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Consumer Choices and Motives for Eco-Labeled Products in China: An Empirical Analysis Based on the Choice Experiment

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Abstract: Based on choice experiments conducted via face-to-face interviews with 435 participants in four provincial areas of China (Shanghai, Zhejiang, Jiangsu, and Guangdong), Chinese consumers' preferences and motives for purchasing eco-labeled rice are examined in this study. The heterogeneous effects of each motivating channel are also investigated. The results reveal positive correlations between premiums for eco-labeled rice and consumers' concerns about food safety and the environment, suggesting that health benefits and environmental considerations are the two critical motivations. The willingness to pay for eco-labeled rice does not increase with consumers' knowledge of the different production standards indicated by each eco-label. Individual characteristics that determine each class are further explored through a seemingly irrelevant regression to identify the target group of consumers for policy-makers.

Keywords: eco-labeling; eco-environmental concerns; food safety; choice experiment; latent class model

1. Introduction

Food consumption is linked to different environmental impacts. Therefore, consumers' food choices represent significant environmental decisions [1–3]. The public is becoming increasingly concerned about the influence of people's daily activities on the natural environment [4,5], leading to a shift in the focus of environmental policy from supply-related pollution control to demand-oriented instruments to achieve more sustainable consumption patterns [6]. The latter instruments depend mainly on informing consumers about the environmental effect of products and calling on consumers to reduce the environmental damage caused by their purchasing choices [7]. In particular, eco-labeling schemes have received increasing attention and have become an effective, high-profile instrument for achieving environmental goals [6]. Due to the need to influence the way in which products are produced, changes in consumer behavior are important, and eco-labeling constitutes a response.

Eco-labeled products are environmentally preferable products with eco-labels compared to other products in the same category [8–10]. Eco-labeling can generate a change toward more eco-friendly consumption patterns by providing consumers with information about the environmental effects of their consumption and can encourage producers to invest in more sustainable agricultural practices [10]. Eco-labels are effective only if they have real effects on consumer's decision-making [9]. Therefore, it is necessary to know what motivates consumers to pay a premium [7]. Organic labels are a typical type of eco-labeling [9,11] that combines private (perceived health) and public (environmental benefits) characteristics [7]. It is questionable whether such premiums are associated with health concerns or

environmental worries. With regard to organic food in developed countries, some studies have related green consumption to different motives, with environmental attributes playing a dominant role [12,13]. Other studies have concluded that the purchase of such products is primarily for personal health or food safety considerations [5,14–16]. However, the situation is somewhat different in developing countries, such as China. Given the extensive media coverage about food safety issues and non-point source pollution in China, public concern has increased with regard to better-quality and safer food from farm to table, which increases the demand for organic products [17–19]. Most Chinese consumers choose organic products for food safety reasons rather than environmental concerns [17,19–21]. The motivation for eco-labeled purchasing behavior and its influence on the heterogeneity of consumer preferences require further investigation.

Our study provides insights into consumer preferences and motives for eco-labeled purchasing behavior in China by analyzing individual choices of eco-friendly rice. Rice is selected because it is the staple food in the Chinese diet, so consumers are very familiar with it. Green and organic labels are eco-labels in China (Figure 1) with technical standards, such as quality control and non-pollution, and they carry a special logo. The green label, which is unique to China, allows limited use of synthetic chemicals during production. The organic label, in contrast, represents more stringent standards that resemble those in other countries [22]. Consumers' needs for eco-labeled rice can be transformed into preferences for green or organic labels. However, the eco-labeling system is complicated for consumers because it is composed of a set of production standards, a certification system, and a labeling scheme [23]. Consumers need some knowledge of the production standards underlying eco-labels to distinguish eco-labeled products from non-labeled alternatives [9,24]. Though some studies have considered consumers' preferences or consumers' willingness to pay for eco-labeled products as well as their determinants [7,9,25–27], limited attention has been paid to how individuals' knowledge of production standards influences their willingness to pay. With regard to the measurement of consumers' knowledge, self-reported perceptions of eco-labeled products are used to measure knowledge [17,19,20,28]. We use six objective true/false questions about production standards rather than subjective cognition to measure consumers' actual knowledge.

(**a**) (**b**)

Figure 1. Picture (**a**) shows the green label for agri-product; and (**b**) shows us the organic label in China.

To avoid consumer response bias and numerous uncontrolled decision variables, we introduce a discrete choice experiment in China. Specifically, we analyze the relationship between concern for food safety, concern for the environment, knowledge of production standards and purchase behavior in relation to eco-labeled rice. We first use a mixed logit model to explore heterogeneities in willingness to pay among consumers. We then categorize people based on their motivation, knowledge and socio-economic characteristics to test whether choices of eco-labeled products are driven by environmental concerns in terms of environmental protection using the latent class model. Our findings show that concern for the environment increases the willingness to pay (WTP) for eco-labeled products. To further identify the target group of consumers for policy-makers, we use a seemingly unrelated regression to demonstrate the probability of inclusion in each group with categorical variables. A better understanding of these relationships is essential for designing or improving eco-labeling as an effective demand-oriented instrument to create more sustainable markets through increased green purchases.

2. Materials and Methods

2.1. Methodology: Choice Modeling

Choice experiments are widely used in food marketing as well as environmental economics studies to elicit respondents' preferences and WTP for goods [13,29–35]. This study applies choice experiments to investigate consumers' preferences for rice. These experiments asked respondents to select from three possible alternatives two types of rice with different levels of relevant attributes and a "do not buy" option. The "do not buy" option was included because it made the choice scenario more similar to actual markets [33].

Formally, the utility by which an individual i chooses an alternative m in choice t can be specified as:

$$U_{imt} = V_{imt} + \varepsilon_{imt} \tag{1}$$

where V_{imt} is the deterministic component and ε_{imt} is a random component of the utility function. The probability that the *i*th consumer selects type m is given by:

$$P(A) = \text{Prob}\{V_{imt} + \varepsilon_{imt} \geq V_{int} + \varepsilon_{int};\ m \neq n,\ \forall n \in C\} \tag{2}$$

If ε_{imt} are independently and identically distributed following a Type I extreme value distribution, then Equation (1) can be converted to a conditional logit model, such as:

$$L_{imt}(\beta_i) = \frac{e^{\beta x_{nit}}}{\sum_j e^{\beta x_{njt}}} \tag{3}$$

If there are heterogeneous preferences across respondents, the CL model results become biased. Consequently, the unconditional probability is the integral of rice product over all values of β:

$$P_{nit} = \int L_{nit}(\beta) f(\beta|\theta) d\beta \tag{4}$$

2.2. Economic Model and Empirical Specification

It is widely accepted that consumers are heterogeneous in their preferences [36–39]. The mixed logit model is recognized as an appropriate approach to capture unobserved heterogeneity, which relaxes the assumption of IIA (independence of irrelevant alternatives) [30,32,36,38]. The latent class model can simultaneously measure the market segmentation and segment-specific parameters to explain the sources of heterogeneity [32]. Consequently, the identified segments exhibit different consumer preferences for attributes associated with attitudinal or socio-demographic characteristics, which have significantly managerial implications [32,40]. We apply the latent class model to examine consumer segmentations based on consumers' knowledge, motives, and individual characteristics.

The probability estimate of this model is as follows:

$$P(c) = \frac{\exp\left(z_t' \gamma_q\right)}{\sum_{q=1}^{Q} \exp\left(z_t' \gamma_q\right)} \tag{5}$$

where $\gamma_Q = 0$, z_t is a series of observed characteristics that affects the classification of respondent into a certain latent class.

After the estimation of the parameters in a latent class model, the WTP values for different attributes can be further calculated using the following formula:

$$WTP_k = -\beta_k / \beta_p \tag{6}$$

where β_k is an estimated parameter for the rice-specific attribute and β_p is the estimated price coefficient.

2.3. Survey Design and Data Description

A cross-sectional survey was conducted in Zhejiang, Shanghai, Jiangsu, and Guangdong, China, from April to July 2015. The reasons for selecting these four cities were their economic nature, major rice consumption status, and prevalence of food safety incidents and scandals in China. Our questionnaire included the choice experiment, other consumption behavior, motivation, knowledge, and socio-demographic characteristics of the respondents.

We first described rice with a combination of four attributes: brand, eco-labels, geographical origin and price [13,29,31]. Attributes, such as taste, were excluded because consumers were not available prior to consumption. Different to some latest studies [41,42], we did not add the sustainable packaging material as an attribute in the experiment due to no eco-labeled packaging logos or such cues in the present Chinese agricultural market. The definitions of the four rice attributes are described in Table 1. The determination of prices included the base price, the middle price, and the highest price, which were derived from national available retail price data. The four rice attributes and their levels were used to build an orthogonal factorial design which is in agreement with other studies [29,32,37,43–45]. The "main effects only" designs permit the uncorrelated estimation of all main effects under the assumption that all interactions between attributes are negligible [44–46]. Main effects can account for 70–90 percent of explained variance and are of primary interest in practical applications [30]. We applied the JMP® 8 software (SAS Institute, North Carolina) to reduce the original 54 ($3^3 \times 2$) combinations to 18 sets. The18 choice scenarios about 500 g packaged rice were then divided into two groups of nine and randomly assigned to each respondent. Table 2 shows one example of a choice scenario. A brief talk that explained to the respondents the importance of reacting as realistically as possible was included to manage the hypothetical nature of the choice experiment [13,32] (Appendix A).

Table 1. Attributes for rice products in choice experiments.

Attributes	Level Considered		
Eco-labels	None	Green label	Organic label
Geographical origin	None	Labeled	-
Brand	None	Local	National
Price (¥/500 g)	¥2.5/500 g	¥4.4/500 g	¥7.5/500 g

Table 2. An example of choice sets.

	Option A	Option B	Option C
Eco-labels	Green	Organic	Neither
Geographical origin	Yes	No	
Brand	National	None	
Price (¥/500 g)	4.4	7.5	

3. Results and Discussion

3.1. Characteristics of the Sample

A database of 435 participants was obtained for our experiment and investigation. In total, 63.22% of the participants were female and 36.78% male (see Table 3), which is consistent with the fact that women are the primary purchasers of food in the family in China. Most of the respondents were married. The major age groups were 25–34 years and 35–44 years; these groups accounted for 41.61% and 26.21% of the sample, respectively. The household income of most participants (30.57%) was more than 14,000 yuan. The average education level was a college degree. Eco-labeled products are purchased mainly by urban consumers in large cities [19], resulting in the higher level of education of the sample. As is often the case with empirical data, less educated people are

underrepresented [13,45,47]. The respondents' motivation was measured by asking about the degree to which they were concerned with agricultural pollution issues and food safety. We measured health motivation with two items, and the environmental motivation with three items. The Cronbach's α values were 0.701 and 0.721, indicating a high degree of internal consistency of the ratings. The respondents showed more concern for food safety (average score of 3.578) than environmental pollution issues (1.850). The sampled participants had basic knowledge (4.522) about the production standards of eco-labeled rice. Although under or over-representation of the sample is a feature common to other surveys and empirical studies [13,45,47,48], it must be considered when interpreting the results.

Table 3. Socio-demographic characteristics of the sample (n = 435).

Variables	Description	Mean	SD
Gender	1 = male; 0 = female	0.368	0.482
Marriage	1 = married; 0 = unmarried	0.768	0.422
Age	1 = 18–24 years old; 2 = 25–34 years old; 3 = 35–44 years old; 4 = 45–54 years old; 5 = 55–64 years old; 6 = more than 65 years old	2.623	1.022
Monthly income	1 = less than 5000; 2 = 5001–8000 yuan; 3 = 8001–11,000 yuan; 4 = 11,001–14,000 yuan; 5 = more than 14,000 yuan	3.368	1.371
Education	1 = middle school or below; 2 = high school; 3 = 3-year college; 4 = undergraduate; 5 = postgraduate	3.731	1.001
Concern for food safety	How concerned you are with food safety issues (1–5) How worried are you about rice quality and safety (1–5)	3.578	0.864
Concern for environment	The large-scale use of chemical pesticides and fertilizers will pollute the environment (1–5); The severity of current agricultural pollution caused by planting process (1–5); The overall situation of China's agricultural pollution (1–5)	1.850	0.636
Knowledge	Based on your understanding, are the following statements correct (correct = 1; wrong = 0): (1) Chemical fertilizers can be limited used in green planting; (2) Chemical pesticides are allowed in green planting; (3) High toxic and high-persistent pesticides are permitted in green rice planting; (4) Organic planting respects environmental protection and ecological balance; (5) Chemical pesticides are allowed in organic planting; (6) Chemical fertilizers are allowed in organic planting;	4.522	1.080

3.2. Estimates of Mixed Logit Model

Table 4 presents the results of the mixed logit model. As expected, the coefficient of option C ("do not buy") was significantly negative, indicating an increase of utility when choosing one of the presented rice alternatives. This finding suggests that the respondents tend to choose rice with the attributes selected in the experiment rather than the "do not buy" option. Moreover, the standard deviation of each attribute was statistically significant except for the local brand, indicating that consumers are heterogeneous. The price coefficient was negative and statistically significant, showing that an increment of price will reduce a respondent's utility. All of the other coefficients were significantly positive, indicating that consumer utility increases when these traits are included. The two eco-labels had the greatest increment in utility, followed by geographical origin, national brand and local brand.

Table 4. The results of the mixed logit model.

Variables	Mean Coefficient	Derived S.D. Coefficient
Price	−0.333 *** (0.018)	NA
Option C	−2.011 *** (0.095)	NA
Green label	0.784 *** (0.058)	0.620 *** (0.075)
Organic label	0.989 *** (0.060)	0.600 *** (0.080)
Local brand	0.333 *** (0.046)	0.088 (0.119)
National brand	0.371 *** (0.052)	0.487 *** (0.084)
Geographical origin	0.771 *** (0.056)	0.950 *** (0.058)
No. of observations	11,745	11,745
Log-likelihood value	−2826.794	
Chi-square value	432.88	

Notes: Standard errors are in parentheses. *** denote significance at 1% levels.

3.3. Estimates of Latent Class Model

The maximum likelihood estimates for the latent class model of rice are shown in Table 5. Table 6 presents the willingness to pay for rice attributes in four classes. We used effects coding to measure rice attributes so that the utility for the "do not buy" option was not confounded with the grand mean [13]. The Bayesian Information Criterion (BIC) was employed to fix the number of suitable classes [36,39]. The latent class model (LCM) results showed that the coefficient for the "do not buy" option in each latent class was significantly negative, indicating that participants preferred to choose two types of rice related to a combination of various attributes. The class membership coefficients for the third group were normalized to zero to ensure the remaining coefficients of the model.

Based on the WTP values (attribute/price ratios) of different attributes for each class, the three estimated classes were named as "eco-label preferred", "price sensitive", and "geographical origin oriented" class.

In Class 1, "eco-label preferred", organic labels and green labels have the highest estimation and are significantly positive. Approximately 52.3% of the respondents belonged to this class. This finding indicates that more than half of the participants preferred eco-labels to improve environmental benefits. Respondents in this class are willing to pay high premiums for eco-labels compared to other groups. They are willing to pay ¥6.112/500 g for a green label and ¥7.784/500 g for an organic label, followed by a national brand (¥3.640/500 g), local brand (¥2.797/500 g), and geographical origin (¥2.510/500 g), the order of which is consistent with the willingness to pay for the overall sample.

Respondents in Class 2 are "price sensitive". The value of the coefficient for price (1.171) is the highest among all three classes, accounting for 20.9% of the sample. These participants' willingness to pay for rice attributes is the lowest among the three classes. Nevertheless, they are willing to pay the highest price for eco-labels compared to other attributes, with a premium of ¥0.953/500 g for a green label and ¥1.061/500 g for an organic label. Despite income constraints, this group still shows a higher preference for eco-labels.

Class 3, "geographical origin oriented", included 117 participants (26.8% of the total sample). The participants in this class prefer geographical origin and pay the highest premium (¥8.268/500 g) relative to the other two classes. The following traits were organic and green labels, with premiums of ¥3.151/500 g and ¥1.660/500 g, respectively. "Geographical origin oriented" participants were also happy to pay a higher premium for eco-labels.

The membership coefficients show that knowledge, motivation and income for Class 1 and Class 2 differ significantly from those of Class 3. To further examine the impact of each specific variable on the probabilities of respondents falling into each group, we employed a seemingly unrelated regression to investigate the detailed personal characteristics of the three segments.

Table 5. The results of latent class model.

Variables	Class1	Class2	Class3
Utility function coefficients			
Price	−0.107 ***	−1.171 ***	−0.233 ***
	(0.019)	(0.091)	(0.054)
Green label	0.653 ***	1.116 ***	0.387 **
	(0.052)	(0.141)	(0.120)
Organic label	0.832 ***	1.242 ***	0.735 ***
	(0.058)	(0.167)	(0.119)
Local brand	0.299 ***	0.191	0.868 ***
	(0.048)	(0.151)	(0.138)
National brand	0.389 ***	−0.017	0.692 ***
	(0.052)	(0.156)	(0.133)
Geographical origin	0.268 ***	0.507 ***	1.928 ***
	(0.039)	(0.127)	(0.149)
Option C	−2.035 ***	−5.501 ***	−0.195
	(0.149)	(0.418)	(0.271)
Class membership coefficients			
Knowledge	−0.283 ***	0.708 ***	-
	(0.107)	(0.146)	
Concern for food safety	−0.056	−0.372 **	-
	(0.138)	(0.190)	
Concern for environment	0.170	0.217	-
	(0.181)	(0.264)	
Gender	0.117	−0.373	-
	(0.267)	(0.354)	
Marriage	0.074	0.443	-
	(0.344)	(0.506)	
Age	−0.147	−0.004	-
	(0.134)	(0.200)	
Education	0.181	0.272	-
	(0.119)	(0.172)	
Income	−0.066	−0.270 **	-
	(0.093)	(0.130)	
Constant	1.654 **	−3.087 **	-
	(0.712)	(1.274)	
Latent class share	52.3%	20.9%	26.8%

Notes: Standard errors are in parentheses. **, *** denote significance at 5%, and 1% levels, respectively.

Table 6. Implicit price estimates of rice traits.

Traits	Mixed Logit Model	Latent Class Model		
		Class 1	Class 2	Class 3
Green label	2.352 [a] (1.974, 2.730) [1]	6.112 *** (3.834, 8.390) [b]	0.953 *** (0730, 1.175)	1.660 *** (0.486, 2.834)
Organic label	2.967 (2.537, 3.398)	7.784 *** (4.766, 10.801)	1.061 *** (0.813, 1.309)	3.151 *** (1.453, 4.849)
Local brand	0.999 (0.734, 1.265)	2.797 *** (1.482, 4.113)	0.163 (−0.087, 0.414)	3.723 *** (2.005, 5.441)
National brand	1.114 (0.785, 1.443)	3.640 *** (1.954, 5.326)	−0.015 (−0.276, 0.247)	2.968 *** (1.085, 4.852)
Geographical origin	2.313 (1.940, 2.687)	2.510 *** (1.308, 3.711)	0.433 *** (0.233, 0.633)	8.268 *** (4.625, 11.911)

[a] Marginal willingness to pay estimates of rice attributes in RMB yuan; [b] NS: trait not statistically significant; [1] 95% confidence interval level; *** denote significance at 1% levels.

3.4. Socio-Demographic Profile, Knowledge, and Motivation of the Segments

In the seemingly unrelated regression model, the probability of the respondents falling into a certain class is an explanatory variable, and individual characteristics are independent variables. The results are presented in Table 7. It shows that safety concerns and environmental concerns have a significantly positive impact on the probability of falling into the eco-label preferred class (Class 1), which has the highest willingness to pay for eco-labels. Consistent with the studies done in other countries [5,14–16], both health motivation and environmental considerations can influence consumer choice of eco-labeled rice, and the health benefits tend to prevail in consumers' motivations. However, our findings are quite different from those earlier investigations on the Chinese consumers [17,19–21], they found that the Chinese consumers would like to choose eco-labeled products for food safety reasons rather than environmental concerns. A possible explanation is that lack of consumer improvement in their environmental awareness due to the recent worsening environment in China.

The third class also has the positive coefficient of concerns for food safety, while the coefficient in the "price sensitive" class is negative. Referring the highest and positive coefficient of food safety concerns in Class 3, respondents in this class pay most attention to information of production areas. Geographical origin becomes a signal of quality improvement as the natural environment endows specific qualities to local products [29,49,50].

Table 7. Individual characteristics for the three consumer segments.

Class Membership	Class 1	Class 2	Class 3
Concern for food safety	0.022 ***	−0.050 ***	0.028 ***
	(0.005)	(0.004)	(0.005)
Concern for the environment	0.019 ***	0.016 ***	−0.035 ***
	(0.007)	(0.005)	(0.007)
Knowledge	−0.123 ***	0.117 ***	0.007 *
	(0.004)	(0.003)	(0.004)
Gender	0.060 ***	−0.060 ***	0.0003
	(0.008)	(0.006)	(0.008)
Marriage	−0.026 **	0.059 ***	−0.033 ***
	(0.011)	(0.009)	(0.011)
Age	−0.034 ***	0.012 ***	0.022 ***
	(0.005)	(0.004)	(0.005)
Education	0.016 ***	0.024 ***	−0.041 ***
	(0.005)	(0.004)	(0.004)
Income	0.009 ***	−0.032 ***	0.022 ***
	(0.003)	(0.002)	(0.003)
Constant	0.961 ***	−0.207 ***	0.246 ***
	(0.036)	(0.028)	(0.034)

Notes: Standard errors are in parentheses. *, **, *** denote significance at 10%, 5%, and 1% levels, respectively.

Our empirical results also show a negative relationship between knowledge and consumers' willingness to pay in Class 1, but strong positive relationship in Class 2 where the participants pay the lowest premium for eco-labels. Purchase incentives may be stimulated when consumers realize that buying eco-labeled products is beneficial to health and the environment without specific knowledge of production standards. Consumers' perceptions of the meaning of an organic label are of a subjective nature and, in many cases, are not based on objective facts [34].

With regard to the socio-demographic background variables, the results indicated that the three latent classes differ significantly ($p < 0.01$) in gender, age, marriage, income, and education. Members of the "eco-label preferred" class (Class 1) are likely to be young, unmarried men, with a relatively higher education and higher income. Participants in the "price sensitive" group tend to be highly educated

married women with the lowest income level. Consumers who are older unmarried men with the lowest level of education and the highest income are most likely to be members of the "geographical origin oriented" class.

We also compare the results with other studies to identify whether there any differences as our sample has little higher educational level and income than nationwide population in China. Consistent with some higher education data (most are college degree or above), educational level has a positive effect on the willingness to pay for organic products [35,45]. Other studies with overrepresented samples reveal that education level has no significant impact on purchasing behavior [47]. For those less educated sample, the results are equally controversial [51,52]. Since green or organic products always have a higher price, buyers of these products tend to be people with high earnings, which is consistent with previous studies regardless of the sample representation [19,35,37,47,53]. In China, older people generally have lower levels of education. However, they are more able to pay the premium for eco-labeled products due to years of economic savings.

4. Conclusions

The present study employed mixed logit and latent class models to investigate consumer preferences and motives for eco-labeled rice in China using a choice experiment. This study contributes to the existing literature by combining health motivations and environmental motivations simultaneously in developing countries. To the best of our knowledge, this study is the first attempt to test whether choices of eco-friendly products are driven by environmental concerns in terms of environmental protection. The results suggest that consumers show a positive preference for eco-labeled rice. The greater the concern for food safety and the environment, the more likely consumers are willing to pay a high price for eco-labels. Their possible health benefits and eco-friendly production have important effects on choices of eco-labeled rice products.

Consumers with relatively poor knowledge of the production standards of eco-labels still present positive attitudes toward eco-labeled products because they believe that eco-labeled products are healthier and more environmentally friendly. Consumer preferences for eco-labeled products are somewhat subjective in nature and are not based on adequate understanding, indicating that increasing consumers' favorable impressions of eco-labeled products is of great importance to promoting demand.

Our results confirm that the willingness to pay for eco-labels is heterogeneous among consumers. The results also identify the sources of preference heterogeneity by applying the latent class model. Based on consumers' socio-demographic characteristics, concern for food safety, concern for the environment and knowledge about production standards, they are categorized into three latent classes: the eco-label preferred group, the price-sensitive group, and the geographical origin-oriented group. Consumers in the first group exhibit the highest willingness to pay for both eco-labels. This study identifies the effects of different motives that increase the probability of a consumer being in the eco-label preferred class.

The empirical results provide implications for the design of effective policies to induce consumers to purchase eco-labeled products, which can considerably contribute to a sustainable environment. Governments can make good use of eco-labeling schemes to increase public awareness of the environmental benefits of eco-labeled products, thereby stimulating consumers' environmental motivation. People with certain socio-economic and household characteristics are the target groups for such efforts. The government could produce messages that appeal to emotions about food safety and environmental protection, which may have an impact on behavior by inducing a favorable attitude toward the purchase of eco-friendly products. Since knowledge is critical to establishing correct attitudes toward purchase decisions, it is necessary to enhance the knowledge of the eco-label preferred group. Eco-labeling schemes could be accompanied by information campaigns on the production aspects underlying eco-labels. Given that household consumption of food and beverages in developing countries accounts for more than 90% of the consumption of these products worldwide, these efforts

would provide opportunities for the eco-labeled food market and environmental sustainability in developing countries.

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Appendix A

The following content of the questionnaires only discusses hypothetical scenarios, and the respondents do not need to pay for their choices. Such surveys tend to create situations under which consumers' presumptive purchase behaviors are not consistent with their actual purchase behaviors, most likely because the respondents do not realize how the additional cost would affect their household budgets. In a real store, respondents may think in different ways: money spent on one commodity cannot be used to buy other goods. To avoid this phenomenon, when you answer the following questions about rice purchases, please imagine that you are choosing which type of rice to buy in a supermarket: "If I decided to buy a certain type of rice, then I have to pay".

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