

The Design of Fruit Supply Control System In Jakarta

Abdullah

Ibnu Khaldun University, West Java
abdulabdullah@gmail.com

ABSTRACT

This study aims to describe and design a fresh fruit supply system implemented by the Fruit Shop in Jakarta. The data analysis method used to analyze quantitative data on fresh fruit supply control is through a deterministic inventory model calculation approach, namely Economic Order Quantity (EOQ), Continuous Review System, Lot for Lot (LFL), Part Period Balancing (PPB), and Period Order Quantity (POQ) and probabilistic inventory models, namely the Single Period Model, Periodic Review System. This quantitative data processing uses calculator tools and computer software in the form of Microsoft Excel program. The results of the study state that the level of inventory that must be maintained, the size of the order, and the time the order must be made is determined based on the calculation of the analysis *Periodic Review System* with the periodic inventory level inspection has been determined for each group of fruit that has been established

Key words: System, Control, Inventory, Fruit

INTRODUCTION

Every company, both service and manufacturing companies, always requires inventory. Without inventory, entrepreneurs will be exposed to the risk that their company at one point will not be able to fulfill the wishes of their customers. This can happen because goods are not always available at any time, so that entrepreneurs may lose the opportunity to get the benefits they should get (Rangkuti, 2007: 1).

Inventory itself needs to be controlled in order to help the stability of the company's operational activities. Inventories have a very important role in industry retail businesses (*retail*), because in this industry there are usually no production process, only distribute a variety of products to consumers. This indicates that retailers must be able to purchase or procure product stocks properly and be able to maintain their availability at the right amount and price as well as the time and place desired by consumers (Sopiah and Syihabudhin, 2008: 75).

Inventory control must be able to reduce the level of losses that may occur, while maintaining product quality. Inventory control is a very important managerial function, because physical inventory for many companies involves the largest rupiah investment

in current assets (Handoko, 2000: 333 - 334). The effectiveness of the use of funds or the value of the investment invested in inventory is also related to the company's operational activities and the profits that the company receives.

Raja Buah Segar Store as one of the business actors in the retail business that focuses on marketing fresh fruit products, should apply good inventory management. This is because the fruit as an agricultural product has characteristics that are easily damaged, so that proper treatment is needed in post-harvest handling in order to minimize possible losses.

The Raja Buah Segar shop faces the complexity of controlling supplies given the wide variety of fresh fruit offered to consumers, ranging from domestic or local fruit to imported fruit. Each type of fruit also has different durability or shelf life and the availability of the product is limited or only available at certain times for seasonal fruit types. This is a challenge in inventory control that must be done by the Fresh Fruit King Shop.

The Fresh Fruit King shop does not currently have a calculation method to control their inventory. Orders made are speculative or based solely on intuition and experience. The ordering decision is taken when the inventory that is owned both in the sales area and storage warehouse is deemed insufficient or unable to meet tomorrow's demand. The assessment is made based on the visible (*visual*) only. Company data relating to inventory control activities is significantly underutilized in clear calculations.

The method of assessing the inventory held to determine when an order was placed and the number of items ordered resulted in a large order frequency with an order rate that was not based on clear calculations. One of the negative effects caused by this is the large number of fruit that are damaged and cannot be sold due to the accumulation of inventory held, which can cause losses.

THEORETIC

Characteristics of Fruits - Fruits as Horticultural Products

Fresh fruits as primary agricultural products which are part of horticulture have the following general characteristics (Sunarjono; 2006: 7):

1. Easily damaged when stored without special treatment, for example storage at low temperatures (4°C) or packaged.

2. Product availability is seasonal and meruah (available in abundance) or available all year round.
3. The price of a product is determined by quality not quantity.
4. It is not a major food requirement but is also important for human consumption as a source of vitamins and minerals.

Post Harvest

Treatment Appropriate post harvest treatment will affect the quality or quality of the product when marketed. Proper post-harvest treatment with each product characteristic will minimize losses that may occur and need not be experienced. Post harvest treatment is divided into several types of treatment or activities. Sediaoetomo (2004: 4) divides post harvest treatment into 4 (four) treatments, namely drying, transportation, storage, and selection. According to Zulkarnain (2009: 172), which is included in the post-harvest treatment is *grading*, packaging, transportation, storage, treatment to maintain the quality (low-temperature storage and coating of wax or *waxing*), and preparation for marketing (cleaning, *trimming* or cutting parts defective or damaged, and *curing*). Post-harvest treatment is also divided into several treatments such as cleaning, sorting and grading, size reduction, *waxing*, and *curing* (Dewi; 2008: 12).

Cleaning

Cleaning or often called washing according to Dewi (2008: 14) aims to remove good contaminants that produce a level of risk from mild to severe to consumers. Zulkarnain (2009: 183) explains that washing is also useful for increasing the added value of the product before it is marketed. Washing the fruit can be done using water, brush, or detergent (NaOH 0.35%) and chlorine with a content of less than 50 ppm (Khomsan, et al; 2004: 97).

Drying

Sediaoetomo (2004: 4 - 5) explains that the high water content at harvest allows various damage processes to take place. Low water content can reduce metabolic processes that still occur in products that have been harvested. Crops must be endeavored to dry according to certain conditions so that they can be stored for a longer period of time without spoiling. Low moisture content can also reduce transportation costs if these costs are calculated based on the weight of the material transported.

Sorting

Sorting according to Dewi (2008: 21-22) is a separation process the clean agricultural products become various fractions of quality based on shape, size, density, texture, and color. *Sorting* can be done manually or mechanically. Manual sorting It is carried out with human labor where sorting is more visual in nature (relying on the operator's vision) so that the room *sorting* must be clean and bright, as well as *sorting* skilled and trained personnel. *sorting is Mechanical* done by using tools, this method is generally done for large and continuous production capacities.

Grading

Grading is sorting the product into various fractions of the appropriate quality with a recognized qualification standard, based on the basis of commercial value and usefulness. Grading really depends on the factors that consumers want (Dewi; 2008: 24). The purpose of grading activities is not much different from the objectives of sorting activities. Zulkarnain (2009: 173) explains that the purpose of *grading* is to eliminate striking differences and for consolidation. Striking differences should be avoided, especially in packaging, as this can lead to negative assumptions.

Wax coating

Waxing is done to get a sparkling appearance and suppresses evaporation of water, so slow withering withering or control material.

Curing

Curing is a post-harvest treatment by providing temperature and certain air humidity against a product. *Curing* can help heal wounds that occur in products during harvesting (Zulkarnain; 2009: 183).

Packaging

Salunkhe and Reddy (2000: 55) explain that the improvement of packaging technology since the early fifties has contributed to increasing the efficiency of marketing fresh fruit and vegetables.

Storage

Storage of foodstuffs must meet certain requirements, especially for perishable materials (Sediaoetama; 2004: 6). Kitinoja and Kader (2007: 85) state that good storage can be done by harvesting agricultural products at optimal conditions of maturity, controlling pests and diseases, controlling the atmosphere, chemical treatment,

irradiation, refrigeration, controlling and adjusting the storage temperature, etc. . The purpose of storing fresh produce is to slow down the remaining biological activity without causing damage, as well as slow down the growth of disease-causing microorganisms and inhibit plant transpiration.

METHOD

The data used in this study consisted of primary data and secondary data. Primary data is obtained through direct observation and interviews with the company, as well as company data or documents. Secondary data complements the primary data and is obtained from a collection of literature in the form of textbooks, theses, journals, and other literature deemed relevant.

Each type of fresh fruit sold by the Raja Buah Segar Shop in 2009 will be the sample studied to be classified into certain groups based on predetermined criteria. The inventory level control model will be tested on the type of fruit with the highest selling rate (*best seller*) of each group that has been formed. This technique *purposive* is carried out with the consideration that the type of fruit *best seller* has a significant influence on the profits obtained by the company, so it is assumed to be crucial in comparison to the types of fruit that have a lower sales level.

Qualitative data will be analyzed descriptively to describe the results obtained from the interview. The credibility of the qualitative data will also be tested using the triangulation method. According to Sugiyono (2008: 83), triangulation is a data collection technique that combines various data collection techniques and existing data sources. Collecting data using this technique means that at the same time testing the credibility of the data. The triangulation method used is technical triangulation, namely by combining and comparing data from observations, interview data, and document data.

RESULT

Inventory Analysis Inventory

analysis begins with classifying all types of fruit sold by the Raja Buah Segar Shop in 2009. Each fruit group that is formed will take one type of fruit as a sample for further analysis regarding the level and cost of its inventory.

Supply Level Analysis The

demand pattern of all fruit samples is fluctuating as seen in Appendix 6. This indicates that the inventory model that can be used to analyze inventory levels is a probabilistic inventory model, namely the *Single Period Model* and the *Periodic Review System*. The deterministic inventory model cannot or is not suitable for use in this study because there are no fulfilled assumptions in the form of constant demand.

Inventory Analysis *Single Period Model*

This inventory model prioritizes to reduce the cost of damage that can occur, namely by considering the cost of lost sales (Cs) and costs *excess* (Ce) or costs that arise because of the remaining goods. The cost of lost sales (Cs) is obtained from the reduction in the average selling price with the result of the sum of the average purchase price and the packaging cost (if the fruit is packaged). The cost *excess* (Ce) is obtained from the reduction between the average purchase price and the *salvage value*. The salvage value of each type of fruit is 50% of the average selling price less the cost of packaging (if the fruit is packed).

Inventory Analysis *Periodic Review System*

Data shows that the longer the inspection period, the greater the safety stock that is owned. This aims to anticipate the level of demand during the inspection period. The relationship between the length of the period and the safety stock can be seen clearly in the calculation of the US Medjool Dates safety stock because it is tested with a more diverse and longer inspection period than other types of fruit. The safety stock for US Medjool dates in the 2-day inspection period was only 28.01 Kg, then this amount increased to 33.77 Kg in the 3-day inspection period. The US Medjool Dates safety stock continues to increase along with the length of the inspection period until it reaches 74.29 Kg in the 14-day examination period.

The data shows the target supply amount for each type of fruit based on a predetermined inspection period. The inventory target is the maximum level of inventory that must be owned, so the number of orders that must be made is calculated based on the difference between the target inventory and the level of inventory that is still on hand. The inventory target seems to be getting bigger in number as the period lengthens inspection. This is due to the increasing level of demand throughout the period which must be able to be met by the level of inventory on hand.

Inventory Cost Analysis The inventory

level control method or model applied by the Raja Buah Segar Store with the *Single Period Model* and *Periodic Review System* results in different inventory costs. Inventory cost analysis is only based on the total ordering cost for one year for each type of fruit. This is because the Raja Buah Shop does not carry out any production activities so that there are no equipment preparation costs or production costs, besides that storage costs are fixed costs and not variable costs because they are not affected by the quantity of inventory, so they are not taken into account (Handoko, 2000: 336) .

Inventory Cost Analysis of Fresh Fruit King Shop Inventory Method The

calculation of the total inventory cost for each type of fruit based on the inventory method applied by the Raja Buah Segar Store is currently presented in Table 6, so it can be seen that the actual inventory costs incurred by the Fresh Fruit King Shop for each inventory kind of fruit.

CONCLUSION

Ordering is based on intuition and experience only. Orders are usually made when the inventory on hand is deemed insufficient and based on assessment *visual* by the *supervisor* or the head or deputy head of the fruit warehouse division.

The mechanism for ordering and receiving supply goods, which includes activities to assess inventory and determine the order level, sending inventory data to the *Distribution Center* (DC), placing orders to *suppliers* by DC, receiving and weighing goods, completing transaction and other administrative processes, recording actual transaction data, storage, and pre-sale preparation treatment

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