Production Planning and Raw Materials Supply to Meet Fluctuative Demand for Livestock Feed Flour

Zainal Arief
Doctoral Student of Economics,
University of 17 Agustus 1945 Surabaya

Ida Aju Brahmasari
Lecturer of Faculty of Economics,
University of 17 Agustus 1945 Surabaya

Anis Eliyana
Lecturer of Faculty of Economics and Business,
Airlangga University Surabaya

M. Fahrul Rozi
Private Sector

ABSTRACT

Production is creating goods and services, CV Bulu Nusantara is a company that processes poultry feathers, fish bones, beef bones, shells into dough flour for livestock feed. Sometimes these companies encounter overproduction and sometimes production shortages. The researcher intends to run production planning and raw material need planning that can meet fluctuative demand and minimize production costs with JIP and MRP approaches. From the research carried out, obtained forecasting demand result for period June 2017 - May 2018 for feather flour, fish flour, bone meal and crab flour for 191,040 kg, 144,876 kg, 135,189 kg and 158,028 kg. From production master schedule made based on forecasting and production capacity result, a plan is obtained for June 2017 - May 2018 of Rp. 1,858,057,638. Material requirements planning (MRP) can be seen when, how many orders, how many times the order for raw materials is within 1 year, so that the raw material inventory is optimal in accordance with the master production schedule, in addition to MRP also obtained for the total cost of raw materials for planning period June 2017 - May 2018 amounting to Rp. 16,710,197,190. From the cost of labor and raw materials, total production planning is Rp. 18,568,254,838, if the total cost of production planning is compared to the total production costs of the company in 2016-1017 amounting to Rp. 18,690,250,000 then the difference in annual production costs of Rp. 121,995,170. This means that by implementing JIP and MRP systems the company will save production costs by Rp. 121,995,170.

Keywords: production planning, raw material inventory, JIP, MPS, MRP.

INTRODUCTION

Production is creating goods and services (Render, Heizel, 2001) operations management is an activity that makes goods and services through changes and inputs into outputs. CV Bulu Nusantara is a company that processes poultry feathers, fish bones, beef bones, shells into dough flour for animal feed. The Company began operations in 2004, located in Gresik, East Java. This company distributes products sold to livestock feed companies such as Pokphand, Japfa, etc. The need for livestock feed flour will never stop, giving rise to fluctuating demand. The company currently has not made demand forecasting based on previous sales data yet. Therefore the company cannot meet all consumer demands, as a result the company will lose

sales at certain times, which should be a profit. One valuable company asset is raw material. Raw materials is a worth for the company. Without raw materials planning, it is can be uncontrollable, if it is too excessive it will cause storage costs to soaring, but if it cannot be sufficient, the company cannot produce so that it affects production smooth. Recognizing the problems faced, companies must be able to deal with fluctuations in demand by making production planning and raw material requirements planning.

LITERATUR REVIEW

Operation Management
Operations management is a series of activities that make goods and services through changes from input to output (Render, Heizel, 2001).

Forecasting
It is the science of predicting future events. Forecasting requires taking historical data and projecting it to the future with some form of mathematical model (Render, Heizel, pp. 46, 2001).

MRP (Material Requirement Planning)
Is a dependent inventory model (David W. Pentica, 1979), the use of this model is an effective inventory model, and the conditions must be known:
   (a) the main production schedule (what will be made and when is done)
   (b) specifications or bill of material
   (c) availability of supplies
   (d) orders that must be fulfilled
   (e) lead time (how long does it take to get various components)

RESEARCH METHOD

To facilitate data processing, a research design is needed that can describe a systematic data processing process, as in the following figure.
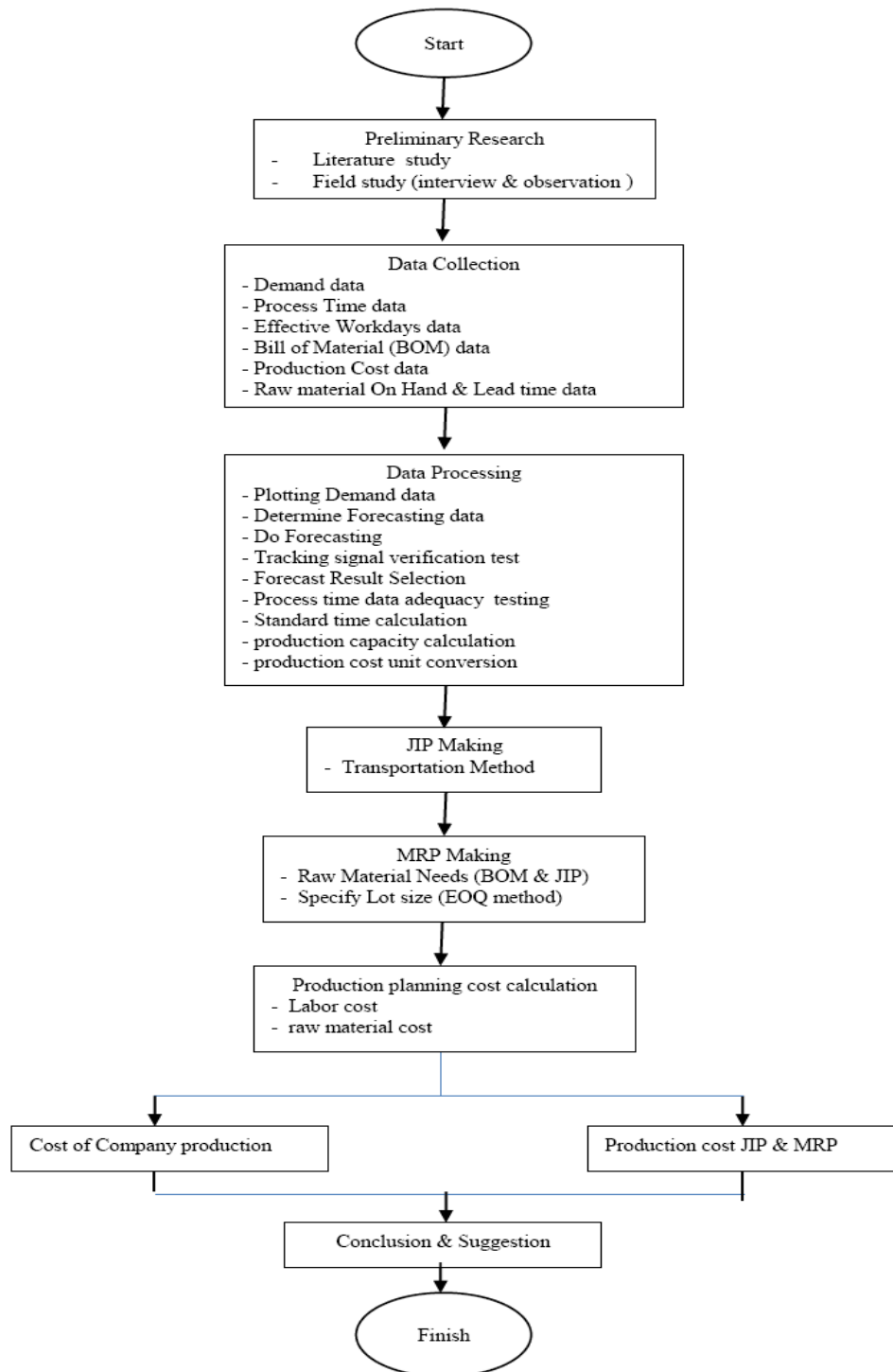

Figure 1. Research Flowchart

RESULTS AND DISCUSSION

To get an analysis and conclusion from this study, then supporting data is needed so that the result can be accounted for both theoretically and applicative in the field. The available data is data sourced from the company, but the presentation is different according to the presentation that I have set in the research method that I do. The supporting data, among others.

Demand Data

Demand data for the past period is production data carried out by the company in accordance with demand to determine the extent of demand level during the last period, thus illustration of production will be obtained based on historical demand obtained by the company not too far with the time research was conducted, so that there was a possibility of data irrelevancy due to incompatibility with real conditions.

Forecasting Demand for Livestock Feed Flour

From the flour feed demand for livestock feed June 2016-May 2017 forecasting is done with the moving average and exponential smoothing methods, this is because the demand data is fluctuating and does not show a linear trend. From demand forecasting that has been carried out for June 2017 to May 2018, the forecasting method was selected for each product, feather flour using the moving average (MA = 3) method, fish flour using exponential smoothing method (α = 0.33), bone flour uses exponential smoothing method (α = 0.33), and crab flour uses exponential smoothing method (α = 0.33). Here are the results:

Table 1. The Forecasting of Livestock Feed Flour

Period	The Result of Forecast (kg)			
	Feather flour	Fish flour	Bone flour	Crab fluor
June 2017	191040	144876	135189	158028
July 2017	191040	144876	135189	158028
August 2017	191040	144876	135189	158028
September 2017	191040	144876	135189	158028
October 2017	191040	144876	135189	158028
November2017	191040	144876	135189	158028
December 2017	191040	144876	135189	158028
January 2018	191040	144876	135189	158028
February 2018	191040	144876	135189	158028
March 2018	191040	144876	135189	158028
April 2018	191040	144876	135189	158028
May 2018	191040	144876	135189	158028

Making Production Master Schedule

Inputs from the Production Master Schedule are the forecasting result, labor costs and production capacity, production capacity is obtained from effective working days data and data processing time. Before making the Production Master Schedule, it must first make equal the units between forecasting, costs, and production capacity, which in this study used units (kg). From the Production Master Schedule made based on the forecasting result and production capacity, the following results are obtained:

Tabel 2. Production Master Schedule of CV. Bulu Nusantara
June 2017- May 2018

Period	Production Planning (kg)			
	Feather flour	Fish flour	Bone flour	Crab fluor
June 2017	191040	144876	135189	158028
July 2017	191040	144876	135189	160834
August 2017	191040	147792	137658	162890
September 2017	191040	141960	132720	150360
October 2017	191040	144876	135189	162890
November 2017	191040	153707	143188	162890
December 2017	191040	136045	127190	148304
January 2018	191040	153707	143188	162890
February 2018	191040	136045	127190	153166
March 2018	191040	150708	140127	162890
April 2018	191040	141960	132720	153166
May 2018	191040	141960	132720	158028

Master Production Schedule above shows that for forecasting requests, production planning is carried out as Table 7 above, so that demand based on forecasting results can be fulfilled with minimum labor costs.

Material Requirement Planning (MRP)

Before making MRP, you must first determine the raw material requirements and lot size, for material requirements obtained from the Bill of Material and Production Master Schedule. The method employed determine the lot size in this study is EOQ, this is because this method is compatible for planning within the time horizon 1 year. From the MRP, you can see when, how many orders, how many orders for raw materials on a plan order release, and also how many raw materials in the inventory for each month are projected on hand so that the raw material inventory is optimal according to the Production Master Schedule , here are the results:

Table 3 Plan for Order Release & Projected On Hand of Raw Materials

Raw material	Plan Order Release												Total
	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	11ar-18	apr-18	May-18	
Poultry feather	310 297		310 297	310297		1 310.297	310 ¹97		310 297	310 297			2. 172 079
Fish bone	330 948		330 948		330.948			330 948		330 948			1 .654 740
Cow bone	319 692			319 692		319 692		319 692		A 692			1. 598 460
Shells	399 114			399114		399114			399114		399114		1.995570
Packing sack	122 879										122.879		245 758
Raw material	Projected On Hand												Total
	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	1pr-18	May-18	
Poultry feather	99.408	209.113	8521	118.226	227.931	1 27.339	137 044	246.749	46.157	15a 86¹	265.567	64.975	1.606.892
Fish bone	97 880	276 708	121 526	303 416	151296	320.856	178.005	16.613	204. 714	46 471	228 361	79 303	2.025.145
Cow bone	108 052	285 796	14125)	1899	179 643	29 296	215 438	65.091	251.233	104 100	284 436	145 080	1811319
Shells	134 071	364 309	193 274	35 396	163 475	92.440	335 835	164.800	3 976	231¹055	71231	304 416	2.195. 278
Packing sack	2 874	113 627	101344	89.375	77 249	64 617	52 998	40)76	28 747	16 307	4 338	115148	707.110

From Table above, in the plan order release section shows that the company must place an order for raw materials in the stated months and the order size stated in the plan order release section in Table 8. The projected on hand section shows the quantity of raw material expected in inventory at the end of the period, and available for

Total Labor Cost   = Rp.   1.858.057.638
Total Cost of Raw Materials
    Poultry Feathers   = Rp.   2.998.391.900
    Fishbone   = Rp.   5.678.156.500
    Cow bone   = Rp.   3.073.359.900
    Shells   = Rp.   4.829.338.800
    Packing Sacks   = Rp.   130.950.100
Total Production Plan Costs = Rp.   18.568.254.838

If the production plan costs results are compared to the company's production costs (labor costs + raw material costs) the year of use in the next period.

Production Cost Calculation

After obtaining total labor costs and total costs for each raw material, the total production costs can be calculated for the first year (June 2017 - May 2018). Following are the results of the calculation of production costs for the first year: 2016-2017 which amounted to Rp. 18,690,250,000, the difference will be obtained as follows:

Table 4. Difference in Production Costs 1 Year of Company Version and Planning Production

Production Costs 1 Year		Difference
Company	**Production plan**	
Rp 18.690.250.000	Rp 18.568.254.838	Rp 121.995.170

CONCLUSION

Based on the calculation of production planning costs obtained from JIP and MRP, the difference between the cost of Rp 121,995,170 and the company's production costs in 2016-2017 was obtained. This cost difference shows that if the company plans production using JIP and MRP, a savings of Rp 121,995,170 will be obtained in 1 year.

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