Journal of Mathematics Technology and Education Vol. 1, No. 1, 2021 | 1 - 10

Journal of Mathematics Technology and Education

Optimization of Crude Palm Oil Distribution Costs in PT. Perkebunan Nusantara III Using Vogel's Approximation Method, Russel Approximation Method and Stepping Stone Method

***Nadya Pratiwi*[1], *Rosman Siregar*[2]**

[1] *Student of Mathematics Department, Faculty of Mathematics and Natural Sciences, Universitas Sumatera Utara*
[2] *Mathematics Department, Faculty of Mathematics and Natural Sciences, Universitas Sumatera Utara*

Abstract. PT. Perkebunan Nusantara III is an Indonesian State-Owned Enterprise engaged in oil palm and rubber plantations. The company is headquartered in Medan, North Sumatra. In general, the distribution process of CPO is one of the most important aspects to be planned, because it will greatly affect the overall cost efficiency of the project. The increase in project costs is often caused by a CPO distribution process that is not optimal. The method used to solve the distribution optimization problem is Vogel's Approximation Method and Russell's Approximation Method to determine the initial solution and optimization test using the Stepping Stone method. From the results of the calculation of the Vogel's Approximation Method for the initial completion and continued by using the Stepping Stone Method is the method that gives optimal results. For the final settlement, a minimum fee of Rp. 34,417.014,501.

Keyword: Vogel's Approximation Method, Russsel Approximation Method, Stepping Stone, Distribution Cost Optimization, Crude Palm Oil

Abstrak. *PT. Perkebunan Nusantara III adalah Badan Usaha Milik Negara Indonesia yang bergerak di bidang perkebunan kelapa sawit dan karet. Perusahaan ini berkantor pusat di Medan, Sumatra Utara. Pada umumnya proses pendistribusian CPO merupakan salah satu aspek yang sangat penting untuk direncanakan, karena akan sangat berpengaruh terhadap efisiensi biaya proyek secara keseluruhan. Meningkatnya biaya proyek seringkali diakibatkan oleh proses pendistribusian CPO yang tidak optimal. Metode yang digunakan untuk menyelesaikan masalah pengoptimalan distribusi adalah Vogel's Approximation Method dan Russel Approximation Method untuk menentukan solusi awal dan uji keoptimalan menggunakan metode Stepping Stone. Dari hasil perhitungan metode Vogel's Approximation Method untuk penyelesaian awal dan dilanjutkan dengan menggunakan*

*Corresponding author at: Mathematics Department, Faculty of Mathematics and Natural Science, Universitas Sumatera Utara, Medan 20155, Indonesia

E-mail address: nadiapratiwi834@gmail.com, rosman@usu.ac.id

e-ISSN: xxxx-xxxx | DOI: xx.xxxxx/jomte.vxxx
Journal Homepage: https://talenta.usu.ac.id/jomte

Stepping Stone Method merupakan metode yang memberikan hasil optimal. Untuk penyelesaian akhir didapat biaya minimum sebesar Rp. 34.417.014.501.

Kata Kunci: *Vogel's Approximation Method, Russsel Approximation Method, Stepping Stone, Optimasi Biaya Distribusi, Crude Palm Oil*

Received 19 Oct 2021 | Revised 22 Oct 2021 | Accepted 15 Nov 2021

1 Introduction

Transportation problems are problems that are often faced by every company in the distribution of goods. In distributing goods, of course, the company will incur significant transportation costs. To stay afloat in the face of its competitors, companies need a way to determine the distribution of goods from source to destination so that all the needs of each goal are met so that the company gets maximum profit [1].

In distributing Crude Palm Oil (CPO) to several destinations requires transportation costs that are not small in number because of the distance and conditions between different locations, then PT. Perkebunan Nusantara III requires a strategy to minimize transportation costs incurred by the company.

The transportation method is a method used in the distribution of sources that provide the same product to destinations optimally [2]. The allocation of this product must be arranged in such a way, because there are differences in the allocation costs from one source to a destination. There are several transportation methods that can be used to solve transportation problems including the completion of the initial solution, namely the North West Corner, Least Cost, Russel Approximation Method (RAM) and Vogel's Approximation Method (VAM) methods. The optimal solution is the Stepping Stone method and the Modified Distribution (MODI) method.

2 Literature review

2.1 Transportation Method

The method of transportation is a method used in the distribution of an item from sources to destinations optimally. The transportation problem was first formulated as a special procedure to obtain a minimum cost program in distributing homogeneous units of a product over a number of supply points (sources) to a number of demand points (destinations). All are placed at geographically different sources and destinations [3].

The specific characteristics of the transportation problem are [4]:

1. There are a number of sources and a certain number of destinations.

2. The quantity of commodities or goods distributed from each source and demanded by each destination is a certain magnitude.

3. Commodities sent or transported from a source to a destination are in accordance with the demand or capacity of the source.

4. The cost of transporting commodities from a source to a destination is of a certain magnitude.

Mathematically the transportation problem can be formulated as follows:

$$\text{Minimalize } Z = \sum_{i=1}^{m} \sum_{j=1}^{n} c_{ij} x_{ij} \tag{1}$$

With obstacles :

$$\sum_{j=1}^{n} x_{ij} = a_i \qquad for\ i = 1, 2, 3, \dots, m \qquad \text{(Stock Obstacles)} \tag{2}$$

$$\sum_{i=1}^{m} x_{ij} = b_j \qquad for\ j = 1, 2, 3, \dots, n \qquad \text{(Demand Obstacles)} \tag{3}$$

Keterangan:

m = the place of origin of the goods transported

n = place of delivery of goods

x_{ij} = units sent from source *i* to destination *j*

c_{ij} = cost per unit from source *i* to destination *j*

a_i = supply capacity from source *i*

b_i = demand capacity from source *j*

i = $1, 2, \dots, m$

j = $1, 2, \dots, n$

2.2 Balanced Transportation

In the transportation model, if the total supply (supply) is equal to the total demand (demand), it is called a balanced transportation model. If the amount of available inventory is greater or less than the amount of demand, it is called an unbalanced model. The unbalanced transportation model must be balanced by adding dummy variable columns or dummy rows to balance supply and demand. The transportation cost for each column or row is IDR 0.

2.3 Vogel's Approximation Method

The Vogel's Approximation method is a method that allocates by minimizing the opportunity cost in selecting boxes for an allocation. The steps for Vogel's Approximation Method are as follows:

1. Calculate the opportunity cost for each row and column. The opportunity cost for each row i is calculated by subtracting the smallest $\boldsymbol{c_{ij}}$ value in that row from the $\boldsymbol{c_{ij}}$ value one level larger in the same row. The opportunity cost column is obtained in a similar way. These fees are a penalty for not selecting the box with the minimum cost.

2. Select the row or column with the largest opportunity cost (if there are twin values, choose arbitrarily). Allocate as much as possible to the box with the minimum c_{ij} value in the selected row or column.
3. Adjust supply and demand to show allocations made. Eliminate all rows and columns where supply and demand has been exhausted.
4. If all supply and demand have not been met, go back to step 1 and calculate the new opportunity cost again.
5. The process is continued in the same way until all requests are fulfilled.

2.4 Russell Approximation Method

The RAM method is a method whose allocation starts by determining the value for each row that is still possible to be allocated and the value for each column that may be allocated. The steps of the Russell Approximation Method are as follows:

1. Determines the highest distribution cost c_{ij} for each row and column.
2. Then calculate the difference in distribution costs of each cell with the formula $\Delta C_{ij} = C_{ij} - u_i - v_j$.
3. Then the value is calculated for each cell that is allocated by selecting the cell with the largest negative value and making the allocation to that cell.
4. The process is continued in the same way until all requests are fulfilled.

2.5 Stepping Stone Method

Stepping stone method or stepping stone method which is a follow-up step from the initial solution method to get the optimal solution. The Stepping stone method changes the product allocation to get the optimal allocation using trial and error or trial and error. The steps of the Stepping Stone Method are as follows:

1. Select an unused blank cell that you want to evaluate.
2. Find the closest path (horizontal and vertical movement only) of this unused rectangle through the quadrilateral's footing back to the original unused rectangle. There is only one closest path for each unused cell in a given solution. Although we can use stepping stone paths or unused cells arbitrarily, the closest paths are only the cells we use as stepping stones and unused cells that are judged.
3. The plus sign (+) and minus (-) appear alternately at each corner of the cell from the nearest path, starting with a plus sign in an empty cell. Mark the rotation clockwise or vice versa.
4. Add up the unit costs in a rectangle with a plus sign as a sign of additional costs. The cost reduction is obtained by adding up the unit costs in each negative cell.

5. Repeat steps 1 to 4 for other blank cells, and compare the evaluation results of these blank cells. Choose the most negative evaluation value (meaning the greatest cost reduction), if there is no negative value in the empty cell evaluation, it means that the solution is optimal.
6. Change the path to the selected cells by allocating the smallest number of units from the cells marked with minus and adding them to cells marked with plus.
7. **Repeat** steps 1 s / d 6 until an index of improvement or evaluation of empty cells has no negative value is obtained.

3 Result and Discussion

3.1 Data collection

In distributing CPO from each POM to the company at PT. Perkebunan Nusantara III Medan, the data is made into a transportation table which can be seen in Table 1.

Table 1 Transportation table PT. Perkebunan Nusantara III

Tujuan / Sumber	ASK	WINA	SDS	IBP	INL	IMT	PII	NPO	ST	PPI	BEST	MNA	**Persediaan**
PSMTI	178	178	178	178	211,1	178	178	178	500	500	500	500	19.534.310
PSDAN	195	195	195	195	208	195	195	195	500	500	500	500	17.278.840
PTORA	167	167	167	167	203,28	167	167	500	354,82	354,82	500	500	23.633.210
PSBAR	160	160	160	160	204,85	160	500	160	361,46	361,46	500	256,65	15.123.803
PPARO	500	206,61	206,61	500	201,71	206,61	500	500	356,39	500	500	500	11.562.850
PATOR	188	188	188	188	171,38	188	500	500	352,8	352,8	352,8	251,25	22.212.590
PSSUT	500	500	500	500	157,53	159,1	500	500	257,25	257,25	257,25	204,62	21.298.575
PARAS	500	500	500	500	151.88	500	500	500	214,27	214,27	214,27	191,52	19.115.440
PSSIL	500	500	500	500	93,1	500	500	500	148,09	148,09	148,09	102,97	22.852.330
PSMKI	500	500	500	500	28,86	500	500	500	500	108	500	74,33	30.692.850
KRBTN	500	500	500	500	87,25	500	500	500	500	97	500	68,04	15.923.323
PHPSG	310,29	500	500	500	310	500	500	500	500	500	311	500	13.516.797
Permintaan	4.091.890	14.969.060	11.979.920	19.484.700	149.774.338	4.992.750	2.994.980	1.998.340	3.992.510	3.493.720	2.496.030	12.476.680	232.744.918

3.2 Initial Solution Completion with VAM

The Vogel's Approximation method is done by calculating the opportunity cost for each row or column. The following is a table of the results of the completion of the VAM method which can be seen in Table 2.

Table 2 Results of Settlement with the VAM Method

Sumber \ Tujuan	ASK	WINA	SDS	IBP	INL	IMT	PII	NPO	ST	PPI	BEST	MNA	Persediaan
PSMTI	178	178	178	178	211,1	178	178	178	500	500	500	500	19.534.310
	4.091.890	-	7.676.667	-	-	4.992.750	2.773.003	-	-	-	-	-	
PSDAN	195	195	195	195	208	195	195	195	500	500	500	500	17.278.840
	-	-	-	-	15.058.523	-	221.977	1.998.340	-	-	-	-	
PTORA	167	167	167	167	203,28	167	167	500	354,82	354,82	500	500	23.633.210
	-	14.969.060	4.303.253	4.360.897	-	-	-	-	-	-	-	-	
PSBAR	160	160	160	160	204,85	160	500	160	361,46	361,46	500	256,65	15.123.803
	-	-	-	15.123.803	-	-	-	-	-	-	-	-	
PPARO	500	206,61	206,61	500	201,71	206,6	500	500	356,39	500	500	500	11.562.850
	-	-	-	-	11.562.850	-	-	-	-	-	-	-	
PATOR	188	188	188	188	171,38	188	500	500	352,8	352,8	352,8	251,25	22.212.590
	-	-	-	-	22.212.590	-	-	-	-	-	-	-	
PSSUT	500	500	500	500	157,53	159,1	500	500	257,25	257,25	257,25	204,62	21.298.575
	-	-	-	-	21.298.575	-	-	-	-	-	-	-	
PARAS	500	500	500	500	151.88	500	500	500	214,27	214,27	214,27	191,52	19.115.440
	-	-	-	-	19.115.440	-	-	-	-	-	-	-	
PSSIL	500	500	500	500	93,1	500	500	500	148,09	148,09	148,09	102,97	22.852.330
	-	-	-	-	16.316.713	-	-	-	3.992.510	-	2.496.030	47.077	
PSMKI	500	500	500	500	28,86	500	500	500	500	108	500	74,33	30.692.850
	-	-	-	-	30.692.850	-	-	-	-	-	-	-	
KRBTN	500	500	500	500	87,25	500	500	500	500	97	500	68,04	15.923.323
	-	-	-	-	-	-	-	-	-	3.493.720	-	12.429.603	
PHPSG	310,29	500	500	500	310	500	500	500	500	500	311	500	13.516.797
	-	-	-	-	13.516.797	-	-	-	-	-	-	-	
Permintaan	4.091.890	14.969.060	11.979.920	19.484.700	149.774.338	4.992.750	2.994.980	1.998.340	3.992.510	3.493.720	2.496.030	12.476.680	232.744.918

According to Table 2, total transportation cost is:

$$Z = (178 \times 4.091.890) + (178 \times 7.676.667) + (178 \times 4.992.750) + (178 \times 2.773.003) + (208 \times 15.058.532) + (195 \times 221.977) + (195 \times 1.998.340) + (167 \times 14.969.060) + (167 \times 4.303.253) + (167 \times 4.360.897) + (160 \times 15.123.803) + (201,71 \times 11.562.850) + (171,38 \times 22.212.590) + (157,53 \times 21.298.575) + (151,88 \times 19.115.440) + (93,10 \times 16.316.713) + (148,09 \times 3.992.510) + (148,09 \times 2.496.030) + (102,97 \times 47.077) + (28,86 \times 30.692.850) + (97 \times 3.493.720) + (68,04 \times 12.429.603) + (310 \times 13.516.797)$$

$$Z = 34.551.775.160$$

3.3 Optimal Solution Solution with Stepping Stone Method

Based on the results table, the initial solution using the VAM method was followed by an optimality test using the Stepping Stone method. The following is a table of the final results using the Stepping Stone method, which can be seen in Table 3.

Table 3 Table of Completion with the Stepping Stone Method

Sumber \ Tujuan	ASK	WINA	SDS	IBP	INL	IMT	PII	NPO	ST	PPI	BEST	MNA	Persediaan
PSMTI	178 4.091.890	178 -	178 7.676.667	178 -	211,1 -	178 4.992.750	178 2.773.003	178 -	500 -	500 -	500 -	500 -	19.534.310
PSDAN	195 -	195 -	195 -	195 -	208 15.058.523	195 -	195 221.977	195 1.998.340	500 -	500 -	500 -	500 -	17.278.840
PTORA	167 -	167 14.969.060	167 4.303.253	167 4.360.897	203,28 -	167 -	167 -	500 -	354,82 -	354,82 -	500 -	500 -	23.633.210
PSBAR	160 -	160 -	160 -	160 15.123.803	204,85 -	160 -	500 -	160 -	361,46 -	361,46 -	500 -	256,65 -	15.123.803
PPARO	500 -	206,61 -	206,61 -	500 -	201,71 11.562.850	206,61 -	500 -	500 -	356,39 -	500 -	500 -	500 -	11.562.850
PATOR	188 -	188 -	188 -	188 -	171,38 22.212.590	188 -	500 -	500 -	352,8 -	352,8 -	352,8 -	251,25 -	22.212.590
PSSUT	500 -	500 -	500 -	500 -	157,53 21.298.575	159,1 -	500 -	500 -	257,25 -	257,25 -	257,25 -	204,62 -	21.298.575
PARAS	500 -	500 -	500 -	500 -	151.88 19.115.440	500 -	500 -	500 -	214,27 -	214,27 -	214,27 -	191,52 -	19.115.440
PSSIL	500 -	500 -	500 -	500 -	93,1 18.812.743	500 -	500 -	500 -	148,09 3.992.510	148,09 -	148,09 -	102,97 47.077	22.852.330
PSMKI	500 -	500 -	500 -	500 -	28,86 30.692.850	500 -	500 -	500 -	500 -	108 -	500 -	74,33 -	30.692.850
KRBTN	500 -	500 -	500 -	500 -	87,25 -	500 -	500 -	500 -	500 -	97 3.493.720	500 -	68,04 12.429.603	15.923.323
PHPSG	310,29 -	500 -	500 -	500 -	310 11.020.767	500 -	500 -	500 -	500 -	500 -	311 2.496.030	500 -	13.516.797
Permintaan	4.091.890	14.969.060	11.979.920	19.484.700	149.774.338	4.992.750	2.994.980	1.998.340	3.992.510	3.493.720	2.496.030	12.476.680	232.744.918

According to Table 3 using Stepping Stone method, total transportation cost is:

$$Z = (178 \times 4.091.890) + (178 \times 7.676.667) + (178 \times 4.992.750) + (178 \times 2.773.003) + (208 \times 15.058.532) + (195 \times 221.977) + (195 \times 1.998.340) + (167 \times 14.969.060) + (167 \times 4.303.253) + (167 \times 4.360.897) + (160 \times 15.123.803) + (201{,}71 \times 11.562.850) + (171{,}38 \times 22.212.590) + (157{,}53 \times 21.298.575) + (151{,}88 \times 19.115.440) + (93{,}10 \times 18.812.743) + (148{,}09 \times 3.992.510) + (102{,}97 \times 47.077) + (28{,}86 \times 30.692.850) + (97 \times 3.493.720) + (68{,}04 \times 12.429.603) + (310 \times 13.516.797) + (311 \times 2.496.030)$$

$$Z = 34.417.014.501$$

3.4 Initial Solution Completion with RAM

The RAM method is done by calculating the difference between the highest distribution costs for each row and column. The following is a table of the results of the completion of the RAM method can be seen in Table 4.

Table 4 Table of Solutions with the RAM Method

Tujuan / Sumber	ASK	WINA	SDS	IBP	INL	IMT	PII	NPO	ST	PPI	BEST	MNA	Persediaan
PSMTI	178 4.091.890	178	178 7.676.667	178	211,1 2.772.433	178	178 2.994.980	178 1.998.340	500	500	500	500	19.534.310
PSDAN	195	195	195	195	208 17.278.840	195	195	195	500	500	500	500	17.278.840
PTORA	167	167	167 4.148.510	167 19.484.700	203,28	167	167	500	354,82	354,82	500	500	23.633.210
PSBAR	160	160 14.969.060	160 154.743	160	204,85	160	500	160	361,46	361,46	500	256,65	15.123.803
PPARO	500	206,61	206,61	500	201,71 11.562.850	206,61	500	500	356,39	500	500	500	11.562.850
PATOR	188	188	188	188	171,38 22.212.590	188	500	500	352,8	352,8	352,8	251,25	22.212.590
PSSUT	500	500	500	500	157,53 16.305.825	159,1 4.992.750	500	500	257,25	257,25	257,25	204,62	21.298.575
PARAS	500	500	500	500	151.88 19.115.440	500	500	500	214,27	214,27	214,27	191,52	19.115.440
PSSIL	500	500	500	500	93,1 16.363.790	500	500	500	148,09 3.992.510	148,09	148,09 2.496.030	102,97	22.852.330
PSMKI	500	500	500	500	28,86 30.645.773	500	500	500	500	108 47.077	500	74,33	30.692.850
KRBTN	500	500	500	500	87,25	500	500	500	500	97 3.446.643	500	68,04 12.476.680	15.923.323
PHPSG	310,29	500	500	500	310 13.516.797	500	500	500	500	500	311	500	13.516.797
Permintaan	4.091.890	14.969.060	11.979.920	19.484.700	149.774.338	4.992.750	2.994.980	1.998.340	3.992.510	3.493.720	2.496.030	12.476.680	232.744.918

According to Table 4, total transportation cost is:

$$Z = (178 \times 4.091.890) + (178 \times 7.676.667) + (211{,}1 \times 2.772.433) + (178 \times 2.994.980) + (178 \times 1.998.340) + (208 \times 17.278840) + (167 \times 4.148.510) + (167 \times 19.484.700) + (160 \times 14.969.060) + (160 \times 154.743) + (201{,}71 \times 11.562.850) + (171{,}38 \times 22.212.590) + (157{,}53 \times 16.305.825) + (157{,}53 \times 4.992.750) + (151{,}88 \times 19.115.440) + (93{,}10 \times 16.363.790) + (148{,}09 \times 3.992.510) + (148{,}09 \times 2.496.030) + (108 \times 47.077) + (28{,}86 \times 30.645.773) + (97 \times 3.446.643) + (68{,}04 \times 12.476.680) + (310 \times 13.516.797)$$

$$Z = 34.682.143.105$$

3.5 Optimal Solution with Stepping Stone Method

Based on the results table, the initial solution using the RAM method is followed by an optimality test using the Stepping Stone method. The following is a table of the final results using the Stepping Stone method, which can be seen in Table 5.

Table 5 Table of Completion with the Stepping Stone Method

Tujuan / Sumber	ASK	WINA	SDS	IBP	INL	IMT	PII	NPO	ST	PPI	BEST	MNA	**Persediaan**
PSMTI	178 4.091.890	178 -	178 7.676.667	178 -	211,1 -	178 2.772.433	178 2.994.980	178 1.998.340	500 -	500 -	500 -	500 -	19.534.310
PSDAN	195 -	195 -	195 -	195 -	- 208 15.058.523	195 2.220.317	195 -	195 -	500 -	500 -	500 -	500 -	17.278.840
PTORA	167 -	167 -	167 4.148.510	167 19.484.700	203,28 -	167 -	167 -	500 -	354,82 -	354,82 -	500 -	500 -	23.633.210
PSBAR	160 -	160 14.969.060	160 154.743	160 -	204,85 -	160 -	500 -	160 -	361,46 -	361,46 -	500 -	256,65 -	15.123.803
PPARO	500 -	206,61 -	206,61 -	500 -	201,71 11.562.850	206,61 -	500 -	500 -	356,39 -	500 -	500 -	500 -	11.562.850
PATOR	188 -	188 -	188 -	188 -	171,38 22.212.590	188 -	500 -	500 -	352,8 -	352,8 -	352,8 -	251,25 -	22.212.590
PSSUT	500 -	500 -	500 -	500 -	157,53 21.298.575	159,1 -	500 -	500 -	257,25 -	257,25 -	257,25 -	204,62 -	21.298.575
PARAS	500 -	500 -	500 -	500 -	151.88 19.115.440	500 -	500 -	500 -	214,27 -	214,27 -	214,27 -	191,52 -	19.115.440
PSSIL	500 -	500 -	500 -	500 -	93,1 18.859.820	500 -	500 -	500 -	148,09 3.992.510	148,09 -	148,09 -	102,97 -	22.852.330
PSMKI	500 -	500 -	500 -	500 -	28,86 30.645.773	500 -	500 -	500 -	500 -	108 47.077	500 -	74,33 -	30.692.850
KRBTN	500 -	500 -	500 -	500 -	87,25 -	500 -	500 -	500 -	500 -	97 3.446.643	500 -	68,04 12.476.680	15.923.323
PHPSG	310,29 -	500 -	500 -	500 -	310 11.020.767	500 -	500 -	500 -	500 -	500 -	311 2.496.030	500 -	13.516.797
Permintaan	4.091.890	14.969.060	11.979.920	19.484.700	149.774.338	4.992.750	2.994.980	1.998.340	3.992.510	3.493.720	2.496.030	12.476.680	232.744.918

According to Table 5 using Stepping Stone method, total transportation cost is:

$$Z = (178 \times 4.091.890) + (178 \times 7.676.667) + (178 \times 2.772.433) + (178 \times 2.994.980) + (178 \times 1.998.340) + (208 \times 15.058.523) + (195 \times 2.220.317) + (167 \times 4.148.510) + (167 \times 19.484.700) + (160 \times 14.969.060) + (160 \times 154.743) + (201{,}71 \times 11.562.850) + (171{,}38 \times 22.212.590) + (157{,}53 \times 21.298.575) + (151{,}88 \times 19.115.440) + (93{,}10 \times 18.859.820) + (148{,}09 \times 3.992.510) + (28{,}86 \times 30.645.773) + (108 \times 47.077) + (97 \times 3.446.643) + (68{,}04 \times 12.476.680) + (310 \times 11.020.767) + (311 \times 2.496.030)$$

$$Z = 34.418.912.175$$

4 Conclusion

From the results of the discussion of the total transportation costs obtained for the initial solution using the VAM method of Rp. 34,551,775,160 and the RAM method of Rp. 34,682,143,105, it can be concluded that the VAM method is the right method for the initial solution because it produces minimum costs compared to the RAM method. . Based on the optimality test using the Stepping Stone method from the initial solution with the Vogel's Approximation method, the results of transportation costs are Rp. 34,417,014,501 and for the initial solution with the Russel Approximation method, the results of transportation costs are Rp. 34,418,912,175.

The results of the CPO distribution costs carried out by PTPN III in 2019 amounted to Rp. 36,470,751,747. While the research results obtained after using the VAM - Stepping Stone method obtained a transportation cost of Rp. 34,417.014,501 and by using the RAM - Stepping Stone method, the transportation cost was Rp. 34,418,912,175. So it can be seen that using the

VAM - Stepping Stone method is more efficient because the company has decreased transportation costs by 5.631% with a difference of Rp. 2,053,737,246.

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