Laos consumer perceptions of rice quality and safety: Insights from a conjoint analysis

L. Chialue[1]; P. Moustier[2]

1: CIRAD, MOISA, France, 2: CIRAD, MOISA, , France

Corresponding author email: lytoua.chialue@cirad.fr

Abstract:

To assess the main factors influencing Lao urban consumers perception of rice quality and safety, a conjoint analysis approach was conducted based on surveys on 300 consumers in 2010. Retailing points and organic certification have a major influence. The preferred retailing point for these attributes is the wet market, followed by minimarts then mobile vendors. Improving organic certification systems and maintaining traditional markets alongside minimarts are recommended. Key words: Consumer, food quality, safety, retail outlet, conjoint analysis

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Abstract

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Introduction

As in many Asian countries, the Lao PDR has experienced rapid urban and economic development, although it is still a predominantly rural country. The urban population was 38% in 2014, with urban growth of 4.13% between 2010 and 2015 and GDP growth of 8% in 2013 (WB, 2015). In parallel to this development, the transition from traditional to market-based agriculture has been ongoing since the early 2000s. An intensive commercial agriculture has been promoted, with increasing use of chemical inputs. High pesticide residues have been identified, mainly in fruits and vegetables (Rassapong, 2016). While infectious diseases have decreased, new food-related diseases have appeared (Strigler, 2011).

Against this backdrop, the Ministry of Health in the Lao PDR has developed a regulation on the labeling of prepackaged food (No.519/MoH.2009) and a national policy and action plan for food safety which serves as a framework for the control of food and agricultural products throughout the food chain (No.020/MoH.2009).

Meanwhile, organic agriculture has been developed through international development projects since the early 2000s under the name ‘Laos Organic Agriculture’. Organic agriculture is also a priority in the Lao PDR agricultural development strategy. The organic standard was developed and adopted by the Ministry of Agriculture and Forestry (MAF) and various NGO projects in 2005 (No. 1666/MAF). According to the 2020-2030 agricultural development strategy, the MAF aims at 70,000 producers being certified as organic. Currently, there are three organic standards in the Lao PDR: one for rice, one for coffee, and one for crops. At the national level, the Lao Certification Body (LCB) was set up under the MAF’s Clean Agricultural Development Center (CADC), which inspects and provides organic certification for production (from planting to harvesting products, processing, storage, packaging and sale) and processing systems (from product and raw material management to processing methods, packaging, transport and distribution). With the support of the government, the CADC has

developed two labels for so-called clean agriculture: one for organic agriculture (mainly for rice, coffee and crops) and one for good agricultural practices (Department of Agriculture 2011).

In this paper, we would like to assess how Laotian consumers assess food quality and safety in this new context of the promotion of various food labels. No such research has been carried out in Laos, while many studies on this topic have been conducted in western countries (for i.e., Efthimia, Mattas Konstadios, Tsakiridou Helen, & Elisavet, 2011; Janssen & Hamm, 2012).

1. Literature review

1.1 Food quality and safety

Food quality has been characterized by two dimensions, namely quality cues (intrinsic and extrinsic product cues) and quality attributes (experience quality and credence attributes) (Grunert (2005). Intrinsic product cues (i.e., appearance, shape, color of food) and extrinsic product cues (i.e., place of origin, labeling, convenience and the place of sale) have been widely used to predict the product attributes in several food products (for i.e., Grunert, Loose, Zhou, & Tringgaard, 2015; Ortega, Wang, Wu, & Olynk, 2011; Peri, 2006). Various authors define food safety according to the risks relative to food consumption (i.e. relative to chemical and pesticide residues) and to the control system in the food chain (Grunert, 2005; Rijswijk & Frewer, 2008). Safety may be considered as a dimension of quality (Grunert, 2005; Uyttendaele, Jacxsens, Van Boxstael, Kirezieva, & Luning, 2015) because quality refers to specific characteristics that make the food safe. Quality and safety are actually intertwined in consumers' minds (Rijswijk & Frewer, 2008).

Consumers in different countries may consider different aspects in what they define as food quality and safety. Rijswijk and Frewer (2008) examined the consumer perceptions of food quality and in four EU countries (Germany, France, Italy and Spain). While German and Italian consumers consider that quality refers to freshness, taste and natural or organic elements, the French relate quality to appearance and taste. Whereas safety refers to risk and healthiness in the minds of Germans and Italians, it is defined by controls and guarantees by the Spanish and by food proper handling and food chain management by the French. The authors also conclude that consumers in Mediterranean countries pay more attention to food quality, whereas consumers in the northern EU are more concerned by food safety.

1.2 The role of product labels, retail outlets and packaging

The perception of food quality and safety is influenced by product labelling and retail outlets. Food safety refers to credence attributes, i.e. attributes not directly observable by the user, which create the most uncertainty concerning quality (Darby & Karni, 1973), compared to search and experience attributes (Nelson, 1970). Labels transform credence into search attributes (Grolleau & Caswell, 2006).

Efthimia et al. (2011) assessed consumer knowledge, attitudes and beliefs relating to food safety, traceability and certification labels for fresh produce in Greece. They showed that the most important criteria when buying vegetables are the nutritious value,

food safety, certification and indication of origin. In another research by Janssen and Hamm (2012), a choice experiments approach was employed to analyze consumer preferences and willingness to pay for different organic certification logos (EU logo, governmental and private logos) for apples and eggs in six European countries. Both choice experiments and group discussion were conducted in two kinds of shop: 1) conventional supermarkets, or shopping centers, and 2) organic food shops. They show that consumers prefer products with a certification logo, and with strict standards and control systems. They conclude that third-party certification is insufficient and that consumer trust in the certification scheme is key. A conjoint joint analysis by Annunziata and Vecchio (2016) in Italy on organic canned peeled tomatoes shows that consumers attach most importance to the price (but accept a premium) followed by local origin, while certification ranks last. This result is similar to the other studies conducted by Denver and Jensen (2014); Hempel and Hamm (2016) and Šárka and Giacomo (2015): the findings of Denver and Jensen showed that consumers have a strong positive preference for domestically grown food produce (e.g. apples) over imported food produce, Hempel and Hamm showed that consumer preference and willing to pay for organic products as indication 'local' than 'foreign', while Šárka and Giacomo reported that consumers favor national labels over foreign labels (e.g. EU label). A choice study conducted in China by Grunert et al. (2015) shows that intrinsic product attributes (i.e., fat content, color) is highly significant in terms of the quality of meat (i.e., pork ribs), whereas extrinsic product attributes (i.e., certification body, place of origin) are of minor importance when making decisions to purchase food products.

The perception of food quality and safety is also influenced by the place of purchase. In developed countries, most consumers purchase fresh food products from modern distribution chains. Conversely, most consumers in developing countries (for instance the Lao PDR) predominantly buy from traditional markets including wet markets and mobile vendors. In Malaysia, night markets, farmers' markets and wet markets are the main places where consumers purchase fresh meat (Chamhuri & Batt, 2013). In terms of quality, they declare that fresh meat should be fresh (96%), Halal guaranteed (30%) and from a good environment (27%). The freshness of food products (e.g. fresh meat) is guaranteed in wet markets (96%) followed by supermarkets (71%). In Vietnam, while wet markets are perceived by consumers as the best in terms of freshness for food, supermarkets are considered to provide safer food than wet markets (Figuié & Moustier, 2009; Heck, O., & Gert, 2016).

One factor that is related to labelling and affects quality is packaging. To be labelled, a product commonly needs to be packaged. Furthermore, packaging influences the shelf life of the product as well as its freshness and cleanness, and consequently affects consumers' perceptions and choices, although this factor is rarely taken into consideration in consumer studies (Koutsimanis, Getter, Behe, Harte, & Almenar, 2012).

Finally, various research on consumer preferences and willingness to pay for labeled products, including organic foods, has shown that consumer characteristics – age, education, income, occupation, etc. – also influence consumer preferences (for i.e., Chen, Lobo, & Rajendran, 2014; Liu & Niyongira, 2017; Mergenthaler, Weinberger, & Qaim, 2009; Xie, Wang, Yang, Wang, & Zhang, 2015).

1.3 Objective and hypotheses

The questions we address are as follows: how do Laotian consumers perceive food products in terms of quality and safety? Which factors in the supply chain affect the consumer perception of food quality and safety? We choose to focus on rice because it is the most important food product in the Lao PDR in terms of volumes produced and consumed. Moreover, there are growing initiatives to develop rice quality and raise awareness with regard to this. From the literature review, we draw the hypothesis that food quality and safety are multi-dimensional and intertwined. Their perception by consumers is influenced by the origin of the product (local being preferred), the labelling, the certification, and the place of purchase. While these factors are often considered individually, we consider all four of them together as well as their interaction in the present study.

2. Method

2.1 Survey data collection (2010)

The quantitative consumer survey was conducted between May to July 2010 in three big cities in the Lao PDR: Vientiane Capital, Luang Prabang and Champasak provinces. A random sampling strategy was developed in order to select respondents from the list of households given by the head of each province. The target sample size in each province was 100 consumers. The final sample includes 296 questionnaires because some contained incomplete data[1].

The structured of the questionnaire was based on fact-to-face consumer interviews, with the questionnaire divided into two parts. The first part related to the consumer's point of view regarding the quality dimension of rice. Several statements in terms of rice quality cues (freshness, shape of grain, no chemical residues, organic) were given to consumers regarding the quality of the rice. We then asked them the question '*What is most important to you in terms of rice quality when you select rice for purchase?'*

The second part related to conjoint experiment methods. In this part, each respondent completed a conjoint experiment with 10 stimuli (pictures) represented in Table 2.

2.2 Conjoint analysis approach

The conjoint analysis (CA) approach can be used to assess consumer willingness to pay for different attributes (both food and non-food products), and this can help marketers to classify the multidimensional attributes of products according to their importance to consumers (Gustafsson, Herrmann, & Huber, 2001). In recent research, conjoint analyses have been applied to consumer preferences and consumer willingness to pay for one or more attributes (for instance fat content, color, organic production method, packaging, the place of origin, organic logo) for different food products (for i.e., Annunziata & Vecchio, 2013, 2016; Bazoche et al., 2013; Grunert et al., 2015; Silayoi & Speece, 2007).

[1] The survey was part of a regional project covering four countries. There were several constraints in the other countries of the project which explain delays at various stages of data collection, processing and reporting; we conducted some focused additional surveys at the beginning of 2017 to confirm the validity of the 2010 survey (see 2.4).

In this study, we applied a conjoint analysis to assess the main factors that deliver a credible message to urban consumers concerning quality and safety. The conjoint design (Table 1) is based on four attributes in the supply chain: packaging (2 modalities), retail outlet (3 modalities), organic certification (2 modalities) and country of origin (2 modalities). Rice can be sold in bulk (at wet markets) or in plastic bags (in all retail outlets). The wet market is the major place for consumers to make their daily food purchases whereas modern distribution (in the form of minimarts) has only very recently appeared (during the last ten years). Consumers also commonly purchase their food from mobile (or street) vendors. Mobile vendors are found in all the districts of the city. They sell their produce directly on the street or sometimes at consumers' front doors. For rice, they mostly sell from small trucks.

In the Lao PDR, organic certification at the national organic standard (Department of Agriculture, MAF) and international organic standards (IFOAM Asia, EU, NOP and JAS) is currently available for rice and other crops (national organic standards) as well as for coffee (national and international organic standards).

We did not consider price attributes to predict consumer preferences for food quality because of the high price differences between different points of sale. We did, however, take account of its potential influence in the phrasing of the question.

As for the place of origin, it is commonly indicated at all retail outlets with regard to the country of origin.

Table 1. Product attributes and modality for conjoint analysis

Attributes	**Modality of attribute**
Packaging of products	Packed Unpacked
Retail outlet	Wet market Modern market (minimart or supermarket) Mobile vendor
Organic certification	Indicated with organic standard seal Not indicated (without organic standard seal)
Country of origin	Indicated Not indicated

The experimental design includes a series of steps that are very important because they may affect the efficiency of selection and information. For the data collection method, we decided to use the profiles method according to (Green & Srinivasan, 1990; Gustafsson et al., 2001). This assumes that the description of full profiles (detailed information of all attributes in a picture) that we propose for all attributes is close to the real situation. We then calculated the number of possible combinations of attributes

resulting from the combination of each profile together with the different attributes. So there are 2x2x3x2 = 24 product profiles.

It is impossible to use 24 product profiles when asking the consumers because the consumers would be confused by the supply of information. We applied a technique called Fractionate Factorial Design (in the SPSS command Orthogonal Design). The complete choice stimuli generated 10 final choice sets (Kuhfeld, 2010) (see table 2). The surveyors presented 10 pictures and explained each picture in more detail to consumers. They then asked the respondents the following question: "Without regard for price or convenience such as distance, please rank these pictures according to the quality that you can identify, where the first picture is the best quality rice (1^{st}) and the last picture is the poorest quality rice (10^{th})". Data from choice experiment were analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 18.

Table 2: The product profile used for consumer conjoint experiments

Number profile	Combination of attributes			
	Packaging	Retail outlet	Organic certification	Country origin
A	Packed	Wet market	Indicated	Indicated
B	Unpacked	Minimart	Indicated	Not indicated
C	Unpacked	Mobile vendor	Not indicated	Indicated
D	Packed	Wet market	Not indicated	Not indicated
E	Packed	Mobile vendor	Indicated	Not indicated
F	Unpacked	Wet market	Indicated	Indicated
G	Packed	Minimart	Not indicated	Indicated
H	Unpacked	Wet market	Not indicated	Not indicated
I	Packed	Minimart	Indicated	Not indicated
J	Packed	Mobile vendor	Not indicated	Indicated
K[a]	Unpacked	Minimart	Indicated	Indicated
L[a]	Packed	Minimart	Not indicated	Not indicated
N[a]	Unpacked	Mobile vendor	Indicated	Not indicated
M[a]	Unpacked	Minimart	Not indicated	Not indicated

a. Holdout

To estimate the consumer utilities on the quality of the rice, we used a regression model of consumer preference as a function of four attributes: packaging, retail outlets, organic certification and country of origin. Part-worth utilities of consumers were estimated by using regression analysis as ordinary least squares. The large part-worth utilities refer to the most preferred levels and small part-worth utilities are assigned to the least important levels. This means that the attributes with the largest part-worth utility range of consumers are considered the most important in predicting preferences (Kuhfeld, 2010).

2.3 Cluster analysis

Segments of consumers were distinguished by means of cluster analysis with respect to consumer preference for the different types of consumer perceptions of quality and safety. A non-hierarchical cluster analysis or k-means cluster analysis with nearest

centroid sorting was performed to classify part-worth utility consumers by using the statistical software package SPSS 18. A three-cluster parameter was tested by crossing the groups of consumers with the other variables: socio-economic variables, frequency of buying rice and awareness of the organic logo (similar to the study by Chen et al. (2014) and Annunziata and Vecchio (2013). A one-way ANOVA analysis was used to compare each cluster means and variable related to consumer preferences for rice

2.4 Additional survey (2017)

In January 2017, to assess whether the main results obtained in 2010 still held some validity, we conducted interviews with 30 consumers distributed across four major retail markets in Vientiane capital (10 in Huakhoua market, 10 in Khouadin market, 5 in Nonsavang market and 5 in Thatluang organic market). The questions related to the place and frequency of rice purchase; the most important quality attributes; and how consumers get rice of the desired quality. This survey included 2/3 women and 1/3 men, aged between 30-40 years old, with two consumers over 50 years old and two are under 20 years old. The small size of the sample implies being extremely cautious in using the results of this additional survey.

3. Results

3.1 Characteristics of respondents (2010 survey)

Food purchasing for the household is predominantly a task carried out by women (which is reflected in 79% of the total respondents being female). The average age of respondents is 38 years. Most households (70%) buy rice several times a month. The vast majority of respondents (97%) have some form of formal education, with a clear majority being educated up to primary/secondary school level, whereas those with at least a bachelor's degree account for 18.9% of respondents. Regarding occupation, a large proportion of the working respondents are independent workers (self-employed) (38%) and government employees (21%) whereas employees of private companies account for only 6%. Households have an average of five members and an average monthly income of USD 375, which is a slightly higher than the figure for the overall population, i.e. USD 297 (Department of Statistics, 2009).

3.2 Rice quality criteria

The most quoted rice quality cues are: freshness (46%), shape of grain (26%) and no chemical residues (24%). A small number (4%) explicitly refer to organic rice which is a new product for consumers, as it was first introduced in 2007 (mainly in Vientiane). Consumers prefer to buy new rice, i.e. recently harvested (referring to freshness) rather than old rice (stored for a long time), which may affect the palatability. In the 2017 survey, the same quality attributes were highlighted, with the following ranking: 1- shape (quoted by 19 of 30 consumers); 2- freshness (6 out of 30); 3- being organic (3 out of 30); and 4- no chemical residues (2 out of 30). Even though the sample is much too small to draw any definitive conclusions, it suggests that there is growing demand and understanding related to organic products.

3.3 Conjoint analysis result: impact of quality attributes

From the results of the conjoint analysis, the most important attribute influencing consumer preferences regarding rice quality is the retail outlet (39.5%) followed by organic certification (29.33%), packaging (16.55%) and origin (Table 3). Considering the utility value of each attribute is interesting because it displays both negative and positive values. The positive value of utility indicates that the level of each attribute is important to consumers while the negative sign shows they dislike the attribute. For instance, the negative sign associated with the attribute "purchase from mobile vendors" means that they dislike buying rice from mobile vendors when they look for quality and safety. Hence, our hypothesis concerning consumers' appreciation of rice quality and safety being influenced by the place of purchase, the packaging of products, the indication of product origin and organic certification is confirmed, the place of purchase representing the most important factor followed by certification. The kendall'tau and pearson's R values in the correlation in the table 3 is close to 1 (0.867 and 0.971 respectively), meaning that the correlation between the observation and the prediction is very high.

The 2017 survey confirmed that the choice of the place of purchase is the first strategy for consumers to guarantee the desired quality of rice, the wet market being the preferred outlet.

Table 3. Importance of the value of attributes

Attributes	Levels	Utility estimate	Std. error	Importance values
Packaging	unpacked	-.*199*	.146	16.55
	packed	.*199*	.146	
Retail outlet	wet market	.444	.195	39.50
	minimart	.259	.216	
	mobile vendor	-.704	.216	
Organic certification	not indicated	-.976	.148	29.33
	indicated	.976	.148	
Country of origin	not indicated	-.257	.148	14.61
	indicated	.257	.148	
(Constant)		5.416	.146	

Correlations [a]

	Value	Sig.
Pearson's R	.971	.000
Kendall's tau	.867	.000

a. Correlations between observed and estimated preferences

Table 4 illustrates the impact of the "Organic certification" attribute on selected scenarios (A to J). The sum of utility values of scenarios "C, J, H, D" and "G" when the rice is sold without "Organic certification" has a negative value, whereas scenarios "E, B, I, F" and "A" when the rice is sold with "Organic certification" has a positive sum of utility value.

Table 4. Gain in utility value of each scenario with regard to the attribute "Certification"

Scenario	Combination of attributes				Sum of utility	Gain in utility
	Organic certification	Retail outlet	Country of origin	Packaging		
C	Not indicated	Mobile vendor	Indicated	Unpacked	3.974	0
J	Not indicated	Mobile vendor	Indicated	Packed	4.192	+ 0.398
H	Not indicated	Wet market	Not indicated	Unpacked	4.428	+ 0.634
D	Not indicated	Wet market	Not indicated	Packed	4.826	+ 1.032
G	Not indicated	Minimart	Indicated	Packed	5.155	+ 1.361
E	Indicated	Mobile vendor	Not indicated	Packed	5.630	+ 1.836
B	Indicated	Minimart	Not indicated	Unpacked	6.195	+ 2.401
I	Indicated	Minimart	Not indicated	Packed	6.593	+ 2.799
F	Indicated	Wet Market	Indicated	Unpacked	6.894	+ 3.100
A	Indicated	Wet Market	Indicated	Packed	7.292	+ 3.498

As shown in Table 4, Card "A" represents the scenario where rice has the best perceived quality (sum of utility = 7.292), followed by Card "F" and Card "I", with 6.894 and 6.593, respectively. Scenarios "A", "F", and "I" describe quite a similar situation. Card "A" describes packed rice sold in the wet market. The rice package mentions the origin of the rice and the rice is certified (organic certification). Card "F" states that the rice is sold in bulk in the wet market in large bags. However, the rice bag mentions the country of origin and "organic certification." Card "I" describes the packed rice sold in minimarts. The rice package mentions the origin and that the rice has "organic certification".

In Table 4 again, we compare the two scenarios "A" and "F". If we change from scenario "A" to scenario "F", 0.398 points of utility are lost relative to scenario "A". This indicates that there is a loss of 5.5%. This number was calculated based on the utility loss of scenario "F" (6.894) compared to sum of utility of scenario "A" (7.292) of consumer preference regarding quality. The result shows that consumers prefer packed organic rice rather than unpacked rice when rice is sold in the wet market.

In order to better understand consumer preference regarding food quality, we changed the place of sale from wet market to minimart, unpacked and with the same organic certification, but with no indication of the country of origin (A over B). In this situation, we lose 1.097 points of utility relative to the scenario "A". This indicates that there is a loss of 15% in consumer preference regarding quality. Wet markets are therefore more associated with quality rice than minimarts. However, consumer preference for scenario "A" over the scenario "B" can be influenced by the country of origin because scenario "B" does not indicate the country of origin, whereas scenario "A" over "F" indicates the country of origin.

3.4 Cluster analysis

Using K-mean cluster analysis with the utility part-worth of each attribute, three clusters of consumers were identified. The P-value in table 5 shows that the retail outlet and organic certification attributes have strongly significant relationships among the three

clusters of consumer (P-value < 0.05), whereas the packaging and country of origin attributes have no significant effect among the three clusters.

As shown in Table 5, cluster 1 comprises half of the respondents (151 consumers). It is the segment that attaches the greatest importance to organic certification to find rice of the desired quality. Table 6 presents details of the three clusters in terms of their socio-demographic characteristics and information on the organic certification. Cluster 1 consists of respondents who are more educated and have bigger households. Cluster 2 comprises around a third of the consumers. It includes averagely educated and average-age consumers. Considering the positive part-worth utilities of this segment, these consumers assign a higher utility to the minimart then to the wet market and a low level to mobile vendors. Finally, cluster 3 encompasses the greatest part-worth utility with organic certification, while the place of purchase has also a positive part-worth utility with the wet market. This consumer group (Table 6) has the highest percentage of people over the age of 45 and a large household size.

Table 5. Means part-worth level of attributes and relative importance by cluster

Attributes and level	Cluster			ANOVA *p-value*
	1 (n=151; 51%)	2 (n=87; 29%)	3 (n=59; 20%)	
Packaging				
Unpacked	0.232	0.048	0.334	0.123
Packed	-0.232	-0.048	-0.334	0.123
Retail outlet				
Wet market	0.225	0.617	0.752	0.025
Minimart	-0.336	1.648	-0.266	0.000
Mobile vendor	0.111	-2.266	-0.486	0.000
Organic certification				
Not indicated	-1.09	0.375	-1.568	0.000
Indicated	1.09	-0.375	1.568	0.000
Country origin				
Not indicated	-0.191	-0.378	-0.246	0.204
Indicated	0.191	0.378	0.246	0.204

Table 6. Main differences between clusters

Variables	Sample	Cluster 1	Cluster 2	Cluster 3
Gender [NS]				
Men	21	25	20	12
Women	79	75	80	88
Age group**				
18-25	16	19	22	3
26-35	29	32	25	24
36-45	23	19	23	32
46-55	22	21	17	31
>55	11	10	13	10

Employment [NS]				
Self-employed	38	36	41	37
Housewives	27	24	29	32
Government	21	24	21	15
Unemployed	5	7	3	3
Private employees	6	8	-	8
Other	3	1	6	3
Education**				
Never been to school	3	5	-	2
Primary school/middle school	34	26	41	46
High school	23	21	21	29
Vocational/associate degree	22	20	29	15
>=Bachelor	19	28	9	8
Monthly income (LAK = Lao Kip)[NS]				
<1 million	10	10	11	10
1-3 million	48	42	53	56
3.1-5 million	21	21	21	22
5.1-7 million	9	14	3	3
>7 million	5	6	7	2
N/A	6	7	5	7
Household size (no. of people)**				
1-3	16	26	9	0
4-7	62	74	74	17
>7	22	0	17	83
Children under 4 years old***				
No	66	73	67	49
Yes	34	27	33	51
People over 60 years old [NS]				
No	74	77	75	68
Yes	26	23	25	32
Frequency of buying rice**				
Several times a week	18	13	25	20
Several times a month	80	85	74	80
Over a month	2	3	1	0
Awareness of organic logo**				
No	53	50	48	68
Yes	27	50	52	32

Note : ***P <0.01; **P <0.05; *P <0.1; [NS] non-significant

4. Discussion

The conjoint analysis found that the retail outlet (place of purchase) and organic certification has the largest relative importance in consumer perceptions of food quality

and safety, followed by the country of origin and packaging attributes. The indication of organic certification has a high positive utility, followed by wet market, minimart and indication of country of origin. The place of purchase attribute, especially wet markets and minimarts, has a positive influence on consumer confidence in rice quality, whereas the wet market shows a higher utility value (preference) than minimarts. This quantitative analysis is confirmed by the 2017 survey in which most consumers prefer to buy quality rice at the wet markets rather than in modern markets. This is conditioned by several aspects: first, the rice has not been stored for a long time. Second, it is not packaged, so that they can check some of its characteristics, especially its shape (long grain, unbroken rice is preferred). Third, they think that rice sold in wet markets contains no or limited chemicals compared to rice sold in supermarkets because it is produced in the Lao PDR without preservatives.

The fact that wet markets are associated with fresher food has been highlighted by other studies, such as that of Chamhuri and Batt (2013). Therefore, wet markets have more advantages in terms of experience attributes for Laotian consumers. Supermarkets are not associated with higher food safety, in contrast to observations in other countries (Figuié & Moustier, 2009). We observe that minimarts and supermarkets in the Lao PDR are still in their infancy and most consumers have not yet been exposed to them. Moreover minimarts commonly sell rice imported from Thailand rather than local rice, so that uncertainty regarding production practices is high. Such rice has also been stored for a long time compared to local rice.

Conclusion

Summary of main results

This paper aims to assess the main factors that deliver a credible message to urban consumers in the Lao PDR concerning quality and safety, with a focus on rice. From the literature review, we draw the hypothesis that food quality and safety are multi-dimensional and intertwined. Their perception by consumers is influenced by the product origin (local being preferred), the labelling, the certification and the place of purchase. While these factors are often considered individually, we consider all four of them together with their interaction in the present study. The results show that retail outlets and organic certification have a major influence on consumer perception of quality and safety. The preferred retail outlet is the wet market followed by minimarts (where rice may be stored for a long time) and then mobile vendors.

Recommendations

First, it is recommended that public authorities support a diversity of distribution formats, including wet markets. As for minimarts, the number of which is growing rapidly[2], we recommend that they consider selling local rice in bulk.

Second, certification and the indication of origin are the key to increasing consumer confidence in rice quality. Certification can be established at different levels and in different forms. It can either take the form of product certification, such as the promotion of production sites with a well reputed indication of origin, or certification of organic production. However, issuing quality signs is not enough to inform consumers. Consumers have difficulty in differentiating between organic labels and conventional labels and in understanding information on food certification (Birgit Roitner-Schobesberger, 2008; Šárka & Giacomo, 2015). Consumers' trust in the agency responsible for issuing the signs is essential to guarantee the credibility of these signs. Government agencies and the private sector should increase consumer information on quality certification and labels (Aday & Yener, 2014; Janssen & Hamm, 2012).

Limitations of the study

First, the study design did not consider price as an attribute. Pricing impacts consumer perception of quality and safety; for example, a higher price may be an indicator of higher quality of food from the consumer's point of view.

Another limitation is that the conjoint card design was created to depict regular consumer deals to get access to food. Consideration must therefore be given to the information on the card (picture) and whether the results may be biased.

Furthermore, the study only considered purchased rice and not rice obtained through gifts or self-production. Finally, the data was collected some years ago and it would be valuable to update it by means of a quantitative survey.

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