Analysis of demand of papaya fruit in Central Market Medan

S P Nasution* and R S Siregar

Study Program of Agribusiness, Universitas Medan Area, Medan, Sumatera Utara, Indonesia.

E-mail: *suhela.putrinst@yahoo.com

Abstract. Market is a meeting place between traders and buyers, so that the process of distributing products and services is often conducted. One of the products sold in the market is papaya fruits. The distribution of papaya is usually conducted directly by the distributors to the traders, so that there are differences in price and demand for papaya fruit sold by these traders to consumers. This research aimed to find out the demand for papaya based on the supply chains in the Central Market, Medan. The market location was determined purposively. The method used was survey using questionnaires to the papaya fruit producers, small traders, large traders, retailers and consumers. The data collected was primary and secondary data then analysed with the descriptive analysis and multiple linear regression methods. Results showed that the demand for papaya in the central market based on the supply chain at the level of small traders was 2 tons/harvest time, at the level of large collectors was 5 tons/harvest time, at the retailer level was 166 kg/day and at the consumer level was 30 kg/month. Partially, the number of dependents, the price of papaya fruit, and the price of other fruits have no significant effect on the demand for papaya fruit in the central Market. The variable that significantly influences was income.

1. Introduction

Papaya fruit is one of fruit commodity that is quite profitable to be cultivated. If it is worked seriously, it will be able to improve the welfare of farmers, such as increasing the community income, employment opportunities, increased fruit consumption, and could foster the regional economy and increase the national income. Therefore, effort in spurring the papaya production and effort in improving the sales management based on to the market demand will have a real impact on the survival of the communities, especially those who make a living in the business of papaya fruit [1].

Nowadays, the traditional markets are one of the suppliers of agricultural commodities including papaya, so traditional markets are usually used by the fruit traders to market the fruits. However, the supply of fruit in the market does not only come from the fruit traders themselves, but there are several sources such as large traders or fruit collectors and also agents who supply the fruit from the farmers, inter-regional traders and also from their own gardens and then sold to the retailers. Then, the trading activity forms a relationship called supply chain.

According to [2], supply chain is a series of relationships between companies or activities that carry out the supply of goods or services from the place of origin to the place of buyers or customers. There are five main components or actors in the supply chain, namely suppliers, manufacturers, distributors, retailers and customers.
Papaya fruit is an herbaceous fruit plant from the Caricaceae family that has a high economic value and is profitable to be cultivated. Papaya fruit is also one of the food ingredients that plays a role for the nutritional balance of body, so the fruit must be available at any time with sufficient quantities. Papaya fruit can also be used as traditional medicine, beauty cosmetics, as well as animal feed. Besides that, papaya fruit can also be processed into various forms of food and beverages such as pasta, sweets and juices. Even the seeds can be processed into oil [3].

Along with the increasement of public awareness of the importance to the fruit nutrition, it also can increase the demand for papaya fruit so that the supply of papaya fruit must also be increased. To overcome these problems, it is necessary to develop the papaya fruit cultivation and increase the production.

**Table 1. Data of papaya production in Sumatera Utara**

| Year | Production of Papaya Fruit (ton) | Percentage (%) |
|------|----------------------------------|----------------|
| 2012 | 31.658                           | 19.57          |
| 2013 | 27.757                           | 17.16          |
| 2014 | 26.238                           | 16.22          |
| 2015 | 26.305                           | 16.26          |
| 2016 | 20.235                           | 12.51          |
| 2017 | 29.570                           | 18.28          |

Source: Statistic of Food Consumption of Sumatera Utara Province, 2017 [4]

Based on the data in Table 1, it can be seen that the highest amount of papaya production was in 2012 which was 31.658 tons with a percentage of 23.94%. On the other hand, the amount of papaya production decreased by 20.235 tons with a percentage of 15.30% in 2016. The production that keep decreasing every year could be caused by pests that attack the papaya fruit plants. The development opportunities of papaya fruit in Indonesia cannot be separated from the level of public consumption of papaya fruit. Consumption of papaya fruit in Indonesia can be seen in Table 2.

**Table 2. Data of consumption of papaya fruit in Sumatera Utara Province 2013-2017**

| Year   | Consumption per week (Kg/Capita) | Consumption per year (Kg/Capita) |
|--------|----------------------------------|----------------------------------|
| 2013   | 0.035                            | 1.825                            |
| 2014   | 0.040                            | 2.086                            |
| 2015   | 0.043                            | 2.242                            |
| 2016   | 0.055                            | 2.868                            |
| 2017   | 0.102                            | 5.319                            |

Source: Statistic of Food Consumption of Sumatera Utara Province, 2017 [4]

Table 2 showed that papaya fruit consumption per capita in North Sumatra Province in 2013-2017 has increased. The highest consumption per week in 2017 was 0.102 kg/capita and the highest consumption per year in 2013 was 5.319 kg/capita. This condition shows that the papaya fruit that people consume comes from imported papaya fruit. This, according to Table 1 data which shows that production tends to decrease while consumption increases.

Central Market of Medan Tuntung District, Medan is a distribution place for fruits and vegetables. The commodities which enter the central market originated from Aceh, Langkat, and Deli Serdang. Traders here are the distributors of papaya fruit traders.

From observation, it was known that the traders in the main market sell goods in very large quantities, in other words, this market is a wholesaler of fruits and vegetables. Furthermore, the fruits enter the traditional market or modern market, also including the small retailers where the consumers could fulfil their needs for the household or for business/trade.

The lower the supply of papaya fruit in the central market, could directly affected the price of papaya fruit. Based on the economic theory, if fewer supplies enter the central market, then the prices will tend to increase if the demand from the papaya fruit remains or even increases.
The longer the supply chain is traversed, the higher the costs incurred [5]. Therefore, the selling price of the commodity is higher. This condition applies to the supply of papaya in the central market, so that the distribution is hampered, which results in high prices of papaya fruit received by consumers. Therefore, supply chain should be cut that can reduce the price of papaya fruit, and commodities could enter the central market on time, then the scarcity of papaya fruits do not occur.

Increased consumption of papaya fruit as a demand is what underlies the interest in studying "Analysis of Papaya Fruit Demand in Central Market, Medan". Based on the background, the problem to be discussed in this study was how the demand for papaya based on the supply chain in the Central Market. The purpose of this study was to find out the demand for papaya fruit based on the supply chain in the Central Market, Medan.

2. Methods
This research was conducted purposively (intentionally) in Central Market, Medan, the largest central market in North Sumatra. Besides that, Central Market is the initial location of the distribution of fruits, and also is one of the traditional markets in Medan. The sampling method used in this study was a survey method. Data collected in this study consisted of primary and secondary data. The data were taken from 5 large traders, 8 small traders, 15 retailers and 30 consumers through a questionnaire guide. These 30 consumers are based on the theory of Walpole, (1993) that to meet statistical data processing with a regression test, a minimum of 30 data samples is needed.

In this study, the data was analysed using descriptive analysis and multiple linear regression method. The required data were the price of papaya fruit, number of dependents, income of consumer, and other fruit prices.

\[
Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + e
\]

Information:
Y = Demand of papaya fruit (kg/mo)
b_0 = constant
X_1 = Price of papaya fruit (IDR/kg)
X_2 = Number of dependents (people)
X_3 = Consumer income (IDR/mo)
X_4 = Price of other fruits (IDR/kg)
e = error

3. Result and discussion
Fruit traders in Central Market do not supply new fruits every day, because the fruits will be sold in more than one day. The traders will make a stock of unfinished fruit for resale in the next day. The supply of stored fruit is adjusted to the characteristics of the fruit, because there are several fruits that are easily damaged and rotten if stored for a long time, such as papaya fruit, which has a relatively short storage time of about three days.

The fruit that can be stored for a long time is a type of fruit which is still raw/immature. The fruit traders have predicted the purchase of fruit to be sold based on market conditions. Demand for fruit supply in the Central Market, Medan was 15 tons/day. However, the demand can still increase depending on the availability of fruit in the supplier area. The weather is also causing the availability of fruit, which will affect the availability and price of the fruit. Based on supply chain analysis, the demand for papaya fruit in central market at the level of small traders were 2 tons/harvest time, at the level of large traders were 5 tons/harvest, at the retailer level of 166 kg/day and the consumer level of 30 kg/month.

The hypothesis test in this research field was using multiple linear regression test using SPSS software. Multiple linear regression test was performed to analyse whether the demand factors such as consumer income, number of dependents, prices, and other fruit prices affect the demand of papaya fruit.
fruit based on the supply chain of papaya fruit in Central Market. The research results based on the test equipment used in this study are as follows:

3.1. Test of simultaneous (F-Test)
F test was used to see the effect of papaya fruit demand factors based on the supply chain in the Central Market, Medan. Result of F test could be seen in Table 3.

| Model       | Sum of Squares | Df | Mean Square | F       | Sig. |
|-------------|----------------|----|-------------|---------|------|
| Regression  | 87834.158      | 4  | 21958.539   | 7.639   | 0.000a|
| Residual    | 71863.209      | 25 | 2874.528    |         |      |
| Total       | 159697.367     | 29 |             |         |      |

a. Predictors: (Constant), price of other fruits, price of papaya fruit, number of dependents, income of consumer
b. Dependent variable: demand of consumer

Table 3 shows the F count value of 7.639 which is greater than the F table, or the significance value of 0.000a is smaller than 0.05. Therefore, Ho is rejected and H1 is accepted. So that it can be said that at least there was one variable that significantly influences the demand for papaya fruit in Central Market, Medan.

3.2. Partial test (t-Test)
The t test was conducted to determine directly whether the demand factors significantly influence or not. This test was conducted by comparing the value of t count with t table and see the significance value that is smaller than 5% (0.05). Result of t test value could be seen in Table 4.

| Model            | Unstandardized Coefficients | Standardized Coefficients | t    | Sig.  |
|------------------|-----------------------------|---------------------------|------|-------|
| (Constant)       | -120.655                    | 153.348                   | -0.787 | 0.439 |
| Papaya Prices    | 0.002                       | 0.008                     | 0.032 | 0.240 |
| Number of Dependents | -5.939                   | 5.857                     | -0.139 | 0.320 |
| Consumer Income  | 27.342                      | 5.195                     | 0.733 | 5.263 |
| Other Fruit Prices | 0.003                    | 0.005                     | 0.098 | 0.711 |

Dependent variable: demand of consumer

Table 4 shows that there was one factor that has a significant effect which was the consumer income, with the value of T count of 5.263 which is greater than the T table or Significant Value of 0.000 is smaller than the alpha value of 0.05. Therefore, Ho is rejected and H1 is accepted. Another factor such as papaya price, price of other fruit sand the number of dependents have no significant effect to the demand of papaya fruit, because the T count value of each factor is smaller than the T table or the significant value is greater than the alpha value of 5%.

a. Price of papaya fruit
T test results obtained Persistently the price of papaya fruit does not significantly influence the demand for papaya fruit because this is not an elastic item.
b. Number of dependents

T test results obtained persistently this explains that the number of dependents gives no significant effect on the demand for papaya in Petisah Market. This is because papaya fruit is not a favourite fruit that is always consumed by all family members of consumers who buy papaya fruit.

c. Consumer income

T test results obtained persistently; income has a significant influence on demand for papaya fruit. Papaya fruit is a normal product obtained > 1 which means that if the income of consumers has increased the demand for papaya fruit is also relatively increased.

d. Prices of other fruits

T test results obtained persistently the price of other fruits (bananas) has no significant effect on the demand for papaya because this is due to differences in the price of bananas relatively more expensive than the price of papaya fruit.

3.3. Determination coefficient \( (R^2 \text{ square}) \)

| Model | R    | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|------|----------|-------------------|--------------------------|
| 1     | 0.742| 0.550    | 0.478             | 53.615                   |

a. Predictors: (Constant), other fruit price, papaya price, number of dependents, income of consumer

Analysis using multiple linear regression model obtained value of \( R^2 \) of 0.550, which means that 55.0% of the variable variation in the amount of demand for papaya can be explained by the variables of papaya prices, other fruit prices, the number of dependents, and consumer income, and the rest of 45.0% is explained by other variables.

4. Conclusion

Based on the results, it can be concluded that the analysis of demand for papaya fruit in Central Market based on the supply chain at the level of small collectors was 2 tons/harvest, at the level of large collectors was 5 tons/harvest, at the retailers’ level was 166 kg/day and at the consumer level was 30 kg/month. Factors that affect the demand for papaya in central market partially were the income of consumer, while the variable of papaya price, the number of dependents and other fruit prices did not affect the demand for papaya in central market, Medan.

References

[1] Badan Pusat Statistik Sumatera Utara [BPS-Statistics of Sumatera Utara] 2016 Sumatera dalam Angka 2016 [North Sumatera in Figures 2016] (Medan, Indonesia: Badan Pusat Statistik Sumatera Utara [BPS-Statistics of Sumatera Utara])
[2] Assauri S 2011 Manajemen Produksi dan Operasi [Management of Production and Operation] (Jakarta, Indonesia: Lembaga Penerbit FEUI)
[3] Purba AP 2008 Analisis Pendapatan Usahatani dan Saluran Pemasaran Pepaya California I [Analysis of Farm Revenue and California Papaya Marketing Channels] Skripsi (Bogor, Indonesia: Institut Pertanian Bogor)
[4] Badan Pusat Statistik Sumatera Utara [BPS-Statistics of Sumatera Utara] 2017 Sumatera dalam Angka 2017 [North Sumatera in Figures 2017] (Medan, Indonesia: Badan Pusat Statistik Sumatera Utara [BPS-Statistics of Sumatera Utara])
[5] Pujawan IN 2010 Supply Chain Management Second Edition (Surabaya, Indonesia: Guna Widya)