Research Article

SEA WEED INVENTORY MANAGEMENT CONTROL ANALYSIS IN SMALL MEDIUM ENTERPRISES (SMEs) MIRACLE OEBUFU KUPANG CITY

* Abdul Majid and KristianusRogi

Fisheries Agribusiness Study Program, Faculty of Fisheries, Universities Muhammadiyah Kupang, Indonesia.

ABSTRACT

This study aims to determine the quantity of seaweed raw material inventory that must be fulfilled by UKM Mujizat and to determine the optimal reorder point. The method used in this study is a quantitative descriptive method, the data in this study were obtained through interviews, observations and documentation. The method used in analyzing the inventory of seaweed raw materials is the EOQ method. The results showed that the quantity of supplies for seaweed raw materials for the three types of products was seaweed sticks of 26.97 kg for 2017 and 23.24 kg for 2018; seaweed lunkhead by 22.52 kg for 2017 and 23.75 kg for 2018; seaweed crackers 22.66 kg in 2017 and 21.45 kg for 2018. The optimal order quantity for seaweed raw materials that must be made by UKM Miraz for these three types of products in 2017-2018 is seaweed sticks of 21, 88 kg for 2017 and 20.06 kg for 2018 ; seaweed lunkhead by 15.91 kg for 2017 and 17.1 kg for 2018; seaweed crackers of 13.76 kg for 2017 and 25.83 kg for 2018. The point of reordering seaweed raw materials for the three types of products in a row in 2017-2018 is seaweed sticks of 170.2 kg for 2017 and 165 kg for 2018 ; seaweed lunkhead by 139.79 kg for 2017 and 141.42 kg for 2018; seaweed crackers amounted to 116.04 kg for 2017 and 114.37 kg for 2018. From the results of this study, it is expected that UKM Mujizat will increase the quantity of seaweed raw material orders by reducing the frequency of purchase or in accordance with the results of calculations using the EOQ method, and paying attention to the optimal reorder point so that the availability of seaweed raw materials is maintained.

Keywords: Raw Material Inventory Control, Seaweed, EOQ Method.

INTRODUCTION

In Prima (2014) Inventory is an asset which includes goods belonging to the company with the intention of being sold within a certain business period or inventory of goods that are still in progress or in the production process or inventory of seaweed raw materials awaiting their use in a production process. Ruauw (2011) Inventory is one of the problems that is considered in relation to production process activities, costs and distribution of goods, both raw materials. The raw materials needed should be available enough to ensure a smooth production process. However, the quantity should not be too large so that the capital embedded in the inventory and the costs it incurs is not too large and not too small because it can slow down the production process. The EOQ method is used to determine the optimal number of items in a period by minimizing the total inventory cost. Inventory costs consist of setup costs and holding costs. In determining the number of goods to be ordered, in-depth analysis data is needed so as to produce the optimal number of goods to be ordered and not harm the company. Some of the advantages of implementing EOQ policies in inventory management are investments embedded in raw material inventories that can be kept to a minimum and the number of orders for raw materials is adjusted to consumption needs. SMEs are one of the breakthroughs in increasing economic growth in the midst of society to achieve adequate welfare. The business people also produce various types of products. SMEs become the pillar of the economy, because they help the community's economic growth. The independence of the community such as SME business people is expected to be able to reduce the unemployment rate if you see the fact that employment opportunities are increasingly limited and the number of workers who have not been absorbed continues to grow. The Miracle UKM which is located in Oebufu

Corresponding Author: Abdul Majid,
Fisheries Agribusiness Study Program, Faculty of Fisheries, Universities Muhammadiyah Kupang, Indonesia.
Email : abdulmajid.umk.1961@gmail.com

Village, Oebobo District, Kupang City produces various types of products whose raw materials are seaweed. The products produced are well known in Kupang City and are able to compete with products from other SMEs. Therefore, it is necessary to determine the policy on the supply of seaweed raw materials as much as possible so that the production process does not get stuck or stalled due to the problem of raw material supplies running out at the Miracle UKM. (UKM) Miracle with the title "Analysis of Inventory Control of Seaweed Raw Materials (Sea Weed) in Miracle SMEs".

LITERATURE REVIEW

Seaweed

The term seaweed is commonly known in the world of trade. This term is a translation of "Sea Weed" (English). Naming this benthic marine algae is actually not quite right, because when viewed from a botanical perspective, this plant is not classified as grass (Graminze), but it is more appropriate to use the term "Sea Benthic Algae" only (Aslan 1999). In science, seaweed is better known as algae or algae. Algae consists of 4 (four) classes namely Rhodophyceae (red algae), Phaeopycea (brown algae), Chlorophyceae (green algae), Chynophyceae (blue green algae). This division is based on the pigment it has. When viewed from the size of the algae consists of microscopic algae (microalgae) and macroscopic algae (macroalgae). This macroscopic algae is known as seaweed (Lovelles, 1989).

Inventory and EOQ (Economic Order Quantity)

According to HamingMurdifin and Mahfud Nurnajamuddin (2014), inventories are physical economic resources that need to be procured and maintained to support smooth production, including raw materials, finished products, assembled components, auxiliary materials, and goods in process.

Optimal raw material inventory control is analyzed using the EOQ (Economic Order Quantity) method. The EOQ model is used to determine the inventory order quantity that minimizes the direct cost of holding inventory and the opposite cost, namely the cost of ordering inventory. With the EOQ method, the quantity of raw materials ordered and the frequency of purchase time will be optimal and the total inventory cost will be minimal (HamingMurdifin and Mahfud Nurnajamuddin, 2014).

RESEARCH METHODE

The research was conducted at the Miracle UKM, Oebufu Village, Oebobo District, Kupang City – East Nusa Tenggara. The data needed from this research is the number of purchases of raw materials, the amount of use of raw materials, the cost of storing raw materials, and the cost of ordering raw materials. The data collected is data for 2 (two) years, namely from 2017 to 2018.

DATA ANALYSIS

Calculating Optimal Order Quantity

The formula for calculating the reorder point using the EOQ (Economic Order Quantity) method is as follows (Haming et al., 2014):

$$EOQ = \sqrt{2DS/H}$$

$$F = \frac{D}{Q}$$

Information:

EOQ = The optimum amount of each purchase (Kg).
D   = Usage per period (Kg).
S   = Ordering cost per order (Rp).
H   = Storage cost per unit per year (Rp per Kg per year).
Q   = Order quantity (Kg).
F   = Frequency of purchases per year.
S   = cost of ordering seaweed raw materialsper order (Rp)
H   = cost of storing seaweed raw materials per kg (Rp)

Optimal Reorder Points

The calculation of the reorder point using the EOQ method is as follows:

T=S+(D) x L

Information:

S = Safety stock.
D = Average product usage.
L = Average waiting time.
T = Reorder point

The data that has been collected is then analyzed using the POM-QM 5.2 (Programing Linear) program.

RESULTS AND DISCUSSION

UKM Mujizat was formed in April 2012 with 5 (five) members located in OebufuVillage, Oebobo District, Kupang City.
To find out the value of TIC (Total Inventory Cost) use the following formula (Haming, 2014):

$$TIC = \frac{D}{Q}(S) + \frac{Q}{2}(H)$$

Information :

TIC = Total economic inventory cost of seaweed raw materials (Rp)
Q   = number of economical purchases of seaweed raw materials per month (kg)
D   = number of purchases of seaweed raw materials per month (kg)

Table 1. Types of Seaweed Products in Miracle SMEs in Price/Gram Source: SME Mujizat 2019

No	Types of products	Price (Rp/100gram)	Price (Rp/500 gram)
1	Seaweed dodol	15.000	-
2	Shrimp crisp	10.000	-
3	Seaweed sticks	10.000	-

This business group started operating on April 5, 2012. Of all the members of the Miracle UKM group, on average they do not have other jobs besides working at the Miracle UKM, some are housewives and some are teenagers who have dropped out of school, with an average education level of graduates. High School so that it is hoped that this seaweed processing business can increase financial income

1.in their respective families.
The types of products that exist in Miracle Small and Medium Enterprises (SMEs) that are sold to these SMEs can be seen in table 1 below.

The purchase of seaweed raw materials at the Mujizat UKM for seaweed stick products, seaweed lunkhead, and seaweed crackers during 2017-2018 can be seen in the following table.

Table 2. Total Purchase of Seaweed Raw Materials at UKM Miraz

Purchase Month	Purchase of Seaweed Raw Materials (Kg)	
	2017	**2018**
January	130	120
February	90	90
March	75	65
April	95	85
May	80	50
June	110	85
July	105	100
August	95	100
September	85	75
October	90	70
November	125	120
December	145	140
Amount	**1.225**	**1.100**

Sumber: SME Mujizat 2019

Based on table 2 above, it explains that the number of purchases of seaweed raw materials is carried out every month starting from January to December with the number of purchases varying each month. From the table, it can be seen that the total purchases of seaweed raw materials in 2017 were 1,225 kg, while in 2018 the total purchases were 1,100 kg. The use of seaweed raw materials in the Mujizat UKM throughout 2017-2018, namely seaweed sticks, seaweed lunkhead, and seaweed crackers. The amount of raw material used for the three types of products can be seen in the table below.

Table 3. Total Use of Seaweed Raw Materials in Miracle SMEs

Bulan	PenggunaanBahan Baku RumputLautUntukSetiapPoduk					
	Seaweed Stick (Kg)		Seaweed Dodol (Kg)		Seaweed Crackers (Kg)	
	2017	**2018**	**2017**	**2018**	**2017**	**2018**
January	50	30	40	50	40	40
February	40	35	20	35	30	20
March	35	20	20	25	20	20
April	30	25	30	30	35	30
May	40	20	10	20	30	10
June	50	30	40	25	20	30
July	40	45	45	10	20	45
August	30	40	30	30	35	30
September	30	30	20	35	35	10
October	45	10	10	40	35	20
November	45	35	40	45	40	40
December	50	40	50	50	45	50
Amount	485	360	355	395	385	345

Sumber: UKM Mujizat 2019

Based on table 3 above, it explains that the highest use of seaweed raw materials for the three types of products is seaweed sticks of 485 kg in 2017 and seaweed lunkhead sales of 395 kg in 2018, the lowest amount of use is seaweed lunkhead, namely amounted to 355 kg in 2017, while the lowest amount of use in 2018 was seaweed crackers at 345 kg. Calculation of the average use of products from seaweed raw materials per month and the average lead time. The average value of using seaweed raw materials per month ($\overline{D}$) and the average lead time per month ($\overline{L}$) can be seen in the following table:

Table 4. Average usage of products from seaweed raw materials per month and average lead time

Types of products	Average Product Usage ($\overline{D}$) (Kg)		Average Lead Time($\overline{L}$) (Moon)	
	2017	**2018**	**2017**	**2018**
Seaweed Sticks	20,20	15,00	1	1
Seaweed Dodol	14,79	16,45	1	1
Seaweed Crackers	16,04	14,37	1	1

Source: Processed Data

To obtain the average results of using seaweed products from raw materials per month, it is calculated by dividing the total sales of each product with a total of 24 months (two years). So the highest average product usage results in UKM Mujizat per month is seaweed sticks of 20.20 kg in 2017 and the lowest is seaweed dodol of 14.79 kg in 2017, while in 2018 the highest average product usage per month is dodol seaweed of 16.45 kg in 2018, and the lowest was seaweed crackers of 14.37 kg in 2018. The average lead time for the three types of products from seaweed raw materials is 1 month in both 2017 and 2018.

Calculating Seaweed Raw Material Inventory Quantity

Calculation of the optimal order

Quantity based on 2017-2018 data, the sales of seaweed stick products, seaweed lunkhead, seaweed crackers, storage costs, ordering costs and the results of calculating the optimal order quantity of the three typesof seaweed products are shown in the following table.

Table 5. Calculation of Optimal Order Quantity

Seaweed Product Type	Usage (Kg/Year) (D)		CostBooking(Rp/Order)(S)	Storage Fee(Rp/Kg/Year)(H)	Optimal Order Quantity (Kg/Year) $EOQ = \sqrt{2DS/H}$	
	2017	**2018**			**2017**	**2018**
Seaweed Sticks	485	360	150.000	200.000	26,97	23,23
Seaweed Dodol	355	395	125.000	175.000	22,51	23,75
Seaweed Crackers	385	345	100.000	150.000	22,65	21,44
Amount	1.225	1.100	375	525	67,18	68,42
Rata-rata					4,47	4,38

Source: Processed Data 2019

The results of calculations using the EOQ method show the optimal order quantity for seaweed raw materials for the three types of products is seaweed sticks of 26.97 kg for 2017 and 23.23 kg for 2018, seaweed lunkhead is 22.51 kg for in 2017 and 23.75 kg for 2018, seaweed crackers 22.65 kg in 2017 and 21.44 kg for 2018 This optimal order quantity generally allows Mujizat Small and Medium Enterprises (SMEs) to maintain stock availability of ingredients so that it can provide all kinds of products in the sales window without having to worry if the demand increases or is high, and the raw material for seaweed is always checked by the chairman of the Miracle UKM. The optimal order quantity calculated using the EOQ method can be obtained by Miracle Small and Medium Enterprises (SMEs) to avoid or reduce broken stock or damaged raw material stock. The calculation of the frequency of orders from the three types of products whose raw material is seaweed can be seen in the following table.

Table 6. Calculation of Ordering Frequency for Seaweed Sticks, Seaweed Dodol and Seaweed Crackers

Types of products	Frequency Order (Times/Year) ($F =$)	
	2017	2018
Seaweed Sticks	17,98	15,49
Seaweed Dodol	15,77	16,63
Seaweed Crackers	16,99	16,09

Source: Processed Data 2019

So, the frequency of ordering seaweed raw materials for the three types of products at UKM Mujizat is seaweed sticks 18 times for 2017 and 15 times for 2018, seaweed dodol 16 times for 2017 and 17 times for 2018, seaweed crackers. 17 times for 2017 and 16 times for 2018. The smaller order frequency is done because the optimal order quantity produced is more in number. The optimal order frequency calculated by the EOQ method can be applied by (UKM) Mujizat to avoid or reduce broken stock. Therefore, management of seaweed raw material inventory management can make fewer orders or according to the results of calculations using the EOQ method. A smaller optimal purchase frequency is balanced with a larger order quantity, and vice versa, because it can prevent the accumulation of seaweed raw materials. This combination can minimize the total cost of inventory, because with a smaller frequency of purchases it can reduce ordering costs to be lower. The calculation of the total cost of seaweed raw material inventory per year for the three types of products can be seen in the following table.

Table 7. Calculation of the Total Cost of Seaweed Raw Material Inventory for the Three Types of Products

Types of products	Total Inventory Cost (Rp/year) (H(Q/2) + S(D/Q))	
	2017	2018
Seaweed Sticks	5.394,44	4.647,58
Seaweed Dodol	3.940,97	4.157,07
Seaweed Crackers	3.398,53	3.217,14
Total	12.733,94	11.931,79

Source: Processed Data 2019

From the table above, it can be seen that the total cost of supplies of seaweed raw materials that must be provided by UKM Mujizat per year for the three types of seaweed stick products is Rp. 5,394.44 in 2017 and Rp. 4,647.58 in 2018, seaweed lunkhead was Rp. 3,940.97 in 2017 and Rp. 4,157.07 in 2018, seaweed crackers amounted to Rp. 3,398.53 in 2017 and Rp. 3,217.14 in 2018. Seaweed stick products are the largest number, followed by seaweed lunkhead and then seaweed crackers.

Calculating Optimal Reorder Point (Reorder Point)

To Maintain Continuity of Inventory The reorder point is the limit of the amount of inventory that exists at a time where the order must be held again. The reorder point is obtained by adding up the amount of material used as long as the ordered materials have not arrived and the minimum inventory / safety stock. Calculation of the ordering point for seaweed raw materials back in the EOQ method with safety stock for the three types of products can be seen in the following table.

Table 8. Seaweed Raw Material Reorder Point

JenisProduk	TitikPemesananKembali(Kg) $T = S + \overline{D}x\overline{L}$	
	2017	2018
Stick RumputLaut	170,2	165
DodolRumputLaut	139,79	141,42
KerupukRumputLaut	116,04	114,37

Sumber : Data Olahan 2019

So the point of ordering seaweed raw materials back optimally that must be done by UKM Mujizat for the three types of products is seaweed sticks of 170.2 kg for 2017 and 165 kg for 2018, seaweed lunkhead of 139.79 kg for 2017 and 141.42 kg for 2018, seaweed crackers amounted to 116.04 kg for 2017 and 114.37 kg for 2018. Based on the calculation results above, if Mujizat SME reorders less than the optimal reorder point, the raw material inventory The seaweed will run out before the supply of substitute seaweed raw materials is received so that the demand for seaweed products from consumers cannot be fulfilled. On the other hand, if the order for seaweed raw materials exceeds the optimal point, the new seaweed raw material inventory has arrived when there is still a lot of inventory in the warehouse. This is risky, damage to goods due to goods

Closing

Conclusion

From the results and discussion, it can be concluded as follows:

1. The quantity of seaweed raw material inventory carried out by UKM Mujizat is for seaweed sticks of 26.97 kg for 2017 and 23.23 kg for 2018, seaweed lunkhead is 22.51 kg for 2017 and 23.75 kg for In 2018, seaweed crackers were 22.65 kg for 2017 and 21.44 kg for 2018.
2. The point for optimal reordering made by UKM Mujizat in a sales period when the raw materials for

seaweed have not arrived for the three types of products are seaweed sticks of 170,2 kg for 2017 and 165 kg for 2018, dodol grass sea by 139.79 kg for 2017 and 141.42 kg for 2018, seaweed crackers amounted to 116.04 kg for 2017 and 114.37 kg for 2018.

Suggestion

From the conclusion above, it is suggested that UKM Miracle should increase the quantity of seaweed raw material orders by reducing the frequency of purchase or in accordance with the results of calculations using the EOQ method, and paying attention to the

optimal reorder point so that the availability of seaweed raw materials is maintained.

REFERENCES

1. Arikunto, suharsimi, 1997. Prosedurpene litiansuatu pendekatan praktek, EdisiRevisi IV, RinekaCipta, Jakarta.
2. Aslan 1999 Budidaya RumputLaut.: penerbitKanisius. Yogyakarta.
3. Haming, Murdifindan H. Mahfud Nurnajamuddin, 2014., ManajemenProduksi Modern.PT. BumiAksara. Jakarta.
4. Lovelles, A. R. 1989. Prinsip-prinsip biologiuntuk tumbuhandaerah tropic .Buku ke-2.Gramedia. Jakarta.
5. Prima,2004.PengendalianpersediaanpozzolanDi PT.Semen Padang. Jurnaloptimasi system industry vol 13 No.2 UniversitasAndalas,padang.
6. Ruauw Eyverson,2011. Pengendalian

****