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MAXIMUM PROFIT CALCULATION BASED ON THE QUANTITY OF DEMAND VEGATABLES WITH THE SINGLE ORDER QUANTITY METHOD

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ABSTRACT

Inventory is one of the most important financial aspects in an enterprise, because it directly impacts revenue. This research discusses uncertainty and perishable demand of vegetable products in AAA Company. AAA supplied organic and hydroponic vegetables to consumers such as supermarkets and restaurants. This research uses the Single Order Quantity method. The items produced that are ordered at a particular time can only beconsumed by the demand during that period. The objective is to calculate the maximum benefit obtained by the company based on the quantity reserved. Vegetables with the highest demand are red cherry tomatoes, TW tomatoes, Recento tomatoes, green spinach and edamame. Profit obtained from red cherry tomatoes was IDR 2,925,000 from 6,150 packs, for green spinach IDR 346,875 from 26,850 packs, for edamame, IDR 262,618 from 650 packs, for TW tomatoes IDR 3,333,333 from 3,650 packs for Recento tomatoes was IDR 1,462,500 from 3,000 packs.
Key words: quantity reservation, uncertain demand, perishable goods, single order quantity

1. INTRODUCTION

1.1. Research Background

Inventory is such a crucial element in any company, because this will directly impact on a company's income. Hence, this paper will discuss how a company's profit is reflected by the quantity of products that they order. AAA Company distributes from supplier to consumer who demand the produce. Distribution is carried out according to the quantity demanded by the customers, which then is done though Single Order Quantity (SOQ).

1.2 Objective

The objective of this research is to: (1) Identify which fresh produce is perishable according to the level of demand. (2) To identify the quantity demanded to achieve the highest profit.

2. THEORETICAL BACKGROUND

2.1. Availability/In stock System

The method of controllingthe available inventory is varied due to the wide range of conditions/ environments. These wide range of conditions are caused by:

a. Seasonal demand
b. Demand that occurs due to the availability of stock of fresh produce or from repeat orders.
c. Uncertainty of demand and waiting period.

2.2. Single Order Quantity

The Single Order Quantity model is related to planning and controlling inventory items which have the chance of being ordered once. Those items are produced or ordered within a certain period and can only be distirbuted within that certain period of time. At the end of that particular period, the demand for those items are small or none. If the company is unable to fulfil the demand, there is not another second opportunity for the company and the value of that particular item is diminised or gone. This kind of method is suitable for items that have fluctuating demands and have short life spans, such as newspapers, flowers, and perishable foods, etc.

Apart from the fact that SOQ is also suitable for items with non-continuous and ever changing demands with a short life span, especially for these two items:

2.2.1. Infrequent demand items

This kind of demand is for items with a continually changing model, components parts that are not easy to be faulty and spare parts for certain items intended for repair and maintenance.

2.2.2. Uncertain demands

This kind of demand is for items that have short intervals within a frequent demand. The items for this demand are items that are perishable and quickly expire. If the demand is greater than the anticipated one, hence the product shortage cannot be fulfilled in the next period (backorder) resulting in excess cost. Vice versa, if the demand is less than the quantity supplied, then there are three possibilities:

a. Products are thrown out because they can no longer be used
b. Products are sold at a cheaper price
c. Products are kept for the next period

When demand keeps changing and lead time is identified, the problem of Single Order Inventory is on the quantity of demand. If quantity demanded is identified, but there is a distribution probabilistic demand, the issues can be solved. According to Kennardi (2003), for determining the quantity of demand Q, if A is the actual sales, so A = min {Q,D}. During demand D is random variable, A is variable demand too, so profit for problem S>0 is:

$$Z(Q,D) = (R+H+S)A-SD-(C+H)Q \quad (1)$$

where:

C: cost of purchasing
R: sales revenue
D: Demand
H: excess costs/unit because of the remaining quantity
S: The cost of deficiency/unit because unable to meet demand

Below are some of the formulae used in Single Order Quantity calculations with probabilistic demand distribution normally distributed (Tersine, 1994) :

1. Probability the shortage (under stock)

$$P(\text{demand} > Q^*) = \frac{cu}{(cu+co)} \quad (2)$$

where :
Q* : Reserving optimal quantity
Cu : Cost if the order < the demand
Co : Cost if the order quantity > the demand

2. Probability not the shortage (over stock)

$$P(\text{demand} < Q^*) = 1- \frac{cu}{(cu+co)} \quad (3)$$

This approach in single order quantity can be divided into two that is under stock and over stock, if the output expected is profit so the formula that can be used is as follows:

$F(Qi,Mj) = Qi.j-(Mj-Qi)A$ for $Qi \leq Mj$ (*Under Stock Condition)* (4)
$F(Qi,Mj) = Mi.j-(Qi-Mj)L$ for $Qi > Mj$ (*Over Stock Condition)* (5)
Expected Value $E(QN) = \sum$ (matrix value x probability) (6)

3. RESEARCH METHOD

Figure 1 illustrates a flowchart of research which shows the thought process about the research conducted by AAA Company.

The first step of this research involves formulating the problems related to AAA Company. Furthermore, literature review as a reference is required to do research and preparation of appropriate reports in the form of books, articles, and journals relating to the research conducted. The writer can then collect the data and make calculations and conduct analyses for the demand of vegetables. Collection of data is data demand during a particular period or 12 months. The next step is to calculate the data, plot this data representing the demand from each vegetable. The research would use the Single Order Quantity method.

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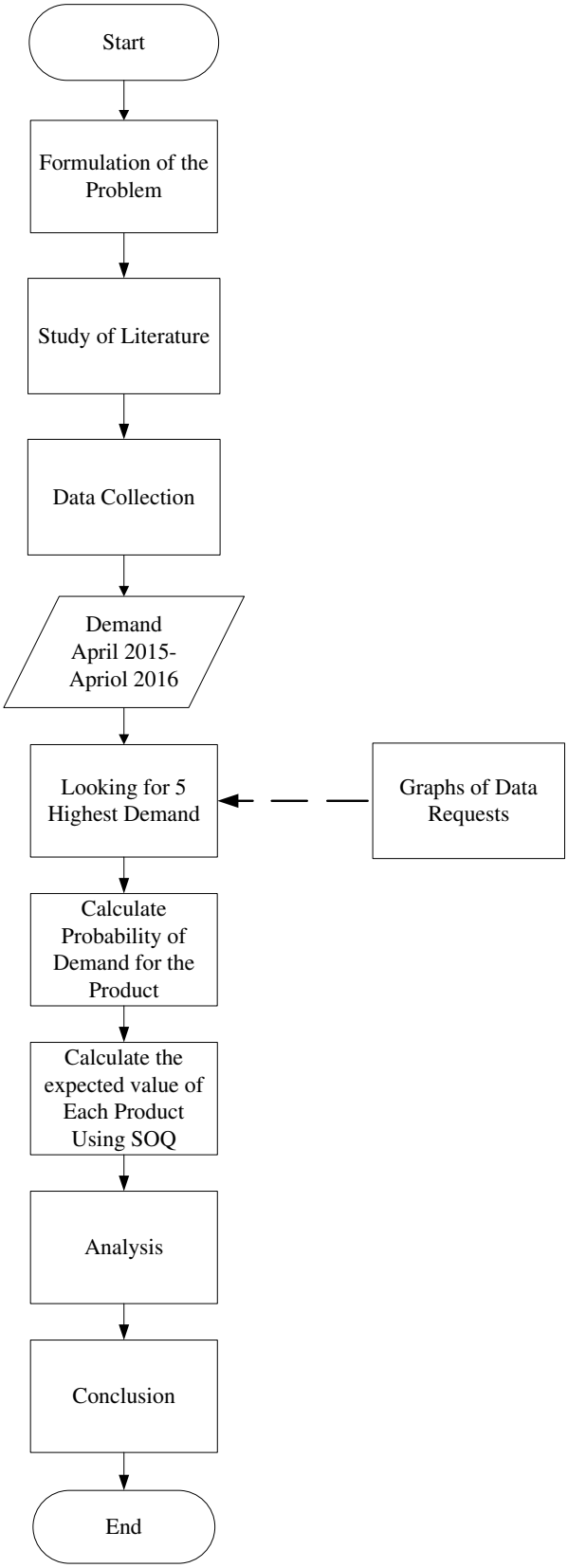

Figure 1. Research Method

4. RESULT AND DISCUSSION

4.1. Data Demand

Data demand of vegetable consumers in AAA Company, obtained by a history of data demand during 12 months from April 2015 to April 2016. This research will focus on 5 vegetables. The authors have plotted the data in a bar chart (Figure 2) using the data from Table 1.

4.2. Single Order Quantity

The next step is to make calculation using the Single Order Quantity method. Before making the calculation, we need to isolate the data from the 5 specific vegetables. Table 2 tabulates the results.

In Table 2, *salvage value* on sales tomatoes is zero, because the vestige of sales of tomatoes are durable in 2 days. If more than 2 days, tomatoes will redden and then will be sold to restaurants.

Using the data from Table 2 and Table 3, the next step is to process the data using the Single Order Quantity method. This data process uses equations 4 and 5. Data is processed by calculating the value of F (QiMj), where F (QiMj) is the outcome of following the demand strategy Qi, when the actual demand is the state of nature Mj. The determination of outcomes can take two forms, depending on whether the amount ordered (Qi) is less than, or greater than the demand level (Mj). Table 4 show the results.

Table 1. The Data Demand of Vegetables in Last Period.

Numb.	Product	Demand	Numb.	Product	Demand
1	ALOE VERA	1100	29	HYDROPONIC CURLY LETTUCE	5300
2	ALOE VERA (1000GR)	2250	30	HYDROPONIC CAISIM	7990
3	AVOCADO BUTTER	6400	31	HYDROPONIC ENDIVE LETTUCE	850
4	BIG ALOE VERA	2300	32	HYDROPONIC GREEN OAKLEAF	250
5	BIG CAULIFLOWER	6450	33	HYDROPONIC GREEN PACKCOY	2250
6	BOGOR NUTS	550	34	HYDROPONIC GREEN SPINACH	8800
7	BROCCOLI	2200	35	HYDROPONIC HORENZO	450
8	CABAI RAWIT MERAH	1250	36	HYDROPONIC KAILAN	2300
9	CAULIFLOWER	200	37	HYDROPONIC LETTUCE BUTERHEAD	650
10	CUCUMBER PICKLES	100			
11	CURAH RECENTO TOMATO	10850	38	HYDROPONIC LOLLOROSA LETTU(	2300
12	EDAMAME	26800	39	HYDROPONIC RED SPINACH	6850
13	EDAMAME (500GR)	2300	40	HYDROPONIC ROMAINE LETTUCE	2700
14	FRESH TOMATO	12200	41	HYDROPONIK KALE	7500
15	GREEN CHERRY TOMATO	9700	42	LETTUCE HEAD	1100
16	GREEN CHILI	100	43	ORGANIC PEA	300
17	GREEN SPINACH	27000	44	OYONG	300
18	HEALTHY VEGET ORGANIC HORENZO	50	45	PARE	500
19	HEALTHY VEGET BEAN	500	46	PEANUTS	4900
20	HEALTHY VEGET CAISIM	1150	47	PEELING SWEET CORN	4250
21	HEALTHY VEGET CARROT	450	48	RECENTO TOMATO	16650
22	HEALTHY VEGET CHAYOTE	250	49	RED CHERRY TOMATO	30000
23	HEALTHY VEGET GREEN PACKCOY	450	50	RED SPINACH	10100
24	HEALTHY VEGET GREEN SPINACH	2000	51	SWEET CORN SKIN	300
25	HEALTHY VEGET KALE	300	52	TW TOMATO	21700
26	HEALTHY VEGET LEEK	850	53	WHITE CABBAGE (5KG)	50
27	HEALTHY VEGET RED SPINACH	1500	54	WHITE CASSAVA	14850
28	HEALTHY VEGET TOMATO	50	55	ZUKINI	5100

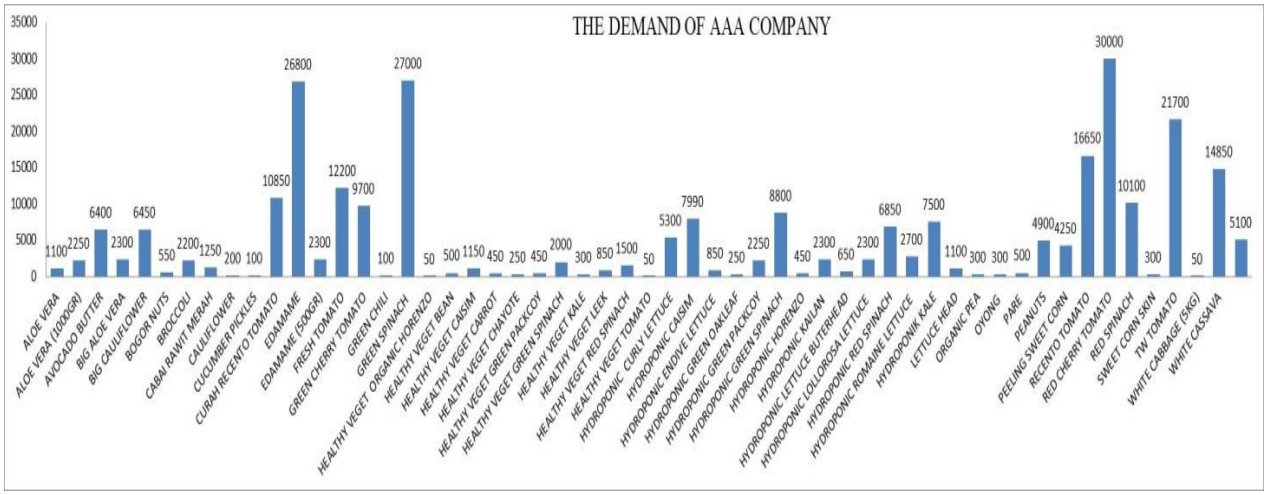

Figure 2. The Demand of Vegetables Consumer Chart

Table 2. Observation Result Data

Numb.	Product	Price	P_1 (unit selling price)	J (profit)	A (stockout cost)	l (salvage value)
1	Red Cherry Tomato	Rp 10,000	Rp 14,500	Rp4,500	Rp 4,500	Rp -
2	Green Spinach	Rp 3,500	Rp 11,500	Rp8,000	Rp 8,000	Rp 1,150
3	Edamame	Rp 10,000	Rp 18,500	Rp8,500	Rp 8,500	Rp 1,850
4	TW Tomato	Rp 13,000	Rp 18,000	Rp5,000	Rp 5,000	Rp -
5	Recento Tomato	Rp 15,000	Rp 21,000	Rp6,000	Rp 6,000	Rp -

Table 3. The Data Demand of Red Cherry Tomatoes.

Demand (M)	Number of Occurences	Probability P(M)	Probability of Demand
50	16	0.340	0.660
100	1	0.021	0.638
150	1	0.021	0.617
250	3	0.064	0.553
300	3	0.064	0.489
350	3	0.064	0.426
400	3	0.064	0.362
500	1	0.021	0.340
550	2	0.043	0.298
600	1	0.021	0.277
700	2	0.043	0.234
900	2	0.043	0.191
950	1	0.021	0.170
1000	1	0.021	0.149
1100	1	0.021	0.128
1200	1	0.021	0.106
1400	1	0.021	0.085
1750	1	0.021	0.064
2750	1	0.021	0.043
3900	1	0.021	0.021
6150	1	0.021	0.000
Total	47	1.000	

Table 4 is based on processing data from red cherry tomatoes, chose the highest expected value to maximise profit. Profit is IDR 2.925.000 from 6150 packs of red cherry tomatoes.

Table 5. The Data Demand of Green Spinach.

Demand (M)	Number of Occurences	Probability P(M)	Probability of Demand
50	5	0.625	0.375
100	2	0.250	0.125
26850	1	0.125	0.000
Total	8	1.000	

Using the data from Table 2 and Table 5, the next step is to process the data using the Single Order Quantity method. This data process uses equations 4 and 5. Data process do with calculating value of F (QiMj), where F (QiMj) is the outcome of following the demand strategy Qi, when the actual demand is the state of nature Mj. The determination of outcomes can take on two forms, depending on whether the amount ordered (Qi) is less than or greater than the demand level (Mj). Here is the result:

Table 6. The Data Process of Green Spinach used by the Single Order Quantity.

Strategy (Q)	Probability P(M)	0.625	0.250	0.125	Expected Value
	State of nature (M)	50	100	26850	
50		400000	0	-214000000	-Rp26,500,000
100		342500	800000	-213200000	-Rp26,235,938
26850		-3E+07	-3E+07	214800000	Rp346,875

The table based on the data process from the green spinach, chose the highest expected value to maximise profit. Profit is IDR 346.875 from 26850 packs of green spinach.

Table 7. The Data Demand of Edamame.

Demand (M)	Number of Occurences	Probability P(M)	Probability of Demand
50	64	0.504	0.496
100	19	0.150	0.346
150	9	0.071	0.276
200	6	0.047	0.228
250	6	0.047	0.181
300	3	0.024	0.157
400	3	0.024	0.134
450	5	0.039	0.094
550	1	0.008	0.087
650	2	0.016	0.071
900	1	0.008	0.063
1000	2	0.016	0.047
1200	1	0.008	0.039
1300	1	0.008	0.031
1350	1	0.008	0.024
1800	1	0.008	0.016
2100	1	0.008	0.008
2450	1	0.008	0.000
Total	127	1.000	

Using the data from Table 2 and Table 7, the next step is to process the data using the Single Order Quantity method. This data process uses equations 4 and 5. Data process do with calculating value of F (QiMj), where F (QiMj) is the outcome of following the demand strategy Qi, when the actual demand is the state of nature Mj. The determination of outcomes can take on two forms, depending on whether the amount ordered (Qi) is less than or greater than the demand level (Mj). Table 8 below show the result.

Table 8 is based on the data process from the edamame, choose the highest expected value to maximum amount of profits. Who selected is IDR 262.618 with the number of edamame requests are 650 packs.

Table 4. The Data Process of Red Cherry Tomatoes used by the Single Order Quantity.

Strategy (Q)	Probability P(M) / State of nature (M)	0.340 50	0.021 100	0.021 150	0.064 250	0.064 300	0.064 350	0.064 400	0.021 500	0.043 550	0.021 600	0.043 700	0.043 900	0.021 950	0.021 1000	0.021 1100	0.021 1200	0.021 1400	0.021 1750	0.021 2750	0.021 3900	0.021 6150	Expected Value
50		225000	0	-225000	-675000	-900000	-1125000	-1350000	-1800000	-2025000	-2250000	-2700000	-3600000	-3825000	-4050000	-4500000	-4950000	-5850000	-7425000	-11925000	-17100000	-27225000	-Rp2,475,000
100		225000	450000	225000	-225000	-450000	-675000	-900000	-1350000	-1575000	-1800000	-2250000	-3150000	-3375000	-3600000	-4050000	-4500000	-5400000	-6975000	-11475000	-16650000	-26775000	-Rp2,178,191
150		225000	450000	675000	225000	0	-225000	-450000	-900000	-1125000	-1350000	-1800000	-2700000	-2925000	-3150000	-3600000	-4050000	-4950000	-6525000	-11025000	-16200000	-26325000	-Rp1,890,957
250		225000	450000	675000	1125000	900000	675000	450000	0	-225000	-450000	-900000	-1800000	-2025000	-2250000	-2700000	-3150000	-4050000	-5625000	-10125000	-15300000	-25425000	-Rp1,335,638
300		225000	450000	675000	1125000	1350000	1125000	900000	450000	225000	0	-450000	-1350000	-1575000	-1800000	-2250000	-2700000	-3600000	-5175000	-9675000	-14850000	-24975000	-Rp1,086,702
350		225000	450000	675000	1125000	1350000	1575000	1350000	900000	675000	450000	0	-900000	-1125000	-1350000	-1800000	-2250000	-3150000	-4725000	-9225000	-14400000	-24525000	-Rp866,489
400		225000	450000	675000	1125000	1350000	1575000	1800000	1350000	1125000	900000	450000	-450000	-675000	-900000	-1350000	-1800000	-2700000	-4275000	-8775000	-13950000	-24075000	-Rp675,000
500		225000	450000	675000	1125000	1350000	1575000	1800000	2250000	2025000	1800000	1350000	450000	225000	0	-450000	-900000	-1800000	-3375000	-7875000	-13050000	-23175000	-Rp349,468
550		225000	450000	675000	1125000	1350000	1575000	1800000	2250000	2475000	2250000	1800000	900000	675000	450000	0	-450000	-1350000	-2925000	-7425000	-12600000	-22725000	-Rp196,277
600		225000	450000	675000	1125000	1350000	1575000	1800000	2250000	2475000	2700000	2250000	1350000	1125000	900000	450000	0	-900000	-2475000	-6975000	-12150000	-22275000	-Rp62,234
700		225000	450000	675000	1125000	1350000	1575000	1800000	2250000	2475000	2700000	3150000	2250000	2025000	1800000	1350000	900000	0	-1575000	-6075000	-11250000	-21375000	Rp186,702
900		225000	450000	675000	1125000	1350000	1575000	1800000	2250000	2475000	2700000	3150000	4050000	3825000	3600000	3150000	2700000	1800000	225000	-4275000	-9450000	-19575000	Rp607,979
950		225000	450000	675000	1125000	1350000	1575000	1800000	2250000	2475000	2700000	3150000	4050000	4275000	4050000	3600000	3150000	2250000	675000	-3825000	-9000000	-19125000	Rp694,149
1000		225000	450000	675000	1125000	1350000	1575000	1800000	2250000	2475000	2700000	3150000	4050000	4275000	4500000	4050000	3600000	2700000	1125000	-3375000	-8550000	-18675000	Rp770,745
1100		225000	450000	675000	1125000	1350000	1575000	1800000	2250000	2475000	2700000	3150000	4050000	4275000	4500000	4950000	4500000	3600000	2025000	-2475000	-7650000	-17775000	Rp904,787
1200		225000	450000	675000	1125000	1350000	1575000	1800000	2250000	2475000	2700000	3150000	4050000	4275000	4500000	4950000	5400000	4500000	2925000	-1575000	-6750000	-16875000	Rp1,019,681
1400		225000	450000	675000	1125000	1350000	1575000	1800000	2250000	2475000	2700000	3150000	4050000	4275000	4500000	4950000	5400000	6300000	4725000	225000	-4950000	-15075000	Rp1,211,170
1750		225000	450000	675000	1125000	1350000	1575000	1800000	2250000	2475000	2700000	3150000	4050000	4275000	4500000	4950000	5400000	6300000	7875000	3375000	-1800000	-11925000	Rp1,479,255
2750		225000	450000	675000	1125000	1350000	1575000	1800000	2250000	2475000	2700000	3150000	4050000	4275000	4500000	4950000	5400000	6300000	7875000	12375000	7200000	-2925000	Rp2,053,723
3900		225000	450000	675000	1125000	1350000	1575000	1800000	2250000	2475000	2700000	3150000	4050000	4275000	4500000	4950000	5400000	6300000	7875000	12375000	17550000	7425000	Rp2,494,149
6150		225000	450000	675000	1125000	1350000	1575000	1800000	2250000	2475000	2700000	3150000	4050000	4275000	4500000	4950000	5400000	6300000	7875000	12375000	17550000	27675000	Rp2,925,000

Table 8. The Data Process of Edamame used by the Single Order Quantity.

Strategy (Q)	Probability P(M) / State of nature (M)	0.504 50	0.150 100	0.071 150	0.047 200	0.047 250	0.024 300	0.024 400	0.039 450	0.008 550	0.016 650	0.008 900	0.016 1000	0.008 1200	0.008 1300	0.008 1350	0.008 1800	0.008 2100	0.008 2450	Expected Value
50		425000	0	-425000	-850000	-1275000	-1700000	-2550000	-2975000	-3825000	-4675000	-6800000	-7650000	-9350000	-10200000	-10625000	-14450000	-17000000	-19975000	-Rp1,054,134
100		332500	850000	425000	0	-425000	-850000	-1700000	-2125000	-2975000	-3825000	-5950000	-6800000	-8500000	-9350000	-9775000	-13600000	-16150000	-19125000	-Rp679,094
150		240000	757500	1275000	850000	425000	0	-850000	-1275000	-2125000	-2975000	-5100000	-5950000	-7650000	-8500000	-8925000	-12750000	-15300000	-18275000	-Rp445,059
200		147500	665000	1182500	1700000	1275000	850000	0	-425000	-1275000	-2125000	-4250000	-5100000	-6800000	-7650000	-8075000	-11900000	-14450000	-17425000	-Rp277,815
250		55000	572500	1090000	1607500	2125000	1700000	850000	425000	-425000	-1275000	-3400000	-4250000	-5950000	-6800000	-7225000	-11050000	-13600000	-16575000	-Rp155,098
300		-37500	480000	997500	1515000	2032500	2550000	1700000	1275000	425000	-425000	-2550000	-3400000	-5100000	-5950000	-6375000	-10200000	-12750000	-15725000	-Rp76,909
400		-222500	295000	812500	1330000	1847500	2365000	3400000	2975000	2125000	1275000	-850000	-1700000	-3400000	-4250000	-4675000	-8500000	-11050000	-14025000	Rp34,941
450		-315000	202500	720000	1237500	1755000	2272500	3307500	3825000	4860000	2125000	0	-850000	-2550000	-3400000	-3825000	-7650000	-10200000	-13175000	Rp83,445
550		-500000	17500	535000	1052500	1570000	2087500	3122500	3640000	4675000	5710000	1700000	850000	-850000	-1700000	-2125000	-5950000	-8500000	-11475000	Rp91,398
650		-685000	-167500	350000	867500	1385000	1902500	2937500	3455000	4490000	5525000	8112500	9147500	11217500	0	-425000	-4250000	-6800000	-9775000	Rp262,618
900		-1E+06	-630000	-112500	405000	922500	1440000	2475000	2992500	4027500	5062500	7650000	8685000	10755000	11790000	3825000	0	-2550000	-5525000	Rp45,020
1000		-1E+06	-815000	-297500	220000	737500	1255000	2290000	2807500	3842500	4877500	7465000	8500000	10570000	11605000	12122500	16780000	-850000	-3825000	Rp90,079
1200		-2E+06	-1E+06	-667500	-150000	367500	885000	1920000	2437500	3472500	4507500	7095000	8130000	10200000	11235000	11752500	16410000	19515000	-425000	-Rp86,969
1300		-2E+06	-1E+06	-852500	-335000	182500	700000	1735000	2252500	3287500	4322500	6910000	7945000	10015000	11050000	11567500	16225000	19330000	22952500	-Rp86,437
1350		-2E+06	-1E+06	-945000	-427500	90000	607500	1642500	2160000	3195000	4230000	6817500	7852500	9922500	10957500	11475000	16132500	19237500	22860000	-Rp178,937
1800		-3E+06	-2E+06	-2E+06	-1E+06	-742500	-225000	810000	1327500	2362500	3397500	5985000	7020000	9090000	10125000	10642500	15300000	18405000	22027500	-Rp1,011,437
2100		-3E+06	-3E+06	-2E+06	-2E+06	-1297500	-780000	255000	772500	1807500	2842500	5430000	6465000	8535000	9570000	10087500	14745000	17850000	21472500	-Rp1,566,437
2450		-4E+06	-3E+06	-3E+06	-2E+06	-1945000	-1427500	-392500	125000	1160000	2195000	4782500	5817500	7887500	8922500	9440000	14097500	17202500	20825000	-Rp2,213,937

Table 10. The Data Process of TW Tomatoes used by the Single Order Quantity.

Strategy (Q)	Probability P(M) / State of nature (M)	0.303 50	0.091 100	0.061 150	0.030 200	0.030 250	0.091 300	0.030 450	0.030 550	0.030 600	0.030 650	0.030 850	0.030 900	0.030 1000	0.030 1400	0.030 1650	0.030 2300	0.030 2450	0.030 3100	0.030 3650	Expected Value
50		250000	0	-250000	-500000	-750000	-1000000	-1750000	-2250000	-2500000	-2750000	-3750000	-4000000	-4500000	-6500000	-7750000	-11000000	-11750000	-15000000	-17750000	-Rp2,833,333
100		250000	500000	250000	0	-250000	-500000	-1250000	-1750000	-2000000	-2250000	-3250000	-3500000	-4000000	-6000000	-7250000	-10500000	-11250000	-14500000	-17250000	-Rp2,484,848
150		250000	500000	750000	500000	250000	0	-750000	-1250000	-1500000	-1750000	-2750000	-3000000	-3500000	-5500000	-6750000	-10000000	-10750000	-14000000	-16750000	-Rp2,181,818
200		250000	500000	750000	1000000	750000	500000	-250000	-750000	-1000000	-1250000	-2250000	-2500000	-3000000	-5000000	-6250000	-9500000	-10250000	-13500000	-16250000	-Rp1,909,091
250		250000	500000	750000	1000000	1250000	1000000	250000	-250000	-500000	-750000	-1750000	-2000000	-2500000	-4500000	-5750000	-9000000	-9750000	-13000000	-15750000	-Rp1,651,515
300		250000	500000	750000	1000000	1250000	1500000	750000	250000	0	-250000	-1250000	-1500000	-2000000	-4000000	-5250000	-8500000	-9250000	-12500000	-15250000	-Rp1,409,091
450		250000	500000	750000	1000000	1250000	1500000	2250000	1750000	1500000	1250000	250000	0	-500000	-2500000	-3750000	-7000000	-7750000	-11000000	-13750000	-Rp818,182
550		250000	500000	750000	1000000	1250000	1500000	2250000	2750000	2500000	2250000	1250000	1000000	500000	-1500000	-2750000	-6000000	-6750000	-10000000	-12750000	-Rp454,545
600		250000	500000	750000	1000000	1250000	1500000	2250000	2750000	3000000	2750000	1750000	1500000	1000000	-1000000	-2250000	-5500000	-6250000	-9500000	-12250000	-Rp287,879
650		250000	500000	750000	1000000	1250000	1500000	2250000	2750000	3000000	3250000	2250000	2000000	1500000	-500000	-1750000	-5000000	-5750000	-9000000	-11750000	-Rp136,364
850		250000	500000	750000	1000000	1250000	1500000	2250000	2750000	3000000	3250000	4250000	4000000	3500000	1500000	250000	-3000000	-3750000	-7000000	-9750000	Rp409,091
900		250000	500000	750000	1000000	1250000	1500000	2250000	2750000	3000000	3250000	4250000	4500000	4000000	2000000	750000	-2500000	-3250000	-6500000	-9250000	Rp530,303
1000		250000	500000	750000	1000000	1250000	1500000	2250000	2750000	3000000	3250000	4250000	4500000	5000000	3000000	1750000	-1500000	-2250000	-5500000	-8250000	Rp742,424
1400		250000	500000	750000	1000000	1250000	1500000	2250000	2750000	3000000	3250000	4250000	4500000	5000000	7000000	5750000	2500000	1750000	-1500000	-4250000	Rp1,469,697
1650		250000	500000	750000	1000000	1250000	1500000	2250000	2750000	3000000	3250000	4250000	4500000	5000000	7000000	8250000	5000000	4250000	1000000	-1750000	Rp1,848,485
2300		250000	500000	750000	1000000	1250000	1500000	2250000	2750000	3000000	3250000	4250000	4500000	5000000	7000000	8250000	11500000	10750000	7500000	4750000	Rp2,636,364
2450		250000	500000	750000	1000000	1250000	1500000	2250000	2750000	3000000	3250000	4250000	4500000	5000000	7000000	8250000	11500000	12250000	9000000	6250000	Rp2,772,727
3100		250000	500000	750000	1000000	1250000	1500000	2250000	2750000	3000000	3250000	4250000	4500000	5000000	7000000	8250000	11500000	12250000	15500000	12750000	Rp3,166,667
3650		250000	500000	750000	1000000	1250000	1500000	2250000	2750000	3000000	3250000	4250000	4500000	5000000	7000000	8250000	11500000	12250000	15500000	18250000	Rp3,333,333

Table 9. The Data Demand of TW Tomatoes.

Demand (M)	Number of Occurences	Probability P(M)	Probability of Demand > M
50	10	0.303	0.697
100	3	0.091	0.606
150	2	0.061	0.545
200	1	0.030	0.515
250	1	0.030	0.485
300	3	0.091	0.394
450	1	0.030	0.364
550	1	0.030	0.333
600	1	0.030	0.303
650	1	0.030	0.273
850	1	0.030	0.242
900	1	0.030	0.212
1000	1	0.030	0.182
1400	1	0.030	0.152
1650	1	0.030	0.121
2300	1	0.030	0.091
2450	1	0.030	0.061
3100	1	0.030	0.030
3650	1	0.030	0.000
Total	33	1.000	

Using the data from Table 2 and Table 9, the next step is to process the data using the Single Order Quantity method. This data process uses equations 4 and 5. Data process do with calculating value of F (QiMj), where F (QiMj) is the outcome of following the demand strategy Qi, when the actual demand is the state of nature Mj. The determination of outcomes can take on two forms, depending on whether the amount ordered (Qi) is less than or greater than the demand level (Mj). Table 10 show the result.

Table 10 is based on the data process from the TW tomato, choose the highest expected value to maximum amount of profits. Who selected is IDR 3.333.333 with the number of TW tomato requests are 3650 packs.

Table 11. The Data Demand of Recento Tomatoes.

Demand (M)	Number of Occurences	Probability P(M)	Probability of Demand > M
50	28	0.389	0.611
100	10	0.139	0.472
150	7	0.097	0.375
200	3	0.042	0.333
250	8	0.111	0.222
300	2	0.028	0.194
400	5	0.069	0.125
450	2	0.028	0.097
600	3	0.042	0.056
700	1	0.014	0.042
800	1	0.014	0.028
1700	1	0.014	0.014
3000	1	0.014	0.000
Total	72	1.000	

Using the data from Table 2 and Table 11, the next step is to process the data using the Single Order Quantity method. This data process uses equations 4 and 5. Data process do with calculating value of F (QiMj), where F (QiMj) is the outcome of following the demand strategy Qi, when the actual demand is the state of nature Mj. The determination of outcomes can take on two forms, depending on whether the amount ordered (Qi) is less than or greater than the demand level (Mj). Table 12 show the result.

Table 12 is based on the data process from the recent tomato, choose the highest expected value to maximum amount of profits. Who selected is IDR 1.462.500 with the number of recento tomato requests are 3000 packs.

Table12. The Data Process of Recento Tomatoes used by the Single Order Quantity.

Strategy (Q)	Probability P(M)	0.389	0.139	0.097	0.042	0.111	0.028	0.069	0.028	0.042	0.014	0.014	0.014	0.014	Expected Value
	State of nature (M)	50	100	150	200	250	300	400	450	600	700	800	1700	3000	
50		300000	0	-300000	-600000	-900000	-1200000	-1800000	-2100000	-3000000	-3600000	-4200000	-9600000	-17400000	-Rp862,500
100		300000	600000	300000	0	-300000	-600000	-1200000	-1500000	-2400000	-3000000	-3600000	-9000000	-16800000	-Rp495,833
150		300000	600000	900000	600000	300000	0	-600000	-900000	-1800000	-2400000	-3000000	-8400000	-16200000	-Rp212,500
200		300000	600000	900000	1200000	900000	600000	0	-300000	-1200000	-1800000	-2400000	-7800000	-15600000	Rp12,500
250		300000	600000	900000	1200000	1500000	1200000	600000	300000	-600000	-1200000	-1800000	-7200000	-15000000	Rp212,500
300		300000	600000	900000	1200000	1500000	1800000	1200000	900000	0	-600000	-1200000	-6600000	-14400000	Rp345,833
400		300000	600000	900000	1200000	1500000	1800000	2400000	2100000	1200000	600000	0	-5400000	-13200000	Rp579,167
450		300000	600000	900000	1200000	1500000	1800000	2400000	2700000	1800000	1200000	600000	-4800000	-12600000	Rp654,167
600		300000	600000	900000	1200000	1500000	1800000	2400000	2700000	3600000	3000000	2400000	-3000000	-10800000	Rp829,167
700		300000	600000	900000	1200000	1500000	1800000	2400000	2700000	3600000	4200000	3600000	-1800000	-9600000	Rp895,833
800		300000	600000	900000	1200000	1500000	1800000	2400000	2700000	3600000	4200000	4800000	-600000	-8400000	Rp945,833
1700		300000	600000	900000	1200000	1500000	1800000	2400000	2700000	3600000	4200000	4800000	10200000	2400000	Rp1,245,833
3000		300000	600000	900000	1200000	1500000	1800000	2400000	2700000	3600000	4200000	4800000	10200000	18000000	Rp1,462,500

5. CONCLUSION

(1) The data ploted from various selected vegetables: red cherry tomato, TW tomato, recento tomato, green spinach, and edamame have the greatest number of request compared to other vegetables. The highest requested vegetables are red cherry tomatoes with a demand of 30000 packs, green spinach with a demand of 27000 packs, edamame with a demand of 26800 packs, TW tomatoes with a demand of 21700 packs, and recento tomatoes with a demand of 16650 packs.

(2) Profit obtained from red cherry tomatoes is as much as IDR 2.925.000 at any reservations when the demand is as high as 6150 packs. Profit obtained from green spinach is as high as IDR 346.875 at any reservations when the number of demand is as high as 26850 packs. Profit obtained from edamame is as high as IDR 262.618 at any reservations when the demand is as much as 650 packs. Profit obtained from TW tomatoes is as high as IDR 3.333.333 at any reservations when the demand is as high as 3650 packs. Profit obtained from recento tomatoes is as high as IDR 1.462.500 at any reservations when the demand is as high as 3000 packs.

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