

OPTIMALISASI PENDAPATAN PETANI PADI SAWAH LAHAN SEMPIT SELAMA PANDEMI COVID-19 DI KECAMATAN BUAYMADANG TIMUR

OPTIMIZATION OF THE INCOME OF RICE PADDY FARMERS OF NARROW FIELDS DURING THE COVID-19 PANDEMIC IN THE EAST BUAYMADANG SUBDISTRICT

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ABSTRAK

Tujuan penelitian ini adalah untuk menganalisis besarnya pendapatan melalui diversifikasi usaha serta skenario-skenario peningkatan pendapatan dalam diversifikasi usaha pada saat pandemi Covid-19. Metode penelitian yang digunakan adalah Metode penelitian yang digunakan adalah metode survey, metode penarikan contoh yang digunakan *snowball* serta penetapan jumlah responden yang dilakukan dengan *purposive sampling* dengan jumlah responden sebanyak 100 responden. Hasil penelitian menunjukkan bahwa besaran optimalisasi pendapatan petani padi sawah lahan sempit pada saat pandemit Covid-19 pada diversifikasi usaha 1 Rp. 29.130.500, diversifikasi usaha 2 Rp.19.007.006,299, diversifikasi usaha 3 Rp. 8.301.257,485, diversifikasi usaha 4 Rp. 14.877.500. Besaran pendapatan petani setelah dilakukan skenario-skenario pada diversifikasi usaha 1 ,dilakukan dengan penambahan modal sebesar Rp. 1.870.000 sehingga akan diperoleh hasil alokasi optimal peningkatan pendapatan sebesar Rp. 2.871.644.888 atau 9,86 %. diversifikasi usaha 2 dilakukan dengan penambahan modal sebesar Rp. 750.000 dan pengurangan tenaga kerja sebanyak 5 JOK sehingga akan diperoleh hasil alokasi optimal peningkatan pendapatan sebesar Rp. 1.472.001,575 atau 7,74 %. Pada diversifikasi usaha 3 ,dilakukan dengan penambahan modal sebesar Rp. 370.000 dan penambahan tenaga kerja sebanyak 4 JOK sehingga akan diperoleh hasil alokasi optimal peningkatan pendapatan sebesar Rp. 978.173,653 atau 11,78 %. Pada diversifikasi usaha 4 ,dilakukan dengan penambahan luas lahan sebesar 0,25 sehingga menjadi 1 hektar dan penambahan modal sebanyak Rp.500.000 sehingga akan diperoleh hasil alokasi optimal peningkatan pendapatan sebesar Rp. 733.061,37 atau 4,93.

Kata Kunci: Diversifikasi, Optimasi, Padi, Pendapatan, Sawah

ABSTRACT

The purpose of this study is to analyze the amount of income through business diversification as well as scenarios for increasing income in business diversification during the Covid-19 pandemic. The research method used is the survey method, the sampling method used is a snowball and the determination of the number of respondents is carried out by purposive sampling with a total of 100 respondents. The results of the study show that the amount of optimization of the income of lowland rice farmers during the Covid-19 pandemic at a business diversification of 1 Rp. 29,130,500, business diversification 2 Rp. 19,007,006,299, business diversification 3 Rp. 8,301,257,485, business diversification 4 Rp. 14,877,500. The amount of farmer's income after the scenarios for business diversification 1 is carried out

with additional capital of Rp. 1,870,000 so that the optimal allocation result will be an increase in income of Rp. 2,871,644,888 or 9.86%. business diversification 2 is carried out with additional capital of Rp. 750,000 and a reduction of the workforce by 5 JOK so that the optimal allocation result will be an increase in income of Rp. 1,472,001,575 or 7.74%. Business diversification 3, it is carried out with additional capital of Rp. 370,000 and the addition of 4 JOK workers so that the optimal allocation result will be an increase in income of Rp. 978,173,653 or 11.78%. In business diversification 4, it is carried out by increasing the land area by 0.25 so that it becomes 1 hectare and increasing capital by Rp. 500,000 so that the optimal allocation of income increases by Rp. 733,061.37 or 4.93.

Keywords: *Diversification, Optimization, Rice, Income*

INTRODUCTION

Indonesia is a country with a fairly high vulnerability. One of the reasons is that the agricultural sector is a sector that is quite large in influencing this vulnerability (Nursan & Septiadi, 2020) In addition, the global condition is the COVID-19 pandemic which has resulted in an economic crisis (Septiadi & Joka, 2019);(Raphael Riemke de Campos Cesar Leao, Silvio Hamacher, 2011).

The COVID-19 pandemic has triggered problems, especially in agriculture, such as low community productivity and also external problems, namely in the form of market and climate aspects that are difficult for farmers to overcome. (Septiadi & Mundiayah, 2020);(Rozaki, 2020);(Ehsanullah et al., 2007). The existence of social distancing makes distribution hampered and product marketing stops, this has an impact on farmers' income, especially rice farmers. This reduces the welfare of farmers. For this reason, a mature strategic plan is needed to overcome problems and increase farmers' production and selling power (Septiadi et al., 2021);(Ye et al., 2020).

According to (Lestari, 2018) strategic efforts that must be made are using machinery and reducing labor wages this can reduce production costs which are quite large, increase the productivity of land to achieve more perfect land, and reduce losses due to loss of yields at harvest and make cooperation in the sale of production. Considering South Sumatra has an area of 87,421.24 km² and an agricultural area of 1,354,847 ha it is divided into 4 cities and 13 regencies. An agricultural sector is one sector that has a very important role in the economy in South Sumatra, this is because the agricultural sector is a job and a source of income for the community. According to the Central Statistics Agency (Habibatussolikhah et al., 2016), one of the business fields that play a role in South Sumatra's GRDP is business from the agricultural sector 16.06 percent (Ratmini & Atekan, 2020).

East OKU Regency, is the main central area of rice in South Sumatra Province and is a national food barn supported by technical irrigation. The area of rice paddy fields in 2019 was 638,198.79 ha with a production of 575,340.17 GKG and productivity of 62.24 percent, the highest in South Sumatra Province. Meanwhile, East Buaymadang District is an area of East OKU Regency with the highest contributor to rice production, considering that this area has a very good area of irrigated rice fields. But on the other hand, the research results (Munajat, 2015) show that tropical agriculture is an area that experiences a lot of fragmentation of paddy fields so that the existing land is narrow lands with an average of fewer than 0.5 hectares.

The data in the field shows that small land farmers continue to make changes to the sengon farming business because the land around them has been planted with sengon so that when farmers persist in sugarcane farming. This change continues to be made because their sugar cane will die and do not get results so they follow the change to sengon. When small land farmers switch to sengon farming, it is hoped that they will get better results with the narrow land they have. Small land farmers will continue to follow changes in sengon farming carried out by large land farmers because it is considered that the shift in sengon farming will be more profitable than staying in sugar cane farming which experiences price fluctuations every year and experiences the risk of loss. This statement is supported by the informant's statement, namely: "My land is only narrow, if there is no one track sugar cane, the result is at least 10 bunches with a yield of less than 1.5 million, the maintenance costs have not been deducted, fortunately sengon is 4 years and it can be 15 million"(Kernalis et al., 2019).

Even though East OKU Regency is the capital city of South Sumatra, land fragmentation has occurred, with only 0.38 ha of available land per farmer. Rice farmers carry out their farming twice a year (IP 200), but the results obtained are still insufficient to meet the needs of the farmers. The implication of this shrinking land has an impact on decreasing the income of rice farmers so that farmers diversify their businesses to increase farmers income. (Rahmadi & Santosa, 2018) stated that Based on research and discussion, the social capital of small land farmers is fulfilling household livelihoods. Small land farmers take advantage of their social capital. With this social capital, smallholder rice farmers are can other income alternatives outside of farming activities, thereby reducing the difficulty of living to fulfill household livelihoods. Various income alternatives are carried out by rice farmers in Kolomayan Village to fulfill household income by utilizing their social capital such as raising livestock, taking debt, and working together on agricultural land. The capacity of farmers is influenced by the ability of agribusiness planning (Herawati et al., 2018).

During the Covid-19 pandemic, small-land rice farmers in Buaymadang District, Ogan Komering Ulu Timur Regency also experienced a significant impact in decreasing income due to restrictions on economic activities. This is in line with the findings (Rozaki, 2020), who concluded that the Covid-19 pandemic had a significant impact on all aspects of human life, including agriculture, as a result of government policies aimed at economic and non-economic development. As a result, one of the most important strategies is business diversification. d Next, press the Para button.

Recently, the findings of the (Obayelu et al., 2021) study in Nigeria, a developing country such as Indonesia, showed that the Covid-19 pandemic also experienced a surge in petitions and food support, leading to a decrease in the number of people living in poverty. The results of the (Sarip et al., 2020) also showed that the COVID-19 crisis caused a surge in economic activity that had not previously occurred for governments around the world, with certain sectors becoming more vulnerable to pandemics. The plight of small migrant farmers in India has shown fault lines not only in the economic sphere but also in the community. Pandemics have changed the status quo. Based on the description, this study analyzed the optimization of narrow land rice farmers' income through business diversification at the time of the Covid-19 pandemic and scenarios of increasing income in business diversification during the Covid-19 pandemic.

RESEARCH METHODOLOGY

This research was conducted from January to February 2021. The research was conducted in two villages, namely Genuksuran Village and Nambuhan Village.

Determination of the research location is done the purposive method based on certain criteria, namely where farmers are fragmented and currently the land they own is narrow.

The research method used is a survey method, in which the data collection instrument is a questionnaire. The sampling method used was the snowball sampling method and the determination of the number of respondents was carried out by purposive sampling with a total of 100 respondents.

The data was collected in the form of primary data and secondary data. Optimizing income with a business diversification pattern during the one to four covid-19 pandemics, data processing is carried out using the following formula Linear Programming with the help of the LINDO program computerization:

$$Z = \sum C_j \times X_j$$

Information :

Z = Purpose function

C_j = Objective function parameters to-j

X_j = Activity level to j n

Maximum Z = C₁X₁ + C₂X₂ ... + C_jX_j - + C_nX_n or Z = $\sum C_j X_j$ j=1

With a constraint:

$$a_{11}x_1 + a_{12}x_2 + \dots a_{1j}x_j + \dots a_{1n}x_n \leq b_1$$

$$a_{21}x_1 + a_{22}x_2 + \dots a_{2j}x_j + \dots a_{2n}x_n \leq b_2$$

$$a_{31}x_1 + a_{32}x_2 + \dots a_{3j}x_j + \dots a_{3n}x_n \leq b_3$$

$$\dots \dots \dots \dots \dots$$

$$\dots \dots \dots \dots \dots$$

$$a_{m1}x_1 + a_{m2}x_2 + \dots a_{mj}x_j + \dots a_{mn}x_n \leq b_m \text{ or } \sum_{j=1}^n a_{ij} X_j \leq b_i \text{ j=1}$$

Keterangan :

i = 1, 2, 3 ... m is the number of limiting factors

j = 1, 2, 3 ... n is the number of production activities

activity is not negative: x_j ≥ 0 for the whole j

Information :

Z = objective function which is farm income which is maximized

C = prices of production (C) and prices of inputs (-C)

x_j = production and consumption activities carried out by households farmer

a_{ij} =input coefficient of each production and consumption activity

b_{ij} =constraint value or available resource limit

RESULTS AND DISCUSSION

Optimizing the available resources is very important. Land area, labor and capital if able to be optimized can generate optimal income.

1. Optimal Income

Based on the results of the analysis with Linear Programming through computerization of optimal income, business diversification for each activity is obtained as in Table 1.

Activity	Optimal Income (Rp/th)
Business diversification 1	$Z = 29.130.500$
Business diversification 2	$Z = 19.007.006,299$
Business diversification 3	$Z = 8.301.257,485$
Business diversification 4	$Z = 14.877.500$

Based on Table 1. It shows that the highest income is in the rice-cucumber business diversification and the lowest is Padi-Kalang. If we look further, the income from business diversification that has been carried out by farmers a form of farmers strategy of narrow land in increasing income which is still far from the level of welfare, therefore farmers also still take advantage of their free time outside of farming to look for additional jobs, namely as farm laborers in other places. . These results are in line with research (Permata & Munajat, 2019), shows that small land farmers as a result of their fragmentation still have a lot of free time. This free time is used by farmers as farm laborers.

Identification of Linear Programming Model

Business diversification carried out by land farmers during the COVID-19 pandemic in East Buaymadang District consisted of several business diversification activities. To find out the optimum combination of these activities, it is necessary to do calculations using linear programming techniques using computer aids. The purpose of the linear programming arrangement is to maximize the income obtained by farmers by finding the optimum combination of business diversification carried out by farmers in East Buaymadang District. The results of the analysis of the linear equation programming model are as follows:

a. Business diversification 1 (Paddy-Cucumber)

$$Z = 9.831.500X_1 + 19.299.000X_2$$

C1	$0,375X_1 + 0,125X_2 \leq 0,5$	Land
C2	$3.200.000 X_1 + 11.500.000 \leq 14.700.000$	Capital
C3	$92X_1 + 15X_2 \leq 107$	Labor

b. Business diversification 2 (Paddy-Fish)

$$Z = 8.746.000X_1 + 10.297.000X_2$$

C1	$0,25X_1 + 0,125X_2 \leq 0,375$	Land
C2	$2.500.000 X_1 + 4.250.000 \leq 6.750.000$	Capital
C3	$90X_1 + 26X_2 \leq 115$	Modal

c. Business diversification 3 (Paddy- Kale)

$$Z = 5.629.500X_1 + 4.415.000X_2$$

$$\begin{array}{ll} C1 & 0,125X_1 + 0,10X_2 \leq 0,225 & \text{Land} \\ C2 & 1.470.000 X_1 + 1.670.000 \leq 3.140.000 & \text{Capital} \\ C3 & 31X_1 + 16X_2 \leq 47 & \text{Labor} \end{array}$$

d. Business diversification 4 (Paddy- mustard)

$$Z = 10.702.000X_1 + 4.175.500X_2$$

$$\begin{array}{ll} C1 & 0,25X_1 + 0,125X_2 \leq 0,375 & \text{Land} \\ C2 & 5.000.000 X_1 + 2.600.000 \leq 7.600.000 & \text{Capital} \\ C3 & 102X_1 + 11X_2 \leq 113 & \text{Labor} \end{array}$$

1. Optimal Business Pattern

Optimization analysis using linear programming consists of primal-dual analysis, and sensitivity analysis. Primal analysis shows a combination of types of businesses that can provide maximum income and dual analysis is an assessment of resource use by looking at the level of sensitivity to changes made (M et al., 2016).

a. Primal-Dual Analysis

Based on the results of data processing analysis with LINDO analysis, it shows that of the six types of existing business activities, only four business activities are selected types of business that can maximize profits with limited resources.

Table 2. Selected business activities in optimizing business patterns in Buaymadang District East

Activity	Types of crops	Variable	Value	Reduce Cost
Business diversification 1	Paddy	X1a	1,000	0,000
	Cucumber	X2a	1,000	0,000
Business diversification 2	Paddy	X1b	0,987	0,000
	Ikan	X2b	1,008	0,000
Business diversification 3	Paddy	X1c	0,000	3.323.307,485
	Kale	X2c	1,880	0,000
Business diversification 4	Paddy	X1d	1,000	0,000
	mustard	X2d	1,000	0,000

Based on Table 2. The suggested businesses to be cultivated by farmers in East Buaymadang District are in diversification 1, namely rice (X1a) and cucumber (X2a), in business diversification 2, namely rice (X1b) and fish (X2b), in business diversification 3, namely rice (X1c) and Kangkung (X2c), while in business diversification 4, namely Rice (X1d) and Sawi (X2d). Based on Table 2, shows that in business diversification 3 for the type of rice plant, it is a business that is not recommended or selected, this can be proven from the Reduce Cos value of 3,323,307,485, it can be interpreted that the cultivation of rice plants in diversification 3 will reduce the optimal profit obtained by 3,323,307,485.

Meanwhile, for the use of resources (Table 3), some resources are not used up and resources that are used up. Resources that are not used up in business diversification 1 are 0.340 hectares of land or 68 percent of the available land area. In business diversification, 2 resources that are not used up are 0.002 hectares of land or 0.89 percent of the available land

area, then capital resources of Rp. 3,555555555.556 or 52.67 percent of the total available capital and 64.09 JOK labor resources or 0.74 percent of the total available working people.

In business diversification 3 some resources are not used up, namely a land area of 0.037 hectares, then capital resources as much as Rp. 3,140,000, and a workforce of 16,916 JOK. In business diversification 4, some resources are not used up, namely capital as much as Rp. 2,060,784,314 and 80.846 JOK manpower resources.

Table 3. Use of resources for the optimal solution for smallholder farmers in East Buay Madang District. East OKU District. 2022

Activity	Obstacles	Available	Resource used/ fulfilled	Unused/ not fulfilled
Business diversification 1	Land	0,500	0,000	0,340
	Capital	14.700.000	No limit	0,000
	Labor	107	No limit	0,000
Business diversification 2	Land	0,375	No limit	0,002
	Capital	6.750.000	No limit	3.555.555,556
	Labor	115	1,000	73,706
Business diversification 3	Land	0,225	No limit	0,037
	Capital	3.140.000	1.765.625	3.140.000
	Labor	47	No limit	16,916
Business diversification 4	Land	0,750	No limit	0,000
	Capital	7.600.000	No limit	2.060.784,314
	Labor	113	0,000	80,846

Based on Table 3. for resources that are used up, it shows that if the resource is added by one unit, it will increase the income by the shadow price. In business diversification, 1 resource that is used up is an area of 0.50 hectares, which means that each additional unit of land will increase farmers' income by Rp. 13,113,214,058. Besides that, the resource that is used up is a workforce of 107 JOK, which means that each additional unit of labor will increase farmers' income by Rp. 1536.

In business diversification, the 2 resources that are used up are 115 JOK, which means that each additional unit of labor will increase farmers' income by Rp. 2,203, in addition to the capital of Rp. 6,750,000 which means that each additional unit of capital will increase the income of Rp. 35,993,701. For business diversification, 3 resources that are used up are capital of 3,140,000, which means that each additional capital of one unit will increase the income by Rp.2,644. Meanwhile, for business diversification, 4 resources that are used up are 113 workers, which means that each additional unit of labor will increase income by Rp. 1,466 besides that, the capital is 7,600,000, which means that each additional capital of one unit will increase the income of Rp. 33,052,807. According to (Gultom, 2018) that to optimize income, it is necessary to increase the area and reduce labor costs so that this research is in line with previous research studies.

Table 4. Shadow Price Resource use on the optimal allocation of smallholder farmers in East Buaymadang District. East OKU District. 2022

Activity	Obstacles	Resource	Slack/ Surplus	Shadow Price
Business diversification 1	C1a	Land (0,5 ha)	0,000	13.113.214,058
	C2a	Capital (Rp/0,5)	0,000	1,536
	C3a	Labor (JOK)	0,000	0,000
Business diversification 2	C1b	Land (0,375 ha)	0,000	0,000
	C2b	Capital (Rp/0,375)	0,000	2,203
	C3b	Labor (JOK)	0,000	35.993,701
Business diversification 3	C1c	Land (0,225 ha)	0,000	0,000
	C2c	Capital (Rp/0,225)	0,000	2.644
	C3c	Labor (JOK)	0,000	0,000
Business diversification 4	C1d	Land (0,5 ha)	0,000	0,000
	C2d	Capital (Rp/0,5)	0,000	1,466
	C3d	Labor (JOK)	0,000	33.052,807

The excess resources except for land and capital resources in diversification 1, capital and labor resources in diversification 2, capital resources in diversification 3, and capital and labor resources in diversification 4, these resources can be allocated to other uses so that they can contribute to farmers' income.

b. Sensitivity Analysis

Sensitivity analysis will provide information about how many changes (increase or decrease) in prices or activity costs are allowed so as not to change optimal results and how many changes (increase or decrease) the number of resources that are still allowed so that optimal results do not change.

Table 6. Sensitivity analysis of the resource objective function on the optimal allocation of land farmer narrow area in East Buaymadang District. East OKU District the year 2000

Aktivitas	Komoditi	Penurunan	Nilai Sekarang	Peningkatan
Business diversification 1	Paddy	5.370.156,522	9.831.500	No limit
	Cucumber	No limit	19.299.900	35.331.953,125
Business diversification 2	Paddy	6.057.058,824	8.746.000	No limit
	Ikan	2.526.622,222	102.977.000	14.868.200
Business diversification 3	Paddy	No limit	5.629.500	3.886.257.485
	Kale	639.541,837	4.415.000	No limit
Business diversification 4	Paddy	8.029.807,692	10.702.000	No limit
	mustard	1.154.137,255	4.175.500	5.565.040

Based on the results in Table 6, for business diversification 1 to 4 all business diversification can be increased from Rp. 3,886,257,485 until the limit is not determined as well as a decrease in income starting from Rp. 1154,137,255 to an indefinite limit.

Table 7. Sensitivity analysis of the right-hand side of the optimal allocation of smallholder farmers in East Buaymadang District. East OKU District 2022

Activities	Commodity	Impairment	Present Value	Increase
Business diversification 1	Land	0,160	0,500	0,500
	Capital	14.700.000	14.700.000	No limit
	Labor	107	107	No limit
Business diversification 2	Land	0,373	0,375	No limit
	Capital	3.194.444,444	6.750.000	No limit
	Labor	41,294	115	116
Business diversification 3	Land	0,188	0,225	No limit
	Capital	0,000	3.140.000	4.905.625
	Labor	30,984	47	No limit
Business diversification 4	Land	0,750	0,750	No limit
	Capital	5.539.215,686	7.600.000	No limit
	Labor	32,156	113	113

Based on the results in Table 7, the overused resource can be increased to an unspecified extent. In diversification 1 is capital and labor, diversification 2 island and capital, diversification 3 island and labor, while diversification 4 island and capital.

c. Optimal Business Diversification Scenario

After the data were analyzed primal-dual and sensitivity analysis so that the scenario that had to be done by rice farmers on narrow land with a pattern of farming diversification to obtain an optimal increase in income, in business diversification 1, it was carried out with additional capital of Rp. 1,870,000 so that the optimal allocation of income increases by Rp. 2,871,644,888 or 9.86%. In business diversification 2, the additional capital is Rp. 750,000, and a reduction of the workforce by 5 JOK so that the optimal allocation result will be an increase in income of Rp. 1,472,001,575 or 7.74%. Business diversification 3, it is carried out with additional capital of Rp. 370,000 and the addition of 4 JOK workers so that the optimal allocation result will be an increase in income of Rp. 978,173,653 or 11.78%.. In business diversification 4, it is done by increasing the land area by 0.25 so that it becomes 1 hectare and increasing capital by Rp. 500,000 so that the optimal allocation result will increase the income by Rp. 733,061.37 or 4.93. This is in line with research (Achmad, 2014) ;(Ristianingrum et al., 2016); (Odhiambo et al., 2021) which says that land optimization can be used as optimally as possible by combining capital and labor input factors so that the income obtained is maximized.

CONCLUSIONS AND POLICY SUGGESTIONS

Based on the results of the study, the following conclusions can be drawn:

1. The amount of optimization of the income of lowland rice farmers during the Covid-19 pandemic is:

- a. For business diversification 1 (Padi-Cucumber) $Z = 29,130,500$
- b. For business diversification 2 (Rice-Fish) $Z = 19,007,006,299$
- c. For business diversification 3 (rice-kangkung) $Z = 8,301,257,485$
- d. For business diversification 4 (Padi-Sawi) $Z = 14,877,500$

2. The amount of farmers' income after carrying out the scenarios on business diversification, namely:

- a. In business diversification 1, it is carried out with additional capital of Rp. 1,870,000 so that the optimal allocation result will be an increase in income of Rp. 2,871,644,888 or 9.86%.
- b. In business diversification 2, it is carried out with additional capital of Rp. 750,000 and a reduction of the workforce by 5 JOK so that the optimal allocation result will be an increase in income of Rp. 1,472,001,575 or 7.74%.
- c. Business diversification 3, it is carried out with additional capital of Rp. 370,000 and the addition of 4 JOK workers so that the optimal allocation result will be an increase in income of Rp. 978,173,653 or 11.78%.
- d. In business diversification 4, it is carried out by increasing the land area by 0.25 so that it becomes 1 hectare and increasing capital by Rp. 500,000 so that the optimal allocation of income increases by Rp. 733,061.37 or 4.93 In business diversification 2, it is carried out with additional capital of Rp. 750,000 and a reduction of the workforce by 5 JOK so that the optimal allocation result will be an increase in income of Rp. 1,472,001,575 or 7.74%.

The suggestions given based on the results of this study are as follows:

1. Farmers should be more selective in choosing the type of business diversification that will be sought to increase optimal income.
2. The allocation of costs should be improved by reducing excessive costs and shifting to increase the availability of costs that are the main constraint.

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