.D.
GA	1 if the respondent named at least one certification, 0 otherwise	0.2485	0.4323
SA	1 if the respondent named at least one certified company, 0 otherwise.	0.1990	0.3994
Independent variables			
I	Monthly household income ($q_i = 1$ if the respondent is in quintile i , 0 otherwise)		
	Income quintiles, in US dollars:		
Q ₁	Less than 528 (omitted for estimation purposes)	0.1671	0.3732
Q ₂	Between 529 and 1056	0.2569	0.4371
Q ₃	Between 1057 and 1761	0.2469	0.4314
Q ₄	Between 1762 and 3521	0.2124	0.4092
Q ₅	More than 3522	0.1167	0.3212
A	Age	35.03	13.50
G	Gender, 1 = man, 0 = woman	0.5264	0.4995
E	Education level, 1 = university or technical education degree, 0 otherwise	0.4030	0.4907
PR	Place of residence, 1 = central provinces, 0 = coastal province	0.7573	0.4289
PG	1 = respondent belongs to one or more environmentalist or community group, 0 otherwise	0.1385	0.3456
M	Marital status, 1 = is married or in a domestic partnership, 0 otherwise	0.3233	0.4679
Type of certification (only for specific knowledge)			
CN	1 for subsample about CN, 0 otherwise (omitted)	0.3249	0.4685
FT	1 for subsample about FT, 0 otherwise	0.3216	0.4673
ISO 14001	1 for subsample about ISO 14001, 0 otherwise	0.3535	0.4782

certified companies or organizations and 0 otherwise.

In our case study, it is important to assess general and specific awareness by means of open questions rather than prompting consumers with specific names. Open questions give the respondents the opportunity to think more actively about the certifications, putting them in a better position to answer the questions about WTP in the final part of the study. Moreover, prompting respondents with specific names could act as a cue and increase the number of false positives, i.e., cases in which the consumers give a right answer by chance. The answers to the awareness questions can only be true or false and thus the authors did not need to interpret the answers.

A logit model⁶ was used to relate GA and SA with consumers' characteristics. Two equations are estimated, where the explained variables are the probabilities of GA and SA, respectively, being equal to 1, and the regressors are the socioeconomic variables described in Table 2. In the equation for specific knowledge, three additional dummy variables (CN, FT or ISO 14001) are included to identify the specific certification (e.g., FT takes the value 1 if the respondent was asked about FT and 0 otherwise). For estimation purposes, the CN variable was omitted to avoid collinearity, so the coefficients associated with FT and ISO 14001 must be interpreted in relative terms as compared to CN.

In the third part, after explaining the characteristics of the corresponding certification, the respondents were asked about their WTP for a package of 250 g of certified coffee, or more specifically, coffee produced by a certified company. Using the Mann and Whitney, 1947 test, WTP between "aware" and "non-aware" consumers is compared.

4. Results

At the general level, roughly 25% of the respondents (296 out of 1191) were able to name at least one certification. The eight most named ones were ISO 14001 (12.01% of the respondents), CN Program (9.07%), Ecological Blue Flag (8.14%), Rainforest Alliance (3.36%), Organic Certifications (2.10%), Costa Rican Certification for Sustainable Tourism (1.51%), Fairtrade (1.51%) and Essential Costa

Rica Brand (1.34%). At the specific level, 237 respondents were able to correctly name some certified company or organization when asked about a specific certification.

Table 3 shows the estimations of the logit models for general and specific awareness. At both levels, awareness is positively related to household income, holding a university or technical degree, and belonging to a community or environmentalist group, while age has a slightly negative effect. Marital status, gender and the place of residence do not show any significant impact.

At the specific level, respondents who were asked about ISO 14001 companies were more likely to answer correctly than those questioned about CN, and both were more likely than those asked about FT.

A natural question is to what extent being aware of environmental certifications and certified companies has an impact on consumer's purchase intentions. A detailed answer to this question is beyond the scope of this study and will be addressed in a companion paper. Nevertheless, it is useful to have a first approach by checking if, on average, aware consumers show a higher WTP for a certified product.⁷ The selected one was coffee, which is a very important commodity in Costa Rica and is susceptible of being certified or produced by certified companies.

This is done by applying the Mann-Whitney test both at the general and the specific level. In each case, the sample is divided in two subsamples of "aware" and "not aware" consumers, i.e., consumers being able and not being able to name an environmental certification (general level) or a certified firm (specific level) and the (additional) WTP for a package of certified coffee is compared between both subsamples. Table 4 shows that WTP of aware consumers tends to be statistically higher than that of non-aware consumers, both at the general and the specific level for any standard significance level.

5. Discussion and limitations

Since three quarters of the sample was unable to name any certification and an even larger proportion were unable to identify

⁶ As a robustness check, a probit model was also estimated and the results were virtually the same.

⁷ "Aware consumers" refers to "a priori" awareness. Before asking the valuation questions, all the consumers (whatever their answers to the previous questions) were informed about the main features of the certification they were asked about.

Table 3
Estimated logit model for general and specific awareness.

Variable		General awareness		Specific awareness	
		Coefficients	Marginal effects	Coefficients	Marginal effects
Income	q_2	0.6133*	0.0965*	0.5659	0.0656
	q_3	0.9656**	0.1519**	0.9456*	0.1095*
	q_4	1.1293***	0.1777***	1.0962**	0.12698**
	q_5	1.8106***	0.2849***	1.3976**	0.1619**
A		−0.0245 ***	−0.0039***	−0.0195*	−0.0023*
G		−0.0224	−0.0035	0.2971	0.0344
E		0.8288***	0.1304***	1.180***	0.1367***
PR		−0.0941	−0.0148	0.4198	0.0486
PG		1.1212***	0.1765***	0.6530**	0.0756**
M		−0.2666	−0.0419	−0.140	−0.0162
Certific.	ISO			1.1961***	0.1385***
	FT			−1.4690***	−0.1702***
Constant		−1.6423***		−3.0930***	
n		1191		1191	
Log likelihood		−574.54122		−436.56021	
McFadden R^2 (adj.)		0.123		0.244	

Legend: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 4
Mann-Whitney test of willing to pay differences between aware and not aware consumers (price premiums in US \$).

	General awareness (environmental certifications)					
	Aware consumers. GA = 1. (n = 296)		Non-aware. GA = 0. (n = 895)		Mann-Whitney test	
	Mean	SD	Mean	SD	Z	p-val.
WTP	0.7762	0.8646	0.6127	0.8068	4.322	0.0000
	Specific awareness (certified companies)					
	Aware consumers. SA = 1. (n = 237)		Non-aware. SA = 0. (n = 954)		Mann-Whitney test	
	Mean	SD	Mean	SD	Z	p-val.
WTP	0.7288	0.7273	0.6346	0.8459	3.340	0.0008

certified firms, one can conclude that there is plenty of room to develop these voluntary approaches in terms of communication and public visibility. Nevertheless, in order to assess the results, one should consider that open (unprompted) questions tend to result in lower rates of correct answers than closed ones.

The conclusion that general and specific awareness is positively related to income is in line with previous studies addressing different aspects of environmental knowledge and awareness, such as Arcury et al. (1986), Arcury (1990) and McCright (2010). Other studies have shown that income is also positively related with other dimensions of ecological behavior and attitudes. For example, Aguirre (2007) showed that Costa Rican consumers who buy organic products tend to have a high income profile. For related studies in other countries, see e.g. Liu et al. (2019), Loureiro and Lotade (2005), or Pinheiro (2012).

Consumers with a university or technical education degree were around 13% more likely to name certifications and certified companies. This positive impact of education has been found by previous studies in the U.S. (Arcury et al., 1986, 1987; Arcury, 1990; Baral, 2018; Hayes, 2001; McCright, 2010), U.K. (Diamantopoulos et al., 2003; Hayes, 2001; O'Garra et al., 2005), Europe (Grunert, 1993; Hayes, 2001; Zsóka et al., 2013), Malaysia (Haron et al., 2005), Brazil (Ritter et al., 2015), and Japan (Hayes, 2001).

The negative impact of age is in the line with results from Arcury et al. (1987), Diamantopoulos et al. (2003), Grunert, 1993, Hayes (2001), and McCright (2010). The present study finds out that, for each additional year of age, consumers are 0.39% less likely to name

a certification or an environmental program, and 0.23% less likely to name a certified company. New Costa Rican generations seem to be more aware of environmental issues, and specifically, of environmental certifications, in accordance to the ecological position that Costa Rica maintains in international forums (Flagg, 2018), the importance of nature tourism (Blackman et al., 2014; Rivera, 2002) and the inclusion of environmental education in the public system (Blum, 2008).

As expected, consumers participating in community or environmental groups seem to be more aware of environmental certifications. This can be explained because of some environmental programs work hand in hand with environmental and community groups or organizations, such as the Blue Flag Program, recycling initiatives, and voluntary actions of some companies, such as the collection of plastic on beaches and rivers (Blackman et al., 2014; Programa de Bandera Azul Ecológica, 2017). This is consistent with the findings by Haron et al. (2005).

No significant effects of gender, marital status and the place of residence were found. Although it contradicts the original hypothesis, the lack of relevance of the place of residence is consistent with the fact that Costa Rica is a small country with a homogeneous access to information and basic education. According to The World Bank Group, 2018, 100% of the Costa Rican population has access to electricity, the mobile cellular subscriptions (per 100 people) are about 180, and 72% of the individuals have used the Internet (from any location) in the last 3 months. The conclusion about marital status is consistent with most of the previous studies.

The lack of effect of gender contradicts most of the reviewed articles about environmental knowledge, which tend to find that males are more informed of environmental issues. To interpret this difference, it is important to consider the increasing role and the access to education of women in Costa Rica. According to the "Estado de la Nación" database, 44.1% of women between 18 and 24 years old were taking regular education in 2017 and only 36.4% of men in the same age range.

The fact that ISO 14001-certified companies tend to be identified more often by consumers than CN or FT companies can be explained by the following reasons: (i) ISO 14001 is an international standard, strongly promoted by the International Organization for Standardization (ISO, 2015). This is in line with previous studies showing that ISO 14001 is a quite well-known certification. For example, Murmura and Bravi (2016), in a study conducted in Italy, found that 31.1% of the respondents knew the certification and

56.1% perceived that adopting companies could improve their management process; (ii) when the survey was conducted, there were 111 companies certified as ISO 14001 in Costa Rica (International Organization for Standardization, 2019), 77 CN organizations (Ministerio de Ambiente y Energía, 2018), and only 33 FT producers⁸ (FLOCERT, 2019); (iii) Out of the top ten brands preferred by consumers in Costa Rica in 2017, three of them belong to companies with the ISO 14001 certification (Chacón, 2017), which naturally makes Costa Rican consumers more prone to be familiar with this certification.

On the contrary, FT companies are mainly cooperatives and associations located in rural areas that only produce agricultural goods. Moreover, they allocate most of their production in international markets, where consumers are willing to pay higher prices for FT products. Since FT companies have not been strongly promoted in local markets, Costa Rican consumers are not likely to know them.

Regarding limitations, as usual in this type of studies, we face the problem of non-responses. Unfortunately (even if a precise counting of non-responses was available) it is not possible to know how non-respondents might have answered and, for obvious reasons, their socioeconomic data are not available either. One may guess that non-respondents could be less aware than respondents. In that sense, one could be inclined to take the estimated values on general and specific awareness as an upper bound of the real ones.

On the other hand, the aim of the study is not to offer an exhaustive measure of consumers' awareness, but only to determine if the respondents were aware or not of environmental certifications and certified firms. Nevertheless, the obtained results reveal that the crucial difference to be considered is between those being and those not being aware, rather than using sophisticated quantitative measures of awareness. Additionally, to keep the study manageable, only three certifications have been addressed. Future extensions may include a more comprehensive consideration of available certifications.

Finally, only two polar situations have been addressed: either certified or not certified companies. However, there are various levels of environmental performance in practice. They can be related to the level of involvement in environmental certifications, and the array of sustainability practices carried out by companies (Rivera and Roeschmann, 2019). Exploring the causes and consequences of this dimension opens up interesting lines of research. For example, regarding the causes, it has been noted that environmental performance tends to increase with the number of green competitors (Dai et al., 2018; Deboer et al., 2017). As for the consequences, the benefits perceived by companies are prone to increase with the level of engagement in sustainability practices. This can be especially relevant for some sectors in Costa Rica, such as tourism (see e.g. Rivera, 2002; Rivera and Roeschmann, 2019) and agroindustry (see e.g. Birkenberg and Birner, 2018).

6. Conclusions, policy implications and future research

The initial hypotheses have been partly confirmed, suggesting that socioeconomic and demographic features matter when studying environmental awareness of Costa Rican consumers. A representative aware Costa Rican consumer is young, educated, with medium or high household income and participating in environmental or community activities. Such consumer is more likely to be aware of ISO 14001 than other certifications.

This study has been performed in a specific country, Costa Rica, which is considered a developing country. The fact that the results

are parallel to those obtained in developed countries can be taken as a sign that consumers' awareness is spreading and becoming a worldwide phenomenon, not limited to a small number of countries.

Although voluntary environmental approaches are quite well established in Costa Rica, there seems to be room for improvement in terms of consumers' awareness. Identifying the profile of an informed consumer is a challenge for the design of companies' environmental volunteer campaigns, as well as the deepening of green businesses. Such a profile can be a key issue for those companies that seek to improve their green image. Green advertising campaigns can be addressed to a more specific public, in this case, young with medium and/or high household income, with a university or technical degree and willing to participate in environmental groups.

At the public policy level, environmental education programs can be designed to improve the knowledge of lagging groups, especially through environmental training at basic education levels (primary and secondary). Fostering participation in environmental and community groups is also an interesting avenue to promote awareness. More information is also needed through information campaigns in the media.

Finally, this article is part of a broader research agenda aimed at getting a better knowledge of voluntary environmental approaches in Costa Rica. At the consumers' level, some ongoing research is focused on performing a more detailed analysis of consumers' WTP for certified products and the relevance of the media to disseminate information on this topic. At the companies' level, ongoing research is focused on decision making process when choosing a certification and to identify the main motivations and obstacles for Costa Rican companies when adopting environmental programs and certifications.

CRedit authorship contribution statement

Jorge A. Valenciano-Salazar: Conceptualization, Methodology, Data collection, Data curation, Writing - original draft, Writing - review & editing. **Francisco J. André:** Conceptualization, Methodology, Writing - original draft, Writing - review & editing. **Mario Soliño:** Conceptualization, Methodology, Writing - review & editing.

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.

Acknowledgements

The authors would like to thank Michael Moya for his help with the making of the Costa Rica map. Authors acknowledge support from the Scholarship Department of the National University of Costa Rica, (grant JB-C-1106-2016) and the Spanish Ministry of Science and Innovation (PID 2019-105517RB-I00).

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⁸ Some cooperatives are jointly certified as consortia.

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