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Consumer's Willingness to Pay for Organic Leaf Vegetables in Modern Markets in Bogor, Indonesia

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Abstract. The price range of organic products ranges from 6% to almost 300% higher than the price of inorganic products. The price difference can affect consumers' willingness to pay. It is necessary to research how much the value of willingness to pay is to be paid by people in the city of Bogor to pay for organic leaf vegetable products. The independent variables studied were age, education, expenditure, gender, number of family members, marital status, health awareness and environmental awareness. The data source in this study uses primary data was conducted in April-June 2024 . The number of samples used in this study were 200 respondents by purposive sampling. Selection of DCE analysis to find the WTP value chosen by respondents as consumers of organic leaf vegetables with 3 physical attributes such as product type (organic or non-organic), label (there is or there is no label) and place (directly to modern markets or through online applications). The results showed that organic vegetable consumers are willing to pay more on attributes for organic products amounting to IDR 5,890.8; having / including labels of IDR 4,292.8; and IDR 2,992.45 on online purchases. When knowing consumer WTP, marketers can set the optimal price according to consumer purchasing power and preferences. In addition, by knowing the price limit that consumers are willing to pay, marketers can design attractive promotions without hurting their profitability. Producers can adjust the quality or type of product according to the preferences of consumers who want to buy organic vegetables.

Keywords: discrete choice experiment; organic vegetables; willingness to pay

INTRODUCTION

The growth of organic agriculture in Indonesia can be seen from the increase in organic food which reaches 15-20% per year (Organic Institute, 2020). Consumers experience various changes, both in the type of food, consumption method, diet, and processing technology. The shift from consumption of inorganic to organic vegetable products shows that the demand for organic leaf vegetables is also increasing. Organic leafy greens are included in the top ten products most frequently purchased by consumers. Based on the Indonesian Organic Agriculture Statistics (SPOI) survey, the majority of organic consumers come from urban areas, with respondents spread across 10 provinces, such as DKI Jakarta (32%), West Java (21%), and Yogyakarta (11%). West Java has the highest organic consumers (27.06%) during the Covid-19 pandemic (Organic Institute, 2020). Therefore, this research will be conducted in Bogor City, which is strategic and close to Jakarta.

According to Ubersuggest data, organic green vegetables are searched about 1,600 times per month on Google, indicating great market potential. Demand for organic products, especially in March-May 2020, increased rapidly due to the Covid-19 pandemic, as people realized that they could boost their immunity by eating organic food (Organic Institute, 2020). However, the premium price of organic products is a major barrier for consumers (Bryła, 2016). Rahmalia et al., (2022) stated that 50% of consumers consider price as the main factor in purchasing fresh food. Consumers who do not buy organic products often cite high prices and limited production as reasons (Organic Institute, 2020).

The most frequently purchased organic product is vegetables, with organic vegetables accounting for 23% of total purchases (David & Ardiansyah, 2017). Vegetables such as spinach, kale, and lettuce were the most chosen during the Covid-19 pandemic (Organic Institute, 2020). The price difference between organic and inorganic leafy vegetables in Bogor modern market ranges from 6% to 300% higher (Sörqvist et al., 2013). 82% of consumers cited high prices as a reason for not buying organic

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products, and the majority of consumers were unwilling to pay more than a 10-20% price premium (Xie et al., 2015). Therefore, it is important to examine consumers' willingness to pay (WTP) for organic leafy greens the most.

Previous research shows an increase in WTP for spinach, kale, pakcoy, and lettuce, with various percentage increases, as studied by Aufanada et al., (2017) and Marda et al., (2021). This study aims to determine how much consumer WTP for organic vegetable commodities such as green spinach, red spinach, kale, pakcoy, and curly lettuce, based on previous research that shows these vegetables are widely consumed. As organic vegetable cultivation requires special treatment that increases production costs, the price of organic vegetables is higher than inorganic. Therefore, WTP analysis is important to see how much consumers are willing to pay.

This research will also evaluate consumer preferences for organic leaf vegetables using DCE analysis, which involves product attributes, labeling, place of purchase, and price. WTP analysis helps the industry understand consumer motivations for buying organic leafy vegetables, develop marketing strategies, and identify appropriate consumer segments and market opportunities (Güney and Giraldo, 2020). Multiple linear regression analysis was used to determine the relationship between consumer WTP values and demographic variables such as age, gender, education, as well as other factors such as expenditure, family members, marital status, health awareness, and environmental awareness. The results of this analysis can provide recommendations to relevant parties to adjust organic vegetable products to consumer expectations.

METHODS

The research was conducted in Bogor City and the location selection was done purposively (purposive sampling). To obtain an overview of the WTP of organic leaf vegetables, this study was limited to consumers in Bogor City. Bogor City was chosen because Bogor as a buffer zone of the capital city, consists of people who have the level of education, employment, and social status that has the potential to become consumers of organic products. In addition, the availability of organic products in Bogor City is also very adequate with the existence of modern vegetable outlets developing in Bogor. The availability of organic products in Bogor is not an obstacle for consumers to get products. The existence of several organic leaf vegetable producers implies that the availability of organic leaf vegetable products can be fulfilled. So the price factor and the willingness to pay consumers are important factors that need to be studied. Data collection time will be carried out in April-June 2024.

Recommended population sampling in DCE research study follows the **Equation 1** (Louviere et al., 2008).

$$n \geq \frac{500\,(c)}{t\ x\ a} \quad \text{.....(1)}$$

Where n is the minimum number of respondents, t is the number of choice sets, a is the number of profiles per choice set, and c is the number of attributes. The sampling is adjusted to the arrangement of choice sets with a combination of 6 choice sets, 2 profiles per choice set, and 3 attributes. Thus, the minimum number of samples that can be minimally taken in the study is as shown in **Equation 2** and **Equation 3**.

$$n \geq \frac{500\,(3)}{6\ x\ 2} \quad \text{.....(2)}$$

$$n \geq 125 \quad \text{.....(3)}$$

The number of samples used in the study was at least 125 respondents and the field data obtained 265 respondents but only 200 respondents met the respondent criteria. Respondents selected in the study were based on the following criteria:

a. A respondent is someone who has made at least one purchase. This criterion was chosen because of the assumption that if you buy at least once, you can already have an assessment of the product.

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b. Respondents were selected as consumers or as purchasing decision-makers.
c. Respondents aged 18 years and over, because at this age they are considered to be able to make choices.
d. For one family group, only one person is a respondent in the study so that the answers in the questionnaire do not influence each other.

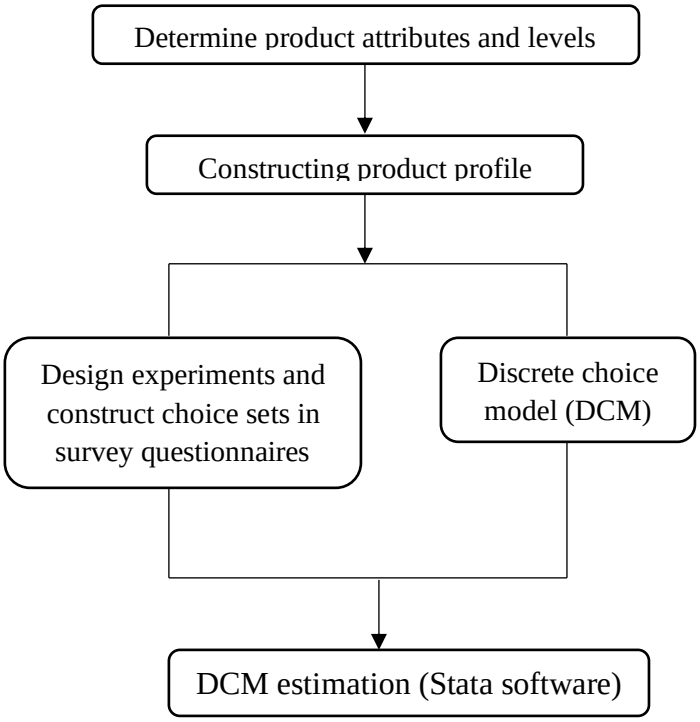

Figure 1. Analysis stage discrete choice experiment

Discrete choice experiments (DCE) model, individuals are considered to be choosing between a set of alternatives (choice set). The purpose of using DCE analysis is to determine the trade-offs underlying customer choices. DCE analysis can show consumers derive product preferences based on utility perceived value (Friedel et al., 2022). DCE leads consumers to choose from a hypothetical set of alternatives. Each alternative choice is described by a set of characteristics and respondents' answers determine the level of importance of each attribute. Attributes are distinguishing characteristics between one product and another that are considered by consumers in making purchasing decisions (Simamora, 2000). Attributes are characteristics possessed in an object which, if processed, can attract consumer decisions in product purchasing decisions (Rangkuti, 2015; Sukesi, 2020). Experimental design was carried out in several stages (JR et al., 2014):

1. Identifying attributes and setting levels

Based on the literature study, this research will use 3 attributes with 2 attribute levels. The price attribute is adjusted at the time of data collection from April-June 2024. Selection of DCE analysis to find the WTP value chosen by respondents as consumers of organic leaf vegetables.

2. Conducting experimental design and choice set preparation

The arrangement of the experimental design in this study uses an orthogonal design using SPSS so that a combination of attributes consisting of six choice sets with two profiles is formed. The choices formed will make it easier for respondents to select a combination of attributes. The third option in each choice set is an option when consumers do not choose the two profile combinations

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offered. In the DCE analysis model, the WTP value of consumers can be known with several stages can be seen on **Figure 1**.

RESULTS AND DISCUSSION

Based on the average WTP price of the five organic vegetable commodities, the value is higher than the prevailing prices in the modern market in Bogor city and those listed in the online application can be seen on **Table 1**.

The results of the analysis show how much consumers are willing to pay for organic vegetables with attributes that the researcher has determined. Based on the WTP analysis that has been carried out, it is known that consumers are willing to pay more for the attributes of organic vegetable products, there is an organic label and online purchases through the application. Organic vegetables are concerned with several important aspects related to health, environment, and quality. Research from Worthington, (2021), found that organic vegetables have a higher vitamin and mineral content compared to those grown conventionally.

In addition, organic vegetables also support biodiversity and soil fertility, due to low residue levels (Reganold and Wachter, 2016). Many consumers report that organic vegetables have a better taste, which can be attributed to farming methods that improve soil quality and nutrients (Rembiałkowska, 2007). Willingness to pay consumers on each attribute of organic leaf vegetables can be seen on **Table 2**.

Table 1. Average price willingness to pay of organic vegetable consumers

No.	Commodities	Selling price in modern markets in Bogor city area (IDR)	Average price WTP (IDR)	Selling price on online apps (IDR)
1.	Green spinach	7,000	10,345	9,150
2.	Red spinach	9,000	13,131	12,500
3.	Kale	8,700	11,546	9,700
4.	Pakcoy	8,000	11,604	10,750
5.	Curly Lettuce	9,950	13,646	12,000

Table 2. Willingness to pay consumers on each attribute of organic leaf vegetables

No.	Attribute	Level	WTP (IDR/Kg)
1.	Product types	Organic	5,890.80
		Anorganic	-655.40
2.	Tagged with	Include organic label	4,292.80
		No organic label	-616.10
3.	Place	In modern markets directly	640.050
		Onlive via the app	2,992.45

In organic vegetable products, consumers are willing to pay a maximum price of IDR 5,890.8/kg higher than inorganic vegetable products. Organic vegetable products have higher nutritional benefits / content believed to be of better quality so that respondents are willing to pay higher. Organic vegetables have a higher nutritional content than inorganic vegetables. For example, organic vegetables tend to have higher levels of vitamin C, iron and magnesium. However, these differences are often inconsistent and can be influenced by other factors such as soil type, climate and processing methods.

Consumer considerations are also influenced by differences in pesticide residues as explained by (Benbrook et al.,

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2021), that In many cases, pesticide residues on organic produce are almost undetectable, while inorganic vegetables often contain pesticide residues, although usually within safe limits. Organic vegetables are also associated with food health, due to the absence of chemical residues attached to vegetables. In Alfian et al., (2016), organic vegetables have the advantage of containing 10-50% antioxidants that can prevent disease compared to inorganic vegetables. Consumers also play a role in determining choices and decisions to consume healthy food. In this study, it is known that organic leaf vegetable products provide higher utility for consumers than inorganic vegetables.

Consumers are willing to pay more for organic vegetables that have a label that results in a value of IDR 4,292.8/kg higher than those without a label. The organic label on organic vegetables is very important because it provides assurance to consumers that the product has met certain standards in the production process. Research by (Kovacs and Keresztes, 2022), explained that consumers tend to be willing to pay more for products with attributes that are believed to provide environmental and health benefits. The presence of labels on organic vegetables also shows that vegetables have good quality. The organic label indicates that the product has gone through an environmentally friendly and sustainable production process, including the use of natural fertilizers and non-chemical pest control methods (Willer et al., 2020). Sutarni et al., (2018) explained in their research that the organic label is very important for consumers in deciding to buy organic products.

The organic label is issued through the Organic Certification Organization (LSO), making it easier for consumers to choose organic and organic vegetables (Hardiyanti et al., 2022). It also serves as a guarantee that the product is free from chemicals, such as pesticides and chemical fertilizers, and contains high nutrients. In Dewi et al., (2022), consumers showed a strong preference for vegetables that have organic labels. Organic labeling is an important attribute category because it relates to the level of consumer confidence in choosing organic vegetables. In this study, organic labels on products provide higher utility for consumers than vegetable products that do not have organic labels.

Place of purchase is an indicator that determines consumer access or affordability of organic vegetables to be purchased. The place of purchase is divided into two, namely the modern market (direct) and also online (application). Consumers are willing to pay IDR 2,992.45/kg higher for organic vegetable products sold online compared to purchases in modern markets directly.

Organic vegetables marketed online make it easier for consumers to choose, determine distance, payment costs and also find out information related to complete vegetable choices. In Rokaya and Pandey, (2023) it is also explained that consumers prefer online purchases because of the ease of access, greater choice, and more complete product information. Consumers who buy organic products online are also influenced by product reviews and ratings presented in online applications. Research by Rohmah et al., (2021), consumers like online purchases because of the content on the platform that includes organic vegetable products for sale, so that consumers know the physical form of vegetables to be purchased.

CONCLUSION

Consumers of organic vegetables are willing to pay more for organic products at IDR 5,890.8; have/listed labels at IDR 4,292.8; and at IDR 2,992.45 for online purchases. The results of the calculation of the average price WTP for green spinach commodities are IDR 10,345; red spinach IDR 13,131; kale IDR 11,546; pakcoy IDR 11,604; and curly lettuce IDR 13,646 in a kilogram package size. Willingness to pay provides important insights for making strategic decisions in terms of pricing, production planning, and marketing of organic vegetable products. When knowing

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consumer WTP, marketers can set the optimal price according to consumer purchasing power and preferences. The right price can maximize sales as well as profit margins. In addition, by knowing the price limit that consumers are willing to pay, marketers can design attractive promotions without hurting their profitability. Producers can adjust the quality or type of product according to the preferences of consumers who want to buy organic vegetables.

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