Analysis of rice purchase decision on rice consumer in Bandung city

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Abstract. This study was conducted at three kinds of purchase location which were traditional market, rice kiosk, and supermarket in Bandung City, with survey data of 108 respondents which were selected by systematic random sampling. The aim of this study is to (1) identify consumer characteristics, (2) identify which attribute is considered by consumer in buying rice, and (3) analyze the relationship between purchase decision and income class. Data were analyzed by descriptive analysis and Chi Square test. The results showed most consumers in the traditional market were middle-educated and lower middle-income, at the rice kiosk, the consumer were generally middle-educated and middle-income, and in the supermarkets, the majority were high-educated and upper middle-income consumers. “Kepulenan” be the first priority of most consumers, but for the lower-middle class, the main priority was price. Thus, in case of scarcity and rice price increase, the government should immediately arrange market operations which targeting to lower-middle class consumers. There was a significant relationship between (1) the quality of rice consumed, (2) the frequency of rice purchase per month, and (3) attitudes toward rice price increase; each with the income class. Although the price of rice increase, consumers of middle and upper-middle were remain loyal to the quality of rice they consumed. This indicates rice market in Bandung city is an ideal market for premium rice so that traders and producers are expected to maintain the quality of rice, such as keep using superior seeds and applying good cultivation based on Good Agricultural Practice (GAP) rules.

1. Introduction
Rice is one of food commodity that has an important role from the side of producers, consumers, government, society and also from the environment in general [1]. Ninety percent of Indonesians consume rice as staple food [2].

There are 3 types of retail (purchase location) of rice that most chosen by consumers that is traditional market (55%), rice kiosk (25%), and supermarket (13%) [3]. This is largely determined by forces of demand and supply which has changed dynamically. Rice is consumed by consumers, both individual consumers, households and business service consumers.

The wide choice of rice product, whether based on the type of rice, packaging, price, taste, and other things as well as the differences and effects of the cultural environment, social class, purchasing power, motivation, and lifestyle shape different consumer behaviors. In addition, there has been a fundamental change in consumer preferences of agricultural products [4]. Changes in consumer preferences from just buying commodity to buying product leads to increased demand on the quality...
of rice which makes rice not only viewed as a staple food but also as a product with its various attributes. This requires producers and market actors in the rice trading system to provide rice that matches the consumers’ wishes, in accordance with the intended market segment. The shifting rice demand on premium quality and high consumer’s Willingness to Pay for better quality indicated a great opportunity for increased income of farmers if the market signal was understood by rice farmers [5].

The pattern of rice consumption is influenced by the level of income [6]. Increasing one's income will not increase the quantity of rice but more on improving the quality of rice consumed. Therefore, the higher the level of one's welfare, the proportion of spending on rice tends to be smaller, and vice versa.

Bandung city has a diverse community structure covering ethnicity, work background, income, culture and economy level. The diversity will certainly affect the people in the city in making decisions about the consumption of a product, including the consumption of rice. The most important stage in the purchase decision process is purchase stage where at this stage consumers take decisions about when to buy rice, where to buy, and how to buy.

The problems identified are how is the characteristics of rice consumers at traditional market, rice kiosk, and supermarkets? Is there any relationship between purchase decision and income? The aim of the study is to (1) determine consumer characteristics in the three types of purchase locations, (2) determine the rice attributes that consumers consider in buying rice and (3) test the relationship between purchase decision and income class.

2. Methods
This study was carried out in February to August 2016 at three types of purchase locations which were traditional market, rice kiosk, and supermarket in Bandung City, with survey data of 108 respondents which selected by systematic random sampling. The research design used was quantitative with survey technique. Variable of consumer characteristics were education level of the household head and the total income level of the family. Rice attributes were: ‘kepulenan’, rice price, type of rice (quality of rice), physical properties, and other. Variable of purchase decision were: a) frequency of purchases per month, b) way of purchase, c) type of rice, d) attitudes toward rice price increase, e) rice price per kg, f) attitude toward unavailability of rice usually consumed.

The data collected consists of primary and secondary data. Primary data was obtained through interviews of respondents by questionnaires; while secondary data were obtained from the Central Bureau of Statistics, scientific papers, and other sources relevant to the study. The selection of respondents can be explained as follows: Of 30 districts in Bandung, there are only 10 districts that have the three types of purchase locations. Then 3 districts were chosen randomly. In each selected district, the number of each type of purchase location was recorded. From each type of purchase location in each district, randomly selected 1 traditional market location, 1 rice kiosk and 1 supermarket location, so there were 9 purchase locations. 108th of respondents proportionally spread to each district and type of purchase location, so that 36 respondents were taken from each district and 12 respondents from each type of location. At every selected purchase location, samples were chosen by Systematic Random Sampling, in which the first sample had to be randomly selected, and the next sample was selected after a certain time interval. The first sample taken is considered random since the total number of consumers who come to a retail is never known, so that each consumer has the same opportunity to be selected as a sample. The second sample of respondent to 108th was chosen every half an hour. This half an hour determination is the approximate time needed to interview a respondent.

Data were analyzed descriptively by cross-tabulation and inferentially by using Chi-Square test. There is a grouping of education and income level. The grouping of education level was based on Constitution Number 20 Year 2003 regarding National Education System, which is low educated class (elementary education), middle educated class (junior-senior high school), and high educated class (graduate-post graduate). The income level grouping was based on World Bank classification which
are lower middle class (less than IDR 2.6 million), middle class (2.6 - IDR 6 million) [7] and upper middle class (more than IDR 6 million). We then cross-tabulated consumer characteristics variables with the type of purchase location, and the rice attributes with income class. To test whether there is a relationship between each of the purchase decision variables and the income class, we used Chi Square test which apply the following formula [8]:

\[ \chi^2 = \sum_{i=1}^{r} \sum_{j=1}^{k} \frac{(O_{ij} - E_{ij})^2}{E_{ij}} \]  

\( \chi^2 \): Chi Square  
\( O_{ij} \): observed frequency  
\( E_{ij} \): expected frequency

The hypothesis were \( H_0 \): there is no relationship between the two variables versus \( H_1 \): there is a relationship between the two variables. At level of significance (\( \alpha \)) = 5% with a certain degree of freedom; if the calculated \( \chi^2 \) is \( \leq \) the table value, accept \( H_0 \), while if the calculated \( \chi^2 \) is \( > \) the table value, then reject \( H_0 \).

3. Results and Discussion

The selected district were Bandung Kulon, Buah Batu and Cidadap. Selected traditional markets were Pasar Cijerah, Pasar Gordon, and Pasar Gandok; and selected rice kiosks were Kios Beras, Jalan Nilem, and Zalfaa; and selected supermarkets were Borma Cijerah, Griya, and Griya Setiabudi.

3.1 Characteristics of Rice Consumers
One's level of education will affect one's thinking and perception of something [9]. Table 1 shows the level of consumer head education class at each purchase location.

| Education Level | TM | % | RK | % | SUP | % |
|-----------------|----|---|----|---|-----|---|
| Low             | 9  | 25| 4  | 11| 1   | 3 |
| Middle          | 19 | 53| 22 | 61| 7   | 19|
| High            | 8  | 22| 10 | 28| 28  | 78|
| Total           | 36 | 100| 36 | 100| 36  | 100|

Note: IC1=Lower-middle; IC2=Middle; IC3=Upper-middle

It can be seen that consumer in traditional markets and rice kiosks were dominated by middle-educated consumers, while in supermarket, the majority of consumers were highly educated. Consumer characteristics according to income level are presented in Table 2. It shows that the majority of traditional market consumers were lower middle income, at rice kiosk, it was dominated by middle-income consumers and in supermarket, the majority were upper-middle consumers. This condition is consistent with consumers' purchasing power where the average price of rice in traditional markets and rice kiosks is relatively lower than that happened in supermarkets.
Table 2. Consumer Characteristics Based on Income Class at Each Purchase Location

| Income Class | Purchase Location | TM  | RK  | SUP |
|--------------|-------------------|-----|-----|-----|
|              | %                 | %   | %   | %   |
| IC1          | 17                | 47  | 12  | 33  | 2   | 6   |
| IC2          | 14                | 39  | 18  | 50  | 10  | 27  |
| IC3          | 5                 | 14  | 6   | 17  | 24  | 67  |
| Total        | 36                | 100 | 36  | 100 | 36  | 100 |

AVG (IDR/Kg) 10,556 10,969 13,628

Note: TM=Traditional Market; RK=Rice Kiosk; SUP=Supermarket. AVG=Average Rice Price

3.2 The Rice Attributes that Consumer Consider in Purchasing Rice

Based on the income class, there is a difference in the consumer’s consideration of the price of rice. Lower middle income class was more considering the price of rice than kepulenan. This findings is interpreted from Table 3.

General product purchasing could be distinguished from fully planned purchasing, semi-planned, and unplanned purchasing. Since rice is a staple food with a high level of necessity, it is more appropriate if rice is classified in the planned purchase process, and every consumer will surely set aside some of his or her income for buying rice. This is consistent with the data presented in Table 4, where 65% of consumers plan to purchase rice with certain cultivar, brands, or price; while 32% of consumers made plans in half; they

Table 3. The Rice Attribute Considered By Consumers Based On Income Class

| Rice Attributes | IC1 % | IC2 % | IC3 % |
|-----------------|-------|-------|-------|
| ‘Kepulenan’     | 12%   | 39%   | 17%   | 40%  | 13%  | 37%  |
| Rice price      | 15%   | 48%   | 9%    | 21%  | 3%   | 9%   |
| Type of rice    | 1%    | 3%    | 5%    | 12%  | 11%  | 31%  |
| Physical properties | 0%  | 0%    | 6%    | 14%  | 5%   | 14%  |
| Other           | 3%    | 10%   | 5%    | 13%  | 3%   | 9%   |
| Total           | 31%   | 100%  | 42%   | 100% | 35%  | 10%  |

Had already known that they are going to buy rice but had not yet decided on the cultivar or brand they will buy until they got complete information from the seller or from the store display.

Table 4. Frequency Distribution of Relationship Between Way of Purchase and Income Class

| Way of Purchase | Income Class | Total |
|-----------------|--------------|-------|
|                 | Lower-middle | Middle| Upper-middle |
| Planned         | 20           | 30    | 20           | 70 (= 65%) |
| Semi-planned    | 11           | 10    | 14           | 35 (= 32%) |
| Unplanned       | 0            | 2     | 1            | 3 (= 3%)   |
| Total           | 31           | 42    | 35           | 108 (= 100%) |
3.3 The Relationship Between Purchase Decision and Income Class

The relationship between the way of purchase and the income class was non significant. This is because at the level of significance ($\alpha = 5\%$), the calculated value of the $\chi^2$ test ($= 3.73$) is smaller than the table value ($= 9.488$) at the degrees of freedom $= 4$. Thus, there was not enough evidence to reject the null hypothesis.

In general, the rice consumed by consumers was rice that tasty and/or aromatic. Field observation found that rice is practically distinguishable based on price and physical rice itself. Average Medium-quality rice price was less than IDR 11,000/kg, while premium quality was more than IDR 11,000/kg. Precisely the average price of rice consumed by consumers was based on income class can be seen in Table 5. The table also shows that the number of consumers who buy premium rice was 4 times larger than those who buy medium rice. The higher the income class, the higher the average rice price.

### Table 5. Frequency Distribution of Relationship Between Rice Type and Income Class

| Type/Cultivar      | Lower-middle | Middle | Upper-middle | Total |
|--------------------|--------------|--------|--------------|-------|
| Premium            |              |        |              |       |
| Pandan Wangi       | 3            | 11     | 6            | 20    |
| Cianjur            | 6            | 5      | 8            | 19    |
| Setra Ramos        | 2            | 8      | 7            | 17    |
| Kurmo              | 7            | 5      | 4            | 16    |
| Setrawangi         | 0            | 5      | 4            | 9     |
| Ciparay            | 0            | 2      | 2            | 4     |
| Rojolele           | 0            | 0      | 3            | 3     |
| Sub-total          |              |        |              | 88 (= 81.5%) |
| Medium             |              |        |              |       |
| Sumedang           | 3            | 2      | 0            | 5     |
| IR 64              | 3            | 1      | 1            | 5     |
| Subang             | 2            | 0      | 0            | 2     |
| Other              | 5            | 3      | 0            | 8     |
| Sub-total          |              |        |              | 20 (= 18.5%) |
| Total              | 31           | 42     | 35           | 108 (= 100%) |

Average Rice Price (IDR/Kg) 10,848.39 11,645.24 13,220 11,926.9

This indicates that the higher the income class, the higher the purchasing power of consumers on rice. This result is in line with the $\chi^2$ test indicating that there was a significant relationship between the quality of rice (i.e. premium or medium) consumed and income class because the calculated value of $\chi^2$ test ($= 18.85$) at degree of freedom $= 2$ is greater than the table value ($= 5.99$).

### Table 6. Frequency Distribution of Relationship Between Frequency of Rice Purchase and Income Class

| Frequency of Rice Purchase | Lower-middle | Middle | Upper-middle | Total |
|----------------------------|--------------|--------|--------------|-------|
| 1 time                     | 8            | 23     | 18           | 49 (= 45%) |
| 2 times                    | 5            | 4      | 3            | 12 (= 11%) |
| 3 times                    | 2            | 2      | 7            | 11 (= 10%) |
| 4 times                    | 10           | 7      | 6            | 23 (= 21%) |
| > 4 times                  | 6            | 6      | 1            | 13 (= 12%) |
| Total                      | 31           | 42     | 35           | 108 (= 100%) |

The frequency of rice purchase by the consumers can be seen in Table 6. It is clear that the majority of consumers (45%) bought rice once per month, followed by the purchase of 4 times per month as
much as 21% of consumers. It was obtained that the calculated value of $\chi^2$ test ($= 16.124$) is greater than the table value ($= 15.507$) at degree of freedom $= 8$. The conclusion was to reject the null hypothesis or in other words, there was a significant relationship between the frequency of consumers buying rice and income class.

Table 7 describes that if the price of rice increased, 80% of consumers will continue to consume the same rice (which they usually buy). The result explained that the increase or decrease in rice price will have relatively a little effect on the changes in rice demand [10]. This is because people will not increase or decrease their consumption of rice significantly.

**Table 7. Frequency Distribution of Relationship Between Consumer Attitudes toward Rice Price Increase and Income Class**

| Attitude toward Rice Price Increase | Lower-middle | Middle | Upper-middle | Total |
|-----------------------------------|--------------|--------|--------------|-------|
| Buy cheaper rice                   | 14           | 5      | 0            | 19 (= 18%) |
| Not affected                       | 17           | 35     | 33           | 85 (= 80%) |
| Buy the same rice but reduce the amount | 0             | 2      | 2            | 4 (= 3%)   |
| Total                              | 31           | 42     | 35           | 108 (= 100%) |

The calculated value of $\chi^2$ test ($= 25.471$) is larger than the table value ($= 9.488$) at degree of freedom $= 4$, so it can be that there is a significant relationship between attitudes on rice price increase and consumer income class.

The consumer's attitude if the desired rice is not available at the purchase location is presented in Table 8. Most consumers (70%) bought other types of rice in the same place if the rice usually consumed is not available at the purchase location. This is because

**Table 8. Frequency Distribution of Relationship Between Consumer Attitudes toward Unavailability of Rice Usually Consumed and Income Class**

| Attitudes toward Unavailability of Rice | Lower-middle | Middle | Upper-middle | Total |
|----------------------------------------|--------------|--------|--------------|-------|
| Buy other type of rice at the same place | 23           | 33     | 20           | 76 (= 70%) |
| Buy the same rice elsewhere             | 7            | 8      | 12           | 27 (= 25%) |
| Delaying rice purchase                  | 1            | 1      | 3            | 5 (= 5%)   |
| Total                                   | 31           | 42     | 35           | 108 (= 100%) |

Consumers have long term patronage to the seller. The distance and convenience of shopping also makes consumers reluctant to buy rice elsewhere. The calculated value of $\chi^2$ ($= 4.976$) is smaller than the table value ($= 9.488$) at degree of freedom $= 4$, so there is no significant relationship between attitude toward unavailability of rice consumed and income class.

4. Conclusion

Rice consumers in Bandung city who buy rice to traditional markets were generally middle-educated and lower-middle income; those who buy rice to rice kiosks were generally middle-educated and middle-income; whereas consumers who buy rice to supermarkets were generally highly educated and upper middle income. “Kepulenan” be the first priority of most consumers, but for the lower-middle class, the main priority was price. There is a significant relationship between (1) the quality of rice consumed, (2) the frequency of rice purchase per month, and (3) attitudes toward rice price increase;
each with the income class. Although the price of rice increases, consumers of middle and upper-middle were remain loyal to the quality of rice they consumed. This indicates rice market in Bandung city is an ideal market for premium rice so that traders and producers are expected to maintain the quality of rice, such as keep using superior seeds and applying good cultivation based on Good Agricultural Practice (GAP) rules.

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