Conjoint analysis of consumer preferences for pineapple fruit in Labuhan Batu District, North Sumatra

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Abstract. This study aims to determine consumer characteristics and attributes, and level of pineapple fruit, which are consumers' preferences in Labuhan Batu District, North Sumatra Province. The largest peatland is on the east coast, namely in the Labuhan Batu District area of 192 thousand ha. Some research results support that pineapple is tolerant of high soil acidity levels, adaptive to peat swampland that is tolerant of pH 3–4. Based on this, pineapple is a potential plant in Labuhan Batu District, so sustainable pineapple cultivation is needed. By understanding the characteristics, attributes of pineapple level, from consumer preferences, it is hoped that marketing and determining sales strategies can be adjusted to market demand: methods, conjoint analysis. The characteristics of the consumers used are gender, age, education level, type of work, family income per month, number of family members, and purchase frequency for attributes, taste, size, taste, color, and texture. The results of the study, the characteristics of age 25–44 are consumers who consume the most pineapples. The combination of pineapple fruit that consumers like, fruit with a sweet taste, large size, strong taste, soft and smooth texture, and yellowish-green color. This can be considered in determining the target market and marketing strategy for pineapple in Labuhan Batu District, North Sumatra Province.

1. Introduction

Pineapple (Ananas comosus L.) is one of the leading fruit commodities in Indonesia. This refers to the amount of pineapple production that ranks third after bananas and mangoes [1]. Indonesia has agricultural commodities that are in demand export market, one of which is pineapple. Indonesia became the 9th largest pineapple producer globally, with a production of 1.39 million tons per year [2]. Pineapple-producing areas include Lampung Selatan, Lampung Timur, and Kediri, with pineapple production of 2.69 million tons per year.

North Sumatra province is the province with the fourth largest peatland, about 325,296 hectares [3]. The largest peatlands are located on the east coast, namely in the Labuhan Batu District area of 192 thousand ha. Pineapple is very tolerant of high soil acidity levels, adaptive to tolerant peat swampland pH 3–4 [4]. Furthermore, the research results CIFOR (Center for International Forestry Research) shows that pineapple is one of the productive, profitable [5]. They are supported by this opinion that pineapple is a potential plant in Labuhan Batu District, so that sustainable pineapple cultivation is needed and knowing consumer preferences. The hallmark of the Labuhan Batu Pineapple is its sweet and savory...
taste, as well as its distinctive aroma. Entering the summer (dry season) which makes residents like to consume fruits as well as ingredients for regional specialities.

The attribute that is considered the most important for consumers when buying honey pineapple is the taste attribute [6]. It has a sweet taste and a dominant yellow color. By understanding the attributes of Pineapple, consumer preferences, it is hoped that marketing and determining selling strategies can be adjusted to market demand. The objectives of this study are as follows: (a) to determine the characteristics of pineapple consumers in Labuhan Batu District; (b) to determine the attributes and level of pineapple fruit, which are consumers’ preferences in Labuhan Batu District.

2. Materials and methods

2.1. Materials

Study literature in this activity, look for valid materials to be used as study materials, including textbooks, textbooks, manual books, journals, papers, and even website articles from academics relating to the discussion.

2.2. Methods

This study used conjoint analysis that produces preference information for each respondent [7]. For retrieval decision, the results of the conjoint analysis end with a general rating display (SPSS subfile summary) which applies to all respondents. To research and develop hypotheses about the market, the number of respondents between 30 and 60 can be used [8]. The basic model of conjoint analysis is systematically formulated as follows:

\[
\mu (x) = \sum_{i=1}^{m} \sum_{k=1}^{ki} a_{ij} k_{ij}
\]

where:
- \( \mu (x) \) = the total utility of each stimulus / combination
- \( a_{ij} \) = utility (value use) from attribute to-i (i = 1, 2, 3,…m) and level to-j (j = 1, 2, 3, k)
- \( k \) = the number of attribute levels i
- \( m \) = the multitude of attributes
- \( k_{ij} \) = 1, if level to -j of the i attribute occurs 0, otherwise.

2.2.1. Method of determination of sample area. Determination of the research area is determined purposively considering that Pineapple is a potential plant in the Labuhan Batu District due to the supportive soil conditions. Furthermore, pineapples are very tolerant of high soil acidity levels, adaptive to peat swamplands that tolerate pH 3‒4 [4]. Research time is 2020 (January–March).

2.2.2. Sample determination method. The sampling method is the process of selecting several individuals (samples) for a study so that these individuals are representatives of a larger group or population [9]. Determination of the sample is done using the judgment sampling method, which determines a sample of a population-based on certain criteria so that its representation of the population can be accounted for. The number of samples was taken as many as 72 samples. Respondents were selected with the following criteria; over 17 years of age, respondents were pineapple consumers who, when the research was taking place, were buying pineapple fruit at the sampling location, namely the markets in each district, in one family, only one person is taken as a respondent so as not to influence each other in answering the questionnaire.

2.2.3. Method of collecting data. There are two types of data collected in this study, namely primary data and secondary data.

2.2.4. Data analysis methods. Descriptive analysis in this study is used to determine the characteristics of pineapple consumers by calculating the percentage of the number of respondents presented in the form of a simple tabulation. Furthermore, in the conjoint analysis using SPSS software.
3. Results and discussion

3.1. Characteristics of pineapple fruit consumers

The characteristics of the respondents in this study were 72 people in each subdistrict of Labuhan Batu District. From the study results, consumer characteristics based on gender are shown in Table 1. It can be concluded that female respondents buy more pineapples than men. Women have the attributes and levels of interest, namely sweet taste, strong aroma, large size, yellowish-green color, and soft and smooth texture, purchasing two pineapples.

![Table 1. Consumer characteristics based on gender.](image)

| No. | Gender   | Total (person) | Total (%) |
|-----|----------|----------------|-----------|
| 1.  | Male     | 14             | 19.4      |
| 2.  | Female   | 58             | 80.5      |
|     | Total    | 72             | 100.0     |

Consumer characteristics based on age levels is presented in Table 2. A person can change the goods and services they buy throughout their life. This is because a person’s needs and tastes will change with age [10]. This can be a consideration in determining target markets and strategies in marketing pineapple in Labuhan Batu District.

![Table 2. Consumer characteristics based on age levels.](image)

| No. | Age group | Total (person) | Total (%) |
|-----|-----------|----------------|-----------|
| 1.  | <25 year  | 3              | 4.1       |
| 2.  | 25–44 year| 41             | 56.9      |
| 3.  | 45–60 year| 26             | 36.1      |
| 4.  | > 60 year | 2              | 2.7       |
|     | Total     | 72             | 100       |

From the study results, consumer characteristics based on education level are shown in Table 3. The fact of research results shows that the level of education does not affect the selection of pineapples.

![Table 3. Consumer characteristics based on education level.](image)

| No. | Level of education | Total (person) | Total (%) |
|-----|--------------------|----------------|-----------|
| 1.  | SD (primary school)| 17             | 23.6      |
| 2.  | SMP (junior high)  | 7              | 9.7       |
| 3.  | SMA (high school)  | 29             | 40.2      |
| 4.  | D-I                | 1              | 1.3       |
| 5.  | D-III              | 8              | 11.1      |
| 6.  | S-I (bachelor)     | 8              | 11.1      |
| 7.  | S-II (master)      | 2              | 2.7       |
|     | Total              | 72             | 100       |

Consumer characteristics based on job level is depicted in Table 4. A housewife is a person who is responsible for taking care of family food, including buying pineapples. According to Suprihati and Utami [11], a person’s job affects the goods and services he buys.
Table 4. Consumer characteristics based on job level.

| No. | Type of work       | Total (person) | Total (%) |
|-----|--------------------|----------------|-----------|
| 1   | Civil servants     | 11             | 15.2      |
| 2   | Private sector worker | 10         | 14.0      |
| 3   | Entrepreneur       | 3             | 2.1       |
| 4   | Housewife          | 26            | 36.1      |
| 5   | Traders            | 13            | 18.0      |
| 6   | Farmer             | 9             | 12.5      |
|     | Total              | 72            | 100.0     |

Characteristics of consumers based on the level of family income per month is presented in Table 5. Economic conditions greatly affect consumer choice of products. Marketers who are sensitive to consumer income can pay close attention to interests in personal opinion, savings, and interest rates. So that economic indicators, family income, can show marketers the type of product to buy [12].

Table 5. Characteristics of consumers based on the level of family income per month.

| No. | Family income per month      | Total (person) | Total (%) |
|-----|-------------------------------|----------------|-----------|
| 1   | < Rp1,000,000                 | 7              | 9.7       |
| 2   | >Rp1,000,000–Rp2,500,000      | 40             | 55.5      |
| 3   | >Rp2,500,000–Rp5,000,000      | 23             | 31.9      |
| 4   | >Rp5,000,000                  | 2              | 2.7       |
|     | Total                         | 72             | 100.0     |

Consumer characteristics are based on several family members. From the results of the study in Table 6. The results showed that the number of household members influenced the purchase of pineapple.

Table 6. Consumer characteristics based on number of family members.

| No. | Number of family members     | Total (person) | Total (%) |
|-----|-------------------------------|----------------|-----------|
| 1   | 1–2 Person                    | 6              | 8.3       |
| 2   | 3–4 Person                    | 36             | 50.0      |
| 3   | 5–6 Person                    | 25             | 34.7      |
| 4   | 7–9 Person                    | 5              | 6.9       |
|     | Total                         | 72             | 100.0     |

Distribution of consumers based on the frequency of buying pineapple fruit. Most of the pineapple consumers in the Labuhan Batu District are not sure how often they buy pineapple fruit.

Table 7. Distribution of consumers based on the frequency of buying pineapple fruit.

| No. | Frequency of purchasing pineapple fruit | Total (person) | Total (%) |
|-----|----------------------------------------|----------------|-----------|
| 1   | Every day                              | 10             | 13.8      |
| 2   | Once a week                            | 21             | 29.1      |
| 3   | Once every two weeks                   | 10             | 13.8      |
| 4   | Uncertain                              | 31             | 43.0      |
|     | Total                                  | 72             | 100.0     |

3.2. Consumer preference for pineapple fruit attributes and levels
Attributes describe the specific characteristics of the product that give rise to benefits. This means that buyers can usually save the benefits they will receive from the product by researching its attributes.
Table 8. Results of conjoint analysis for 72 respondents (overall statistics) pineapple fruit in Labuhan Batu District.

| Attribute            | Utility estimate | Std. error |
|----------------------|------------------|------------|
| Taste                |                  |            |
| Sweet 1              | .789             | .033       |
| Acid 2               | -.848            | .039       |
| Sweet sour 3         | .058             | .039       |
| Size                 |                  |            |
| Small 4              | -.118            | .033       |
| Medium 5             | -.043            | .039       |
| Large 6              | .161             | .039       |
| Aroma                |                  |            |
| Strong 7             | .160             | .033       |
| Medium 8             | -.016            | .039       |
| Not flavored 9       | -.144            | .039       |
| Color                |                  |            |
| Green 10             | -.016            | .033       |
| Yellow 11            | -.119            | .039       |
| Yellowish green 12   | .135             | .039       |
| Texture              |                  |            |
| Small and smooth hollow 13 | -.111  | .033       |
| Large and rough hollow 14 | -.028  | .039       |
| Soft and smooth 15   | .139             | .039       |
| (Constant)           | 3.095            | .031       |

Pineapple fruit, the consumer's preference, can be seen from the value of the greatest use among the levels on each attribute. Based on the results of the study, the respondents' preferred pineapple in terms of taste, size, aroma, texture, and color.

3.2.1. Taste. The results showed that the taste of pineapple that the respondents chose was a fruit with a sweet taste. These results can be seen in Figure 1, wherein the taste attribute, the level of sweetness, has the largest positive use-value among the other levels, namely 0.789. The reason respondents like sweetness is that the dominant sweetness gives the impression that the pineapple is ripe or ready for consumption, fresh, and increases interest.

![Figure 1. Usefulness value chart for each level of taste attributes](image)

The taste of the fruit is the first indicator that can reveal the quality of the flavor of the fruit [13]. For most people, taste is the most important attribute and influences them in consuming food products compared to other attributes. This means that taste considerations for a product can indicate that someone likes or dislike a product. In this study, it was found that the respondents' preferred taste for pineapple fruit was sweetness.

3.2.2. Size. The results showed that the pineapple fruit size chosen by the respondents was large. These results can be seen in Figure 2, wherein the size attribute, the largest level, has a positive utility value equal to 0.161. The reason respondents chose pineapples with a large size was that large pineapples attracted more attention than those with smaller sizes. Large fruit may be more desirable than small fruit because large fruit implies better quality [13]. On the other hand, the larger fruit size is considered the result of production with the help of hormones.
3.2.3. Aroma. The reason respondents chose pineapple fruit with a strong aroma, according to most respondents’ perceptions, pineapple fruit with a strong aroma indicates that the fruit is still fresh or has just been harvested.

3.2.4. Texture. The results showed that the pineapple that the respondents chose was a fruit with a soft and smooth texture. These results can be seen in Figure 4, where the texture attribute, soft and smooth levels, have a positive utility value of 0.139. The respondents chose pineapple with a soft and smooth texture to avoid discomfort on the tongue during consumption and afterward.

3.2.5. Color. The results of the research on pineapple fruit selected by respondents were yellowish-green fruit. This can be seen in Figure 5, wherein the color attribute, the yellowish-green level, has a positive utility value of 0.135. The reason respondents choose pineapple fruit with yellowish-green color is that the respondent perceives that pineapple fruit is ready for direct consumption. From the overall statistics for the utility values for the highest attributes and levels for pineapples, the best combination of interest in pineapples is obtained according to consumer preferences, which are as follows: sweetness, big size, strong aroma, smooth soft texture, yellowish green color.
4. Conclusions
The results of the study, the characteristics of age 25–44 are consumers who consume the most pineapples, the characteristics of the type of work housewives get the highest value 36.1% in purchasing pineapples. The combination of pineapple fruit that consumers like, fruit with a sweet taste, large size, strong taste, soft and smooth texture, and yellowish-green color. This can be considered in determining the target market and strategies in marketing pineapple fruit in Labuhan Batu District, North Sumatra Province.

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