

Understanding the price perception: Assessing youth willingness to pay for organic rice in Indonesia

Muhammad F. Nurohman¹, Herawati^{1*}, and Bayu Krisnamurthi¹

¹Agribusiness Department, IPB University, Bogor, Indonesia

Abstract. A critical step towards attaining sustainable agricultural development is the production of organic crops. The upstream sector's support is crucial to the success of organic farming. Due to their understanding of sustainable food methods, the younger generation has the potential to lead the rise of organic agriculture. This study intends to examine young people's perceptions, preferences, and willingness to pay for organic rice. The research uses original information gathered from 161 young respondents in Indonesia. The Discrete Choice Experiment (DCE) methodology and descriptive analysis are used. According to the study, despite having favourable impressions of organic rice and the ability to purchase it, the younger generation's willingness to pay for it is still less than the average cost of organic rice. Compared to conventional rice, the younger generation is prepared to pay an extra IDR 10,776.83 for organic rice. Promoting organic rice with enticing health benefits, certifications, and environmental friendliness compared to conventional rice should be the main goal to increase youth preference for organic rice. Furthermore, decisions about the production of organic rice and the formulation of pricing policies should take into account the young generation's willingness to pay for it.

1 Introduction

By 2050, the global population is expected to reach 9.7 billion [1], posing a challenge in producing nutrient-rich food for good health. Sustainable agricultural systems, like organic cultivation, are essential for addressing this challenge [2]. While organic cultivation in Indonesia is not as popular as conventional farming, it offers health benefits and similar yields. Overcoming obstacles, including policy and public awareness issues, is crucial for the growth of organic cultivation [3]. The process of organic cultivation will develop if the downstream sector responds appropriately. Therefore, increasing the preference for organic products is one step to indirectly participate in protecting the environment.

The development of organic agriculture in Indonesia has continued to increase annually. It is in line with the government program 2010 called Go Organic, which supports organic

* Corresponding author: hera@apps.ipb.ac.id

farming because it is considered more beneficial for health and the environment. The program received a positive response in its development, as indicated by the increasing land area for certified organic commodities, reaching 251,630.98 ha in 2018 [4].

Indonesian organic products still struggle to compete globally, representing only 0.03% of global demand, with per-capita spending of USD 0.06 in 2021 [5]. Despite these challenges, there is a positive trend, with an estimated Compound Annual Growth Rate (CAGR) of 6.1% projected for 2021-2026. Further analysis of the market and consumer interest in organic products in Indonesia is needed to estimate the positive potential of organic products in Indonesia.

According to David and Ardiansyah [6], organic rice is an organic product with the second highest demand after organic vegetables. The increased demand for organic rice in Indonesia is also because most of its population consumes rice as a staple food. In addition, the number of organic rice operators is the highest compared to other commodities [4]. The prospect of organic rice will continue to grow along with the marketer's ability to analyse market segmentation. The market segmentation for organic rice remains limited [7]. Therefore, the development of organic rice marketing must be based on consumer characteristics and preferences, in addition to geographic and demographic segmentation.

The younger generation is an important segmentation target for organic product marketers. The United Nations (UN), in its International Youth Year, which was held in 1985, defined the younger generation as the age group of 15-24 years. According to Deloitte [8], this segment concerns food safety and ecological development. The younger generation segment differs from other age groups when dealing with environmental issues [9]. Furlow and Knott [10] added that they are like consumers who appear well-educated regarding environmental and sustainability issues. According to the market analysis report by the International Markets Bureau, the largest potential market for organic packaged food products and organic fresh products in the UK is under 25. However, they have more limited production potential [11]. Most of the younger generation agrees that it is worth paying more for organic food, so it is necessary to anticipate that there is no decline in this market segment.

In line with conditions in the UK, the younger generation in Indonesia also has a positive potential for organic products. According to David and Ardiansyah [6], the younger generation has a desire to pay more for organic products when they have their income. However, the study also found that 48% (n=253) of the younger generation in Indonesia answered 'maybe' regarding their interest in buying organic food in the future. Promoting organic products is one way to encourage people to prefer them [6]. According to the Indonesian Organic Agriculture Statistics [4], 2020-2030 will be a golden era for Indonesian people in developing organic agriculture, where Indonesia will experience an increase in the workforce (demographic bonus). Therefore, awareness of organic food consumption in the younger generation must continue to be campaigned.

As a developing country, the number of young people in Indonesia is sufficient to dominate the age group of the population. The formation of preferences for choosing organic rice in the younger generation can be achieved by knowing in advance how they perceive organic rice. Mowen and Minor [12] refer to the stages of exposure, attention, and understanding as perceptions, which affect information processing. In reality, the perception that arises will be embedded in the individual's mind, becoming a preference, choice, or something consumers prefer.

Awareness of organic food in the younger generation is very important because the younger generation is the agent of change. Therefore, an analysis of the perceptions, preferences, and willingness to pay for organic food among the younger generation needs to be carried out to support sustainable organic agriculture development. This study aims to analyse the younger generation's perceptions, preferences, and willingness to pay for organic rice. The hypotheses in this study are 1) the younger generation has a positive perception of

all the attributes of organic rice and 2) the younger generation has a preference and willingness to pay more for organic rice.

2 Methodology

This research was conducted from January to May 2023. The data used in this study were primarily qualitative and quantitative data obtained from a survey using a questionnaire as a medium filled in by respondents. According to Sugiyono [13], a questionnaire is a data collection technique in the form of a collection of questions that must be answered by the respondent indirectly so that the respondent does not need to answer questions directly to the researcher. The questionnaire was made using a Google Forms survey distributed via social media such as WhatsApp, Instagram, and Twitter using group chat, stories, and community-based features.

The population in this study is the young generation in Indonesia, aged 15-24 years. The sample is part of the number and characteristics of the population [13]. The sampling method used in this study was non-probability sampling with a voluntary response sampling technique. The sample size requirement used in the Discrete Choice Experiment (DCE) refers to Orme's calculations [14], with a minimum of 50 respondents. In this study, 161 young-generation respondents were obtained, mostly university and high school students from around 18 provinces in Indonesia.

The data analysis method in this study will be conducted using descriptive data analysis, which aims to identify the characteristics of the respondents. According to Sugiyono [13], descriptive analysis is used to analyse data by describing the data that has been collected, as it does not intend to make general conclusions or generalisations. In addition, this study uses a 4-point Likert scale as a measurement scale. A Likert scale measured the respondent's perceptions of organic rice.

In this study, the attributes of the rice used could be visually compared between conventional and organic rice. Based on research by Ar-Rozi et al., Adrianto, and Maula et al. [15-17], consumer perceptions of organic rice can be measured in terms of quality, price, and benefits. The attributes used in this study were physical rice, certification labels, price suitability, health, and environmental friendliness, as shown in Table 1.

Table 1. Attributes for measuring respondent's perceptions.

Aspect	Attribute	Source
Quality	Physical appearance	Adrianto (2018)
	Certification	Ar - Rozi <i>et al.</i> (2020)
Price	Suitability	Maula <i>et al.</i> (2016)
Benefit	Health	Maula <i>et al.</i> (2016)
	Environmental friendly	Maula <i>et al.</i> (2016)

Measurements were taken using the Discrete Choice Experiment (DCE) method. The DCE method is based on a well-tested theory of choice behaviour and can account for interrelated behaviours [18]. In this study, the DCE method was used to examine the attribute performance of organic rice compared with conventional rice, which can determine the WTP value consumers are willing to pay. The basic principles of DCE are based on Random Utility Theory (RUT) [19]. In the RUT framework, consumers are assumed to have a latent preference (utility) in selecting product profiles in a choice set and choosing the most preferred [18].

Measurements using the Discrete Choice Experiment (DCE) method were carried out in five key stages. The first is to determine the level and product attributes by conducting a

literature review on the top three priority rice attributes obtained from a pre-research questionnaire of rice. The second step is to construct a choice set based on the level of each attribute using a combination formula. The D-efficiency principle was used with JMP 16 software to make the choice set valuable and accessible for the interviewees to fill out. Then, referring to Chen et al. [20], the unreasonable profiles or profiles that did not make sense were eliminated. The profile of the organic rice product used in this research is rice with health claims and a dull physique, referring to the Regulation of the Indonesian National Food Agency No. 2 of 2023 and SNI 6729-2016 standardisation [21]. In this study, 15 choice sets were used to avoid respondent fatigue [21,22]. The third is to design a questionnaire using a Google Forms survey and collect data by distributing the questionnaire. In addition to containing the choice set, the questionnaire contained the respondent's identities, including name, gender, age, occupation, last education, and amount of income. The fourth is to input the data collected into Microsoft Excel to be organised. The fifth is to analyse and interpret the data using conditional logistic regression in Stata 17 software to analyse the effect of each variable on utility and estimate the WTP value.

3 Results and discussion

3.1 Characteristics of respondents

The total number of respondents was 161. The characteristics of the respondents in this study were described through five variables: gender, age, occupation, last education, and income. Based on the gender variable, the majority of respondents in this study were female, with a total of 132 respondents (82%), while 29 respondents (18%) were male, with the greatest age frequency being 21 years, with a total of 33 respondents (20.5%). According to Dadas et al. [23], the female gender has a greater tendency to purchase organic rice.

The majority of respondents in this study had employment status as students or university students, with a total of 146 respondents (90.7%), with the majority of recent education being dominated by D4/S1/Bachelor education level, namely 79 respondents (49.1%) and high school/equal education level, 73 respondents (45.3%). Based on the monthly income variable, most respondents in this study had an income of less than IDR 500,000 (70 respondents, 43.5%).

3.2 The young generation's perception of rice in general

Analysis of the perceptions of the younger generation towards rice was carried out by submitting several statements regarding rice attributes, including price, information on health benefits, environmentally friendly claims, certification labels, and the physical appearance of rice. In this study, a descriptive analysis was carried out to determine how the distribution of respondents responded to several statements regarding the attributes of rice.

Based on Figure 1, it can be seen that the majority of respondents agreed with statements regarding information on health benefits, environmentally friendly claims, and certification labels. It shows that respondents agreed and had more preference for rice, including health benefits information, environmentally friendly claims, and certification labels. Organic rice has these characteristics, which can also be seen as their tendency towards organic rice. Based on the rice's physical appearance, respondents preferred physically smooth or bright white rice (85%), compared to rice with broken skin or dull colour rice (15%). In line with Rahyuni et al. [24], Indonesian people choose physically polished rice (bright white). BPS-Statistic Indonesia [25] also shows that consumers in Indonesia are more familiar with polished rice

as their main source of calories. Polished rice (milled) symbolises higher standards in Asian countries [26].

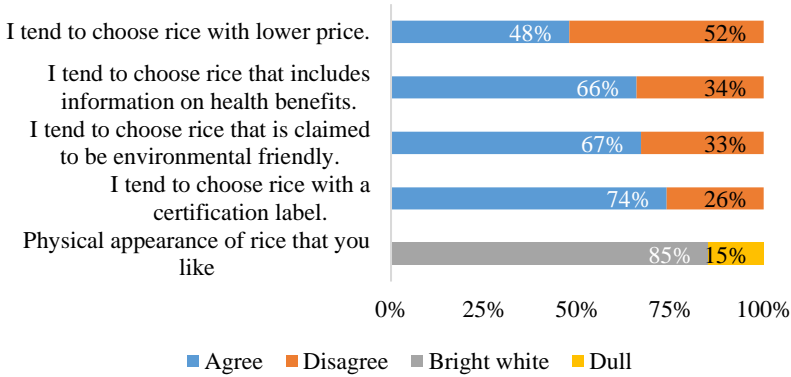


Fig. 1. Young generation's perception of rice.

Although most respondents agreed with statements regarding health benefits information, environmentally friendly claims, and certification labels, their responses to statements regarding prices were slightly inverse. As many as 84 respondents (52%) considered that the low price of rice was not their consideration when choosing rice. It shows their tolerance for rice with higher prices. Furthermore, an attribute priority analysis was carried out to determine respondent's order of attribute importance when choosing rice.

Based on Figure 2, the order of priority of the five attributes is health, price, rice physique, certification, and environmentally friendly claim. The top three attributes will be used to create a choice set in estimating the willingness to pay of respondents, namely, the attributes of claims for health benefits, physical rice, price, and the type of rice, as a comparison between organic and conventional rice.

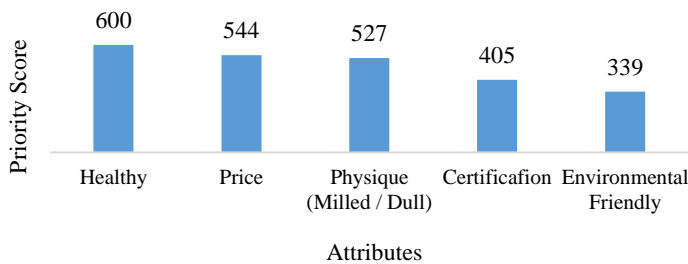


Fig. 2. Priority of rice attributes according to the younger generation.

3.3 Young generation's perception of organic rice

An analysis of the young generation's perception of organic rice was carried out after the respondents filled out and responded to several statements regarding the attributes of rice in general. Therefore, in this study, screening was first carried out to determine whether the respondent had some knowledge of organic rice. As many as 39 respondents (24%) did not know about organic rice, so the number of respondents used to analyse the perceptions of the younger generation towards organic rice totalled 122 respondents.

Before submitting several statements regarding organic rice, the questions were asked about their experiences and perceptions of organic rice. Respondent's experience with

organic rice was measured by whether they had ever bought or consumed organic rice, followed by their perceptions of the characteristics of organic rice based on the attributes previously proposed.

According to Figure 3, the percentage of respondents who buy and consume organic rice is still less than 50%, indicating that most are already aware of organic rice. However, their experience with organic rice has not yet reached buying and consuming behaviour. As many as 32 respondents (26%) had purchased organic rice, and 47 respondents (39%) had consumed organic rice. Later, the respondents' perceptions of organic rice characteristics were proposed with multiple choices of five attributes that the respondents then selected.

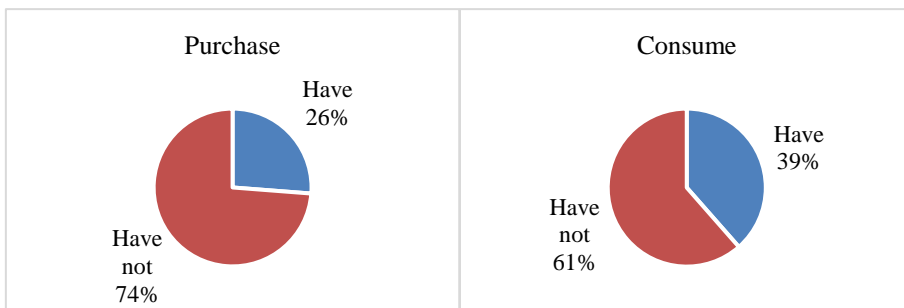


Fig. 3. Experience buying and consuming organic rice in the young generation.

Based on Figure 4, the respondents considered organic rice to be healthy (84%), environmentally friendly (62%), certified (39%), expensive (39%), and dull (6%). By that, it can be inferred that most respondents consider organic rice to be healthy and support environmental sustainability. It aligns with the perceptions of European consumers, who view organic products as healthy, environmentally favourable, and pesticide-free [27]. Furthermore, Slamet et al. [28] revealed that concern for the environment and health benefits are reasons for buying organic products.

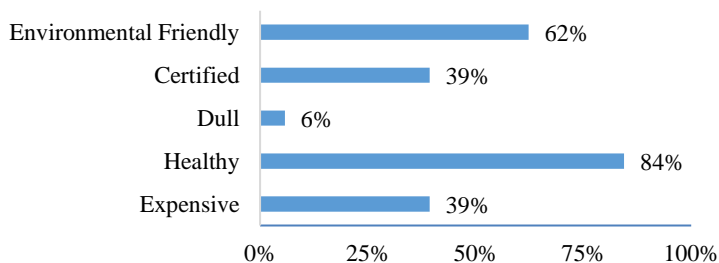


Fig. 4. Young generation's perception of the characteristics of organic rice.

As shown in Figure 5, most respondents agreed with health, environment, prices, and certification statements. In contrast to these four attributes, 64 respondents (52%) tended to disagree with the statement about the physical of organic rice as dull rice (still having epidermis). This is in accordance with respondents' responses to the characteristics of organic rice that were previously mentioned, where only seven respondents considered organic rice dull. It happens because many respondents still had never bought or consumed organic rice. In addition, it has been stated that most organic rice in Indonesia follows conventional milling principles [29]. Therefore, this must be evaluated as consumers find distinguishing between organic and conventional rice difficult.

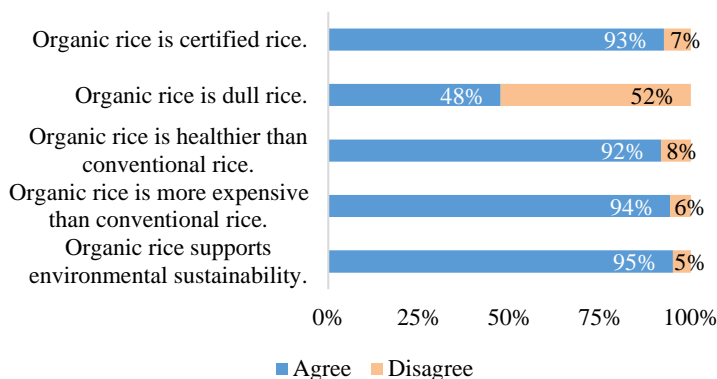


Fig. 5. Young generation's perception of organic rice.

3.4 The young generation's preference and willingness to pay for organic rice

Willingness to pay for organic rice was analysed based on the top three priority attributes of the survey results using the Discrete Choice Experiment (DCE) method, which was processed using the Conditional Logistic Regression Test on Stata 17 software. The results of the Discrete Choice Experiment (DCE) process are shown in the table below.

Table 2. Attributes that influence the young generation's willingness to pay for organic rice.

Attributes	Coefficient	P-value
Type of rice	0.5334529	0.000
Health benefits claim	2.563142	0.000
Physical appearance	0.2318216	0.034
Price	-0.0000495	0.000

Based on Table 2, it is known that all of the four attributes influence the willingness of the young generation to pay for organic rice. These attributes significantly affect the younger generation's willingness to pay at the 5% significance level for rice, proven by a P-value score of <0.05. This result is in line with the previous study [30], which states that price and lifestyle influence consumer's willingness to pay for organic rice.

The attributes of the type of rice, health benefits claim, and physical appearance of rice have positive coefficient values. It means that based on the type of rice, organic rice provides higher utility than conventional rice. Based on health benefits, rice with health claims provides a higher utility than rice without health claims. Regarding the visual characteristics of rice, it can be argued that unpolished rice, which retains its outer layer or epidermis, possesses greater use than polished rice. Furthermore, the price attribute has a negative coefficient value for consumer utility. It suggests that a price increase results in lower consumer utility. The utility obtained by a consumer is related to the price paid, which can then be measured by WTP [27]. In this study, WTP was measured using the formula provided by Train [32].

$$WTP_{\text{type of rice}} = \frac{b_{\text{type of rice}}}{b_{\text{price}}} (-1) \quad (1)$$

$$WTP_{\text{type of rice}} = \frac{0.5334529}{-0.0000495} (-1) \quad (2)$$

$$WTP_{\text{type of rice}} = 10,776.83 \quad (3)$$

Table 3. Willingness to pay the young generation for organic rice.

WTP Type of rice	IDR 10,776.83	Respondents are willing to pay a higher price for organic rice IDR 10,776.83 compared to conventional rice.
WTP Health benefits	IDR 51,780.65	Respondents are willing to pay for rice with higher health claims of IDR 51,780.65 compared to rice without health claims.
WTP Physical appearance	IDR 4,683.26	Respondents are willing to pay a higher price for broken (dull) rice IDR 4,683.26 compared to milled rice.

Based on the WTP calculation results in Table 3, it can be concluded that respondents were willing to pay for organic rice at a higher price of IDR 10,776.83 compared to the price of conventional rice. The willingness to pay the younger generation for organic rice is still lower than the real average price between conventional and organic rice, as shown in Table 4.

Table 4. Comparison of the price (June 2023).

Price of conventional rice	Young generation's WTP	Price of organic rice
IDR 12.600/kg (<i>hargapangan.id</i>)	IDR 23,377/kg	IDR 25,000/kg (<i>hargabulanini.com</i>)

The current price of organic rice is still slightly higher than the younger generation's WTP [33]. Nonetheless, the tendency and willingness of the younger generation to pay more for organic rice shows the potential for a positive attitude, and it must be addressed wisely. In addition, looking at the WTP for health benefits with the highest value compared to other attributes shows that the younger generation has more awareness and desire to choose products with health claims.

One of the efforts that can be made to continue to increase the positive attitude of the younger generation towards organic rice is to promote and offer organic rice according to the younger generation's expectations. Income levels do not necessarily influence attitudes towards organic products [34]. Instead, the belief that organic food meets the requirements (claims) will increase a person's marginal WTP because of a positive relationship between consumers' trust and high prices [35]. Therefore, the certification label is an important aspect of organic rice that must be considered to increase trust in organic rice.

Most young consumers are still unfamiliar with the Indonesian organic logo but know the characteristics of organic products [6]. In Indonesia, certification for organic products has been regulated at SNI 6729:2016 concerning Organic Agriculture Systems, which was issued by the National Certification Agency (BSN) [36]. Based on this, one of the promotion efforts that can be carried out is introducing the Indonesian Organic logo to the younger generation as an important attribute found in organic products (including organic rice) so that it will foster trust in organic rice claims. The organic Indonesia logo can be seen in Figure 6.

With an increasing number of "all-natural" or "free of" labels that mimic the appearance of organic product attributes, efforts to deepen trust in organic labels can greatly assist the growth of the organic market [35]. Establishing a collaborative effort among governmental entities, farmers, and organic product marketers is imperative to facilitate the widespread and comprehensive promotion of organic rice. The government has a role in evaluating policies related to organic farming so that they can cover the household level of organic farmers as a whole. The organic product certification process must be closely monitored to maintain consumer trust. The government can also revive programs such as Go Organic as an educational effort to promote organic products to the younger generation.



Fig. 6. Logo of "Organik Indonesia".

4 Conclusions and policy recommendations

This study found that the younger generation already had a positive perception of organic rice, as indicated by their positive response to information on health benefits, environmentally friendly claims, certification labels, and tolerance for high prices. In addition, the willingness to pay for organic rice in the younger generation is still slightly below the real average price of organic rice; therefore, it is necessary to promote organic rice according to the younger generation's expectations to increase their confidence in organic rice. It was also found that the young generation's willingness to pay for organic rice was IDR 10,776.83 higher than conventional rice.

The author's suggestion to increase preference (the tendency to choose) for organic rice in the younger generation is to promote organic rice as rice that has health claims, is certified and is also more environmentally friendly than conventional rice. The willingness to pay for organic rice in the younger generation can be used as material for consideration in producing organic rice, as well as formulating and determining policies regarding the selling price of organic rice. In addition, the authors suggest conducting research related to rice consumption behaviour among the younger generation in Indonesia is necessary.

References

1. S. Daniela and D. Pascalis, FAO publications catalogue (Food and Agriculture Organizations of the United Nations, Rome, 2018)
2. H. Patel, M. Sharma, and R. Purohit, *Int. J. Futur. Gener. Commun. Netw.* **14**, 2032 (2021)
3. I. Fuady, Mardianah, and M. A. S. Sutarjo, *Perception and intention in organic agriculture cultivation in North Maluku Province*, in Proceedings of the First International Conference on Assessment and Development of Agricultural Innovation ICADAI, 6-7 July 2021, Bogor, Indonesia (2021)
4. A. R. Firman and W. David, editors, *Statistik pertanian organik Indonesia 2019* (Aliansi Organik Indonesia, Bogor, 2019)
5. Organic Trade Association, *Organic dashboard from passport* (2021)
6. W. David and Ardiansyah, *Int. J. Agric. Resour. Gove. Ecol.* **13**, 315 (2017)
7. J. Rusma, M. Hubeis, and B. Suharjo, *Manag. IKM.* **6**, 49 (2011)
8. Deloitte, *Deloitte Millennial survey* (Deloitte, London, 2018)
9. P. Sheahan, *Generation Y: thriving and surviving with generation Y at work* (Hardie Grant Books, Prahran, 2005)
10. N. E. Furlow and C. Knott, *J. Appl. Bus. Econ.* **10**, 1 (2009)

11. Mintel International, Attitude towards healthy food (Mintel International, Chicago, 2013)
12. C. Mowen and M. Minor, Consumer behavior (Erlangga, Jakarta, 2002)
13. Sugiyono, Metode penelitian kuantitatif kualitatif dan R&D (Alfabet, Bandung, 2016)
14. B. K. Orme, Getting started with conjoint analysis: Strategies for product design and pricing research (Research Publishers LLC, Madison, 2010)
15. M. F. Ar-Rozi, S. Masitoh, and H. Miftah, *J. Agribus.* **6**, 89 (2020)
16. R. Adrianto, *PARSIMONIA: J. Akuntansi, Manaj. Bisnis* **4**, 321 (2018)
17. L. R. Maula, B. Siswadi, and S. Hindarti, *Persepsi masyarakat terhadap beras organik di Kota Malang*, in Proceedings of the Seminar Nasional Pembangunan Pertanian, 12 November 2016, Malang, Indonesia (2016)
18. J. J. Louviere, T. N. Flynn, and R. T. Carson, *J. Choice Model* **3**, 57 (2010)
19. L. L. Thurstone, *Psychol. Rev.* **34**, 273 (1927)
20. Y. H. Chen, K. H. Qiu, K. E. Liu, and C. Y. Chiang, *Sustainability* **12**, 1 (2020)
21. Badan Pangan Nasional, Peraturan Badan Pangan Nasional Republik Indonesia No 2 tahun 2023 tentang Persyaratan Mutu dan Label Beras (Badan Pangan Nasional, Jakarta, 2023)
22. G. M. Allenby and P. E. Rossi, *J. Econom.* **89**, 57 (1998)
23. B. Dadas, M. Yamin, and L. Lifianthi, *JEPA* **6**, 79 (2022)
24. Rahyuni, M. Noer, and Yusmarni, *JOSETA*, **2**, 199 (2020)
25. BPS-Statistic Indonesia, Jumlah data konsumsi beras di Indonesia (BPS-Statistic Indonesia, Jakarta, 2015)
26. G. Zhang, V. S. Malik, A. Pan, S. Kumar, M. D. Holmes, D. Spiegelman, X. Lin, and F. B. Hu, *J. Am. Diet. Assoc.* **110**, 1216 (2010)
27. H. Torjusen, L. Sangstad, K. O'Doherty Jensen, and U. Kjaernes, European consumer's conceptions of organic food (National Institute for Consumer Research, Oslo, 2004)
28. A. Slamet, A. Nakayasu, and H. Bai, *Foods* **5**, 85 (2016)
29. W. David and D. Kofahl, Editors, Food culture of Southeast Asia: Perspective of social science and food science (Kassel University Press GmbH, Kassel, 2017)
30. K. Barki and M. A. Rachmah, *J. Econ. Bus. Airlangga* **33**, 21 (2023)
31. Pusat Studi Ekonomi-Kebijakan Publik Universitas Gadjah Mada, Analisis tarif listrik regional di Jawa Tengah dan D. I. Yogyakarta (PSE-KP UGM & PT. PLN (Persero) Unit Bisnis Distribusi Jawa Tengah dan Yogyakarta, Yogyakarta, 2002)
32. K. Train, Discrete choice methods with simulation (Cambridge University Press, Cambridge, 2003)
33. National Food Agency, Pusat Informasi Harga Pangan Strategis Nasional (2023)
34. L. Zepeda and D. Deal, *Int. J. of Consum. Stud.* **33**, 697 (2009)
35. K. Britwum, J. C. Bernard, and S. E. Albrecht, *Food Qual. Prefer.* **87**, 104056 (2021)
36. National Standardization Agency of Indonesia, Sistem pertanian organik Indonesia: SNI 6729-2016 (National Standardization Agency of Indonesia, Jakarta, 2016)