

EFFECTIVENESS OF THE OIL TO GAS FUEL CONVERSION PROGRAM FOR FISHERMEN IN PALEMBANG CITY

*Efektivitas Program Konversi Bahan Bakar Minyak ke Bahan Bakar Gas Bagi Nelayan di
Kota Palembang*

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ABSTRACT

The Oil to Gas Fuel Conversion Program aims to make it easier for fishermen to obtain fuel at affordable prices, hence they can increase their income. Program implementation is declared effective if it runs smoothly and produces the expected results. This research aims to analyze the effectiveness of the program, analyze the income of program recipients and non-program recipients, and analyze the relationship between program effectiveness and income. Interviews using questionnaires were conducted with research subjects, namely 51 members of the Joint Business Group who received the program and 30 members who did not receive the program. Data in the form of attitudes or opinions of program recipient respondents are analyzed based on the achievement of effectiveness scores, income data from two groups of respondents were analyzed based on the difference between two means tests, and the relationship between effectiveness and income was analyzed based on the Spearman rank correlation test. The research results showed that the program's effectiveness was 94.20% (very high). The t-count value of 4.816 is greater than the t-table of 1.994, indicating that there is a significant difference between the income of program recipients and non-program recipients. The relationship between program effectiveness and income is very weak and not significant, with a coefficient value of 0.032. The effectiveness of the program does not directly affect income, but the existence of the program increases fishing efforts and the income of program recipients.

Keywords: *Conversion; effectiveness; fishermen; gas fuel; Spearman Rank Correlation Test*

ABSTRAK

Program Konversi Bahan Bakar Minyak ke Bahan Bakar Gas bertujuan untuk memberikan kemudahan bagi nelayan dalam memperoleh bahan bakar dengan harga terjangkau sehingga dapat meningkatkan pendapatannya. Pelaksanaan program dinyatakan efektif apabila berjalan lancar dan memberikan hasil yang diharapkan. Penelitian ini bertujuan untuk menganalisis efektivitas program, menganalisis pendapatan penerima program dan non penerima program, serta menganalisis hubungan efektivitas program dengan pendapatan. Wawancara dengan menggunakan kuisioner dilakukan terhadap subyek penelitian yaitu 51 orang anggota Kelompok Usaha Bersama yang menerima program dan 30 orang anggota yang tidak menerima program. Data berupa sikap atau pendapat responden penerima program dianalisis berdasarkan capaian skor efektivitas, data pendapatan dua kelompok responden dianalisis berdasarkan uji beda dua rata-rata, dan hubungan efektivitas dengan pendapatan dianalisis berdasarkan uji korelasi rank spearman. Hasil penelitian

menunjukkan efektivitas program sebesar 94,20% (sangat tinggi). Nilai t-hitung sebesar 4,816 lebih besar dibandingkan dengan t-tabel sebesar 1,994 menunjukkan terdapat perbedaan yang signifikan antara pendapatan penerima program dan non penerima program. Hubungan efektivitas program dengan pendapatan sangat lemah dan tidak signifikan dengan nilai koefisien sebesar 0,032. Efektivitas program tidak mempengaruhi pendapatan secara langsung, namun adanya program meningkatkan upaya penangkapan ikan (*effort*) dan pendapatan penerima program.

Kata kunci: konversi; efektivitas; nelayan; bahan bakar gas; Uji Korelasi Rank Spearman.

INTRODUCTION

In the capture fisheries sector, fishermen often face difficulties in obtaining subsidised fuel oil. This is due to the long distances to fuel bases and the scarcity of fuel in the field. In addition, the increasingly high fuel costs make fishermen buy fuel in limited quantities and at high prices. According to Luhur & Sari (2017), expenditure on purchasing fuel is the largest cost component of all fishing operational costs in the small business sector, ranging between 40 and 60%. This will, of course, limit fishing activities carried out by fishermen, affecting fish catches and income.

Low income will impact fishermen's lives in meeting their daily needs. In general, fishermen are known as poor people because of limited capital, market access, a high population growth rate, a low level of education, and a low level of technology used. The government's role is vital in supporting the economic improvement of fishing communities. According to Novianto *et al.* (2022), providing government assistance can make it easier for fishermen to meet their needs for fishing activities.

The Ministry of Energy and Mineral Resources has implemented an Oil to Gas Fuel Conversion Program for fishermen to overcome problems related to fuel use on fishing vessels since 2016. This program is in the form of assisting with a starter package of Liquefied Petroleum Gas (LPG) intended for fishing vessels, often called an LPG converter kit package, namely a boat propulsion engine equipped with a series of additional equipment used to change the working system of an oil-fueled engine so that the working system can be adapted to use gas fuel (Wahyudi *et al.* 2019). This effort aims to shift fuel consumption to more economical and environmentally friendly LPG. By assisting, it is hoped that fishermen will not have difficulty obtaining fuel at an affordable price.

The distribution of LPG converter kit packages aims to increase the use of domestic natural gas. Palembang City is one of the districts or cities in Indonesia that is predicted to experience gas shortages and is focused on assisting. In 2022, the Ministry of Energy and Mineral Resources succeeded in distributing 551 LPG converter kit packages in Palembang City (KESDM 2023). Recipients of program assistance are fishermen who are members of the Joint Business Group and are actively involved in the entire aid distribution process.

A preliminary study of the Oil to Gas Fuel Conversion Program for fishermen was carried out by Wahyudi (2019) and Haderah (2019). Wahyudi's research (2019) was conducted to assess fishermen's perceptions of using LPG as fuel in boat engines, which obtained an average score of 53.19%, including the medium category. Meanwhile, Hadera (2019) conducted a study on fishermen's attitudes or responses to the Oil to Gas Fuel Conversion Program in Bone Regency and its challenges. Fishermen's attitudes and resistance are at a Good level. The program is considered successful because it can reduce operational costs. However, an obstacle was encountered, namely the emergence of social issues among fishermen due to the limited number of aid recipients, so it was not evenly distributed in all sub-districts.

No research evaluates the level of implementation or success of the Oil to Gas Fuel Conversion Program for fishermen or its impact on the income of program recipients, making research considered important to conduct. The program is considered effective if implementation in the field at each stage runs smoothly and fairly according to the program objectives and obtains the expected results. So it is necessary to carry out a careful program evaluation to determine the level of implementation or success of the program as a basis for making decisions and adopting policies for further program development. The achievement of program results can also be

seen physically in the income that program recipients obtain after utilizing the program. Program implementation can be said to be successful if there is an increase in the income of program recipients as beneficiaries. Nurman (2016) stated that to determine the level of success in implementing a program, it can be assessed based on the achievement of the objectives that have been set, so an assessment of the effectiveness of the program is needed. Therefore, this research was conducted to analyze the level of effectiveness of the Oil to Gas Fuel Conversion Program, analyze the income of Joint Business Group members who received the program and those who did not receive the program, and analyze the relationship between the effectiveness of the program and the income of program recipients. To achieve the research objectives, the CIPP (Context, Input, Process and Product) approach was carried out (Stufflebeam & Zhang 2017), mean difference test analysis, and Spearman Rank correlation test.

METHODS

The research was carried out from August to December 2023, in Kertapati District and Gandus District, Palembang City. Location determination was carried out purposively by considering the existence of research subjects, namely members of the Joint Business Group who received and did not receive the Oil to Gas Fuel Conversion Program. Whereas among the 8 sub-districts that received the program, the existence of the two groups of research subjects was only found in these two sub-districts.

Research procedure

The proportional stratified random sampling method was used to determine the respondents, which was determined according to Arikunto (2017). If the number of research subjects is less than 100, then the entire population can be used as a sample. However, if the number of subjects is more than 100, then about 10-15% or 15–25% can be taken. The total sample for this study was

81 people (25% of the total research population), consisting of 51 Joint Business Group members who received the program and 30 Joint Business Group members who did not. The distribution of samples in each subpopulation in this study can be seen in Table 1.

Research data includes primary data and secondary data. Primary data includes data on respondents' attitudes or opinions regarding the effectiveness of the program and respondents' income. Primary data was obtained from interviews with respondents using a questionnaire. The questionnaire contains an open-ended list of questions regarding the respondent's identity and income. Meanwhile, the questionnaire which contains a list of questions regarding the respondents' attitudes or opinions is closed, where alternative answers have been given with reference to the Likert scale parameters.

Secondary data collected is data on the population of Joint Business Group members who received the program and those who did not receive the program in the research sample area, as well as the results of scientific research relevant to the Oil to Gas Fuel Conversion Program. Secondary data was collected using the literature study method from relevant sources such as previous research results and agency reports related to the program.

Data analysis

1. Analysis of the effectiveness of the Oil to Gas Fuel Conversion Program

Assessment of the effectiveness of the Oil to Gas Fuel Conversion Program uses the CIPP (Context, Input, Process and Product) approach model (Stufflebeam & Zhang 2017). Evaluation using the CIPP approach will provide solution options for decision makers in solving problems. The list of questions in the questionnaire is designed in the form of a Likert scale with 4 available answer choices including Strongly Disagree (score 1), Disagree (score 2), Agree (score 3), and Strongly Agree (score 4).

Table 1 Sample distribution based on respondent type and engine power range

No	Subdistrict	Sample type	Engine power (HP)	Population	%	Sample
1	Kertapati	Program recipients	6,5	126	25	32
			9-13	27	25	7
		Non-program recipients	6,5	53	25	14
			9-13	9	25	3
2	Gandus	Program recipients	6,5	11	25	3
			9-13	33	25	9
		Non-program recipients	6,5	23	25	6
			9-13	27	25	7
Total				309		81

Source: Primary data processing results (2023)

The effectiveness of the Oil to Gas Fuel Conversion Program for Target Fishermen was analyzed descriptively by first measuring it using the effectiveness percentage formula:

$$\text{Effectiveness} = \frac{\text{Achievement score}}{\text{Expectation score}} \times 100\% \dots\dots(1)$$

Determining program effectiveness is carried out based on the interpretation categories of effectiveness achievement score based on Table 2.

2. Analysis of the income of Joint Business Group members who received the program and those who did not receive the Oil to Gas Fuel Conversion Program

Income data in the form of average production, price, receipts, costs, and income were analyzed descriptively for all respondents who were grouped based on the category of boat engine power owned by the respondents. To see the difference in income between Joint Business Group members who received the program and those who did not, a two-average difference test (t-count) was used, which was analyzed with the help of the SPSS application program.

The hypothesis tested is:

H₀ There is no difference between the income of Joint Business Group members who received the program and those who did not, in other words the Oil to Gas Conversion Program is not effective

H₁ There is a difference between the income of Joint Business Group members who received the program and those who did not, in other words the Oil to Gas Conversion Program is running effectively

Decision rule: Accept H₀ if t-count < t-table and Reject H₀ if t-count > t-table

Table 2 Categories of achievement scores for the effectiveness of the Oil to Gas Fuel Conversion Program

Category	Average Score	Achievement score(%)
Min-Max Interval	1.00-4.00 0.75	25.00-100.00
Low	1.00-1.74	25.00-43.75
Medium	1.75-2.49	43.76-62.55
High	2.50-3.24	62.56-81.35
Very high	3.25-4.00	81.36-100.00
Score range	1.00-4.00	25.00-100.00

Table 3 Level of correlation and strength of relationship

Correlation value (r)	Relationship level
0.00-0.199	Very weak
0.20-0.399	Weak
0.40-0.599	Medium
0.60-0.799	Strong
0.80-1.000	Very strong

Source : Sugiyono (2015)

The formula for the difference test between two means (t-count):

$$t = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\left(\frac{S_1^2}{n_1}\right) + \left(\frac{S_2^2}{n_2}\right)}} \dots\dots\dots(2)$$

\bar{X}_1 = Average income of Joint Business Group members who received the Oil to Gas Fuel Conversion Program (Rp/month)

X_2 = Average income of Joint Business Group members who did not receive the Oil to Gas Fuel Conversion Program (Rp/month)

$\bar{\mu}_1$ = Average income of the population of Joint Business Group members who received the Oil to Gas Fuel Conversion Program (Rp/month)

$\bar{\mu}_2$ = Average income of the population of Joint Business Group members who did not receive the Oil to Gas Fuel Conversion Program (Rp/month)

n_1 = Number of samples of Joint Business Group members who received the Oil to Gas Fuel Conversion Program (people)

n_2 = Number of samples of Joint Business Group members who did not receive the Oil to Gas Fuel Conversion Program (people)

S_1^2 = Variety of income of Joint Business Group members who received the Oil to Gas Fuel Conversion Program (Rp/month)

S_2^2 = Variety of income of Joint Business Group members who did not receive the Oil to Gas Fuel Conversion Program (Rp/month)

3. Analysis of the relationship between program effectiveness and the income of Joint Business Group members who received the Oil to Gas Fuel Conversion Program

To determine the relationship between the effectiveness of the program and the income of Joint Business Group members who received the Oil to Gas Fuel Conversion Program, the Spearman Rank Correlation Test formula was used. The strength of the relationship is described by the coefficient value, which ranges from -1 to 1. Positive or negative values indicate the direction of the relationship between the variables. The level of strength of relationship is explained based on Table 3.

RESULTS

Effectiveness of the Oil to Gas Fuel Conversion Program

Context evaluation is intended to see the suitability of the situation and background that influences program planning from the perspective of the program recipient. In Table 4, the context dimension achieved an effectiveness achievement of 98.37 % which is classified as a very high category, where all indicators achieved a very high effectiveness achievement. Input evaluation is carried out to analyze the resources needed to achieve program objectives. The achievement of input dimension effectiveness of 92.48 % is considered very high. The spare parts facility indicator achieved high effectiveness, while the other 5 indicators, namely program budget, human resources, natural resources, supporting infrastructure and gas cylinder facilities achieved very high results. Process evaluation is carried out to identify weaknesses that often arise in the procedural design of a program and its implementation. A total of 8 indicators out of 10 indicators used in the process dimension, namely indicators of socialization, proposal, identification and verification, delivery of aid, target accuracy, suitability of the amount and specifications of aid, punctuality and utilization of aid achieved very high effectiveness. Meanwhile, engine servicing achieved medium and supervision indicators achieved high effectiveness. The assessment results show that the effectiveness of the process dimension is 92.89 % and is classified as very high. Product evaluation is carried out to evaluate the achievement of the objectives of a program that has been implemented. The product

dimension obtained an effectiveness achievement value of 96.94 % which is classified as very high, where all the indicators used achieved very high effectiveness achievements.

Thus, the Oil to Gas Fuel Conversion Program in Palembang City, viewed from the Context, Input, Process and Product dimensions, achieved an effectiveness of 94.20 % and was classified as very high.

Income analysis of Joint Business Group members who received the program and those who did not receive the program

Data on income of Joint Business Group members who received the program and those who did not receive the program in Palembang City in Table 5 shows that the average production, income and monthly income of Joint Business Group members who received the program is greater than those who did not receive the program, both overall and based on boat engine power categories 6.5 HP and 9-13 HP. Overall, the difference between the average production of Joint Business Group members who received the program and those who did not receive the program was 10.47 kg/month or 15.90% greater, the difference in revenue was IDR. 357,504/month or 16.50% greater and the income difference is IDR. 521,945/month or 35.37% greater. On the other hand, the average total costs and fuel costs incurred by Joint Business Group members who received the program are smaller than those who did not receive the program. The difference in total costs is IDR. 164,441/month or 23.80% more savings, and the difference in fuel costs is IDR. 150,255/month or more savings of 49.26%.

When compared according to engine power, it is known that the average production, revenue, costs and income of Joint Business Group members receiving the program with 9-13 HP boat engines is greater than Joint Business Group members receiving the program with 6.5 HP boat engines. The average difference in production is 9.23 kg/month or 12.57% greater, the difference in revenue is IDR. 817,039/month or 36.03% greater, the cost difference is Rp. 123,341/month or 25.29% greater, and the income difference is Rp. 693,698/month or greater 38.98%.

Meanwhile, the price obtained by Joint Business Group members who received the program who have a 6.5 HP boat engine is lower than those who did not receive the program, with a difference of Rp. 282,-. On the

other hand, the price obtained by Joint Business Group members who received the program who have 9-13 HP boat engines is higher than those who did not receive the program, with a difference of Rp. 1,283,-.

In Table 6, the results of the analysis of the difference test in the average income of Joint Business Group members who received the program and those who did not receive the program with a 6.5 HP boat engine, obtained a calculated t value of 4.022 which is greater than the t table (0.05/2); (53) 2.006 with a significance value of 0.000 < 0.05. Meanwhile, according to the ownerboat of a boat engine with a power of 9-13 HP, the results of the analysis of the average difference test obtained a calculated t value of 4.895 which is greater than the t table (0.05/2); (24) 2.064 with a significant value of 0.035 < 0.05. Overall, the results of the analysis of the difference in the average income of Joint Business Group members who received the program and those who did not receive the program obtained a calculated t value of 4.816 which was greater than the t table (0.05/2); (79) 1.994 with a significance value of 0.001 < 0.05.

The relationship between program effectiveness and the income of Joint Business Group members who received the program

In Table 7, it is known that the results of the correlation test of program effectiveness and the income of Joint Business Group members who received the program have a very weak and insignificant relationship with a correlation coefficient value of positive or in the same direction of 0.032. Partially, the process dimension and income have a fairly strong and significant relationship with a positive correlation coefficient of 0.400**.

Analysis of each dimension of effectiveness, it is known that the context dimension has a weak and significant relationship with a positive correlation coefficient value of $R_s = 0.351^*$; the input dimension has a strong and significant relationship with a positive correlation coefficient value $R_s = 0.684^{**}$; the process dimension has a fairly strong and significant relationship with a value of $R_s = 0.531^{**}$; and the product dimension has a fairly strong and significant relationship with a correlation coefficient value of $R_s = 0.533^{**}$.

Table 4 Effectiveness of the Oil to Gas Fuel Conversion Program in Palembang City from the dimensions of Context, Input, Process and Product

No	Indicator	Respondent's answer				Total Score	Average	Achievements (%)	Categories
		1	2	3	4				
Context Dimensions									
1	Program background	0	0	4	47	200	3.92	98.04	Very high
2	Program objectives	0	0	4	47	200	3.92	98.04	Very high
3	Program targets	0	0	2	49	202	3.96	99.02	Very high
	Total	0	0	10	143	602	3.93	98.37	Very high
Input Dimensions									
1	Program budget	0	0	4	47	200	3.92	98.04	Very high
2	Human Resources	0	0	0	51	204	4.00	100.00	Very high
3	Natural resources	0	0	0	51	204	4.00	100.00	Very high
4	Supporting infrastructure	0	6	13	32	179	3.51	87.75	Very high
5	Gas cylinder facilities	0	4	8	39	188	3.69	92.16	Very high
6	Spare parts facility	0	18	11	22	157	3.08	76.96	High
	Total	0	28	36	242	1,132	3.70	92.48	Very high
Process Dimensions									
1	Socialization	0	0	0	51	204	4.00	100.00	Very high
2	Proposal	0	0	0	51	204	4.00	100.00	Very high
3	Identification and verification	0	0	0	51	204	4.00	100.00	Very high
4	Delivery of aid	0	0	0	51	204	4.00	100.00	Very high
5	Target accuracy	0	0	0	51	204	4.00	100.00	Very high
6	Suitability of the amount and specifications of aid	0	0	0	51	204	4.00	100.00	Very high
7	Punctuality	0	0	7	44	197	3.86	96.57	Very high
8	Utilization of aid	0	0	0	51	204	4.00	100.00	Very high
9	Engine servicing	3	36	0	12	123	2.41	60.29	Medium
10	Supervision	0	28	1	22	147	2.88	72.06	High
	Total	3	64	8	435	1,895	3.72	92.89	Very high
Product Dimensions									
1	Energy security	0	0	6	45	198	3.88	97.06	Very high
2	Expenses	0	0	1	50	203	3.98	99.51	Very high
3	Income	0	0	7	44	197	3.86	96.57	Very high
4	Environment	0	0	11	40	193	3.78	94.61	Very high
	Total	0	0	25	179	791	3.88	96.94	Very high
	Total effectiveness					4,420	3.77	94.20	Very high

Source: Primary data processing results (2023)

Table 5 Income of Joint Business Group members who received the program and those who did not receive the program in Palembang City, Indonesia

No	Average	6.5 HP engine power		9-13 HP engine power		Total	
		Program recipients	Non-program recipients	Program recipients	Non-program recipients	Program recipients	Non-program recipients
1.	Production (kg/month)	73.40	63.64	82.63	70.23	76.30	65.83
2.	Price (Rp/kg)	30,890	31,172	37,328	36,045	33,077	32,905
3.	Revenue (Rp/month)	2,267,411	1,983,625	3,084,450	2,531,450	2,523,737	2,166,233
4.	Fixed Fee (Rp/month)	247,210	255,833	296,267	299,500	262,601	270,389
5.	Variable Costs (Rp/month)	240,466	382,610	314,750	496,050	263,771	420,423
	- Fuel costs	138,643	274,770	190,000	365,550	154,775	305,030
	- Cost of ice, provisions etc	101,823	107,840	124,750	130,500	109,016	115,393
5.	Total Cost (Rp/month)	487,676	638,443	611,017	795,550	526,371	690,812
6.	Income (Rp/month)	1,779,735	1,345,182	2,473,433	1,735,900	1,997,366	1,475,421

Source: Primary data processing results (2023)

Table 6 Analysis of the difference test in the average income of Joint Business Group members who received the program and those who did not receive the program in Palembang City, Indonesia

Engine power	Component	Program recipients	Non program recipients	Sig.	Sig (2-tailed)	t count
6,5 HP	Income	1779735.34	1345181.55	0.000	0.000	4.022
9 - 13 HP	Income	2473432.63	1735900.00	0.035	0.000	4.895
Total	Income	1997365.86	1475421.03	0.001	0.000	4.816

Source: Primary data processing results (2023)

Table 7 Correlation test results of program effectiveness with the income of Joint Business Group members who received the program in Palembang City, Indonesia

	Income		Effectiveness	
	Sig. (2-tailed)	Correlation coefficient	Sig. (2-tailed)	Correlation coefficient
Effectiveness	0.824	0.032	.	1.000
Context	0.533	-0.089	0.012	0.351*
Input	0.158	-0.201	< 0.001	0.684**
Process	0.004	0.400**	< 0.001	0.531**
Product	0.125	-0.218	< 0.001	0.533**
Pendapatan	.	1.000	0.824	0.032

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Source: Primary data processing results (2023)

DISCUSSION

Effectiveness of the Oil to Gas Fuel Conversion Program

In the context dimensions, the program background is considered to be very appropriate to the conditions and problems faced by Joint Business Group members as fishermen. According to Joint Business Group members who received the program, before receiving the starter pack of LPG converter kits, they often had difficulty getting fuel for going to sea due to its scarcity and perceived high prices. As small-scale fishermen, Joint

Business Group members really need fuel alternatives that are more economical and easier to obtain. The aim of the program in Presidential Regulation Number 38 of 2019 is to guarantee national energy security and improve the welfare of target fishermen. The goals and objectives of the program are considered to be very appropriate and able to answer the needs of Joint Business Group members who receive the program as fishermen. The assistance of LPG converter kits makes it easy for Joint Business Group members to obtain environmentally friendly fuel at affordable prices so that they can

increase their income. Overall, program implementation is assessed from background indicators, the program goals and objectives have been met and are running very effectively, as indicated by the conformity between actual conditions in the field and existing program policies. In accordance with the opinion of Agustiani *et al.* (2022), describing the program's environmental conditions helps determine its strengths and weaknesses in order to provide direction for necessary improvements. If everything has been fulfilled then a program can run effectively.

In the input dimensions, the results obtained from assessing the effectiveness of program budget indicators are in the very high category. This shows that the Oil to Gas Fuel Conversion Program has been implemented using the Ministry of Energy and Mineral Resources' budget based on an analysis of fishermen's needs. The Ministry of Energy and Mineral Resources, assisted by fisheries extension agents, identifies problems and needs of Joint Business Group members through regular group meetings. The proposed needs of Joint Business Group members were then accommodated by the Palembang City Fisheries Service to be submitted to the Ministry of Energy and Mineral Resources to be included in the following year's budget planning. Kandati *et al.* (2019) calls this approach an empowerment approach which emphasizes the flow from the bottom up. In this approach, the identification of community problems and needs is facilitated by the government in planning development programs.

The achievement of effectiveness in human resource and natural resource indicators was very high, indicating that all human resources involved and the natural resources around the Joint Business Group members locations supported the implementation of the program. The Oil to Gas Fuel Conversion Program is a program of the Ministry of Energy and Mineral Resources which in its implementation is assisted by fisheries extension agents and the Palembang City Fisheries Service involving all Joint Business Group members as program recipients. All human resources who are competent in their fields have collaborated and participated at every stage of program implementation. In terms of natural resources, the existence of rivers and the large number of swamp waters in the locations around program recipients are very suitable and

supportive for carrying out fishing activities using LPG converter kits.

In terms of supporting infrastructure indicators, most Joint Business Group members who received the program assess that LPG cylinder sales places (LPG agents or bases, stalls), service places and spare parts shops are easy to reach and are close to program recipients. Even so, there are still 6 Joint Business Group members receiving the program who consider the spare parts shop difficult to reach, because it is far outside their area of activity.

In terms of gas cylinder facility indicators, most Joint Business Group members receiving the program assess that 3 kg LPG cylinders are easy to obtain and always available. There were different assessments from 4 members of the Joint Business Group who received the program, although not often, the availability of LPG cylinders around where they lived often ran out, requiring them to look for LPG cylinders outside their neighborhood. The existence of LPG agents / bases which are quite far from where they live causes the purchase of LPG cylinders to be mostly done in stalls, where the need for 3 kg LPG cylinders for fishermen competes with the needs of households and small industries. According to Wahyudi *et al.* (2019), the main cause of this situation is due to the open distribution of LPG cylinders and there is no difference between the 3 kg LPG cylinder packaging intended for fishermen and households. However, this condition is still considered better than before they received LPG converter kit assistance, where they more often had difficulty getting fuel.

On the spare parts indicator, as many as 18 members of the Joint Business Group who received the program assessed spare parts, especially LPG converter kits, were difficult to obtain on the market. There were 2 (two) members of the Joint Business Group program recipients who had experienced problems with the LPG converter kit and had difficulty obtaining spare parts in the offline and online markets. Even though the equipment could ultimately be repaired, this condition also influenced the assessment of other Joint Business Group members regarding the indicators of spare parts facilities. Meanwhile, for ordinary boat propulsion engines, all the spare parts are easier to obtain. Despite this, the achievement of the effectiveness of spare parts indicators obtained is still high, namely 76.96%. This is because most members of the Joint Business Group who received the program consider

that engine spare parts for LPG converter kits from the Oil to Gas Fuel Conversion Program are easy to obtain. The respondent members who provided assessments had not experienced any problems with the LPG converter kit but felt confident that all spare parts were easy to obtain.

The existence of supporting infrastructure that is still difficult to reach for some program recipients and the availability of gas cylinder facilities that often run out, as well as spare parts for LPG converter kits that are difficult to obtain, contradicts Fadila *et al.* (2020) who states that the availability of facilities and infrastructure determines the effective achievement of goals. If this condition continues and is not handled immediately, it will hamper the productivity of program recipients and threaten the sustainability of the program (Laraswati *et al.* 2020).

Even though there are still shortcomings, overall the input dimension indicators are considered to have worked very effectively. This is indicated by the results of achieving the effectiveness of the input dimension which is classified as very high.

The effectiveness assessment result of the process dimension shows that all respondents who were members of the Joint Business Group who received the program had received socialization regarding the Oil to Gas Fuel Conversion Program through counseling and coaching activities for the Joint Business Group carried out by fisheries extension agents and the Palembang City Fisheries Service before submission assistance. Proposals for assistance are submitted collectively. All Joint Business Group members respondents who received the program also strongly agreed that officers had carried out data identification and verification which was carried out in stages and stages starting from fisheries extension agents, then the Palembang City Fisheries Service and then the Ministry of Energy and Mineral Resources. The Ministry of Energy and Mineral Resources then determines potential recipients of The Oil to Gas Fuel Conversion Program based on validated proposed data.

In the aid delivery indicator, all Joint Business Group members stated that the delivery of aid had gone as it should. Where at the time of handing over the aid, all program recipients received an explanation regarding how to use and maintain the engine, signed the Minutes of Handover and a statement of

responsibility for the aid and had it documented. The handover of aid was attended by the Ministry of Energy and Mineral Resources, the Palembang City Fisheries Service, fisheries extension agents and third parties, namely Pertamina, goods providers and supervisory consultants.

The Oil to Gas Fuel Conversion Program implemented was considered to be on target because the LPG converter kit assistance was in accordance with the needs of the program recipients and all Joint Business Group members designated as program recipients had met the required criteria. According to Pathony *et al.* (2020), on target refers to how well a program sets program targets and the extent to which it is successful in achieving its intended targets. According to Irma *et al.* (2022), the implementation of a program is said to be successful if the target determination is in accordance with needs.

In terms of the suitability indicator for the amount and specifications of assistance, all Joint Business Group members who received the program stated that the LPG starter package or LPG converter kit received was in accordance with the amount and specifications of assistance that had been previously proposed. Each Joint Business Group members received 1 LPG converter kit package consisting of 1 boat engine unit, 1 set of LPG converter kit and its installation, 2 units of 3 Kg LPG cylinder and its contents, and 1 set of long axles and propeller.

The implementation of The Oil to Gas Fuel Conversion Program is also considered to have been carried out according to schedule. Members of the Joint Business Group receiving the program receive certainty regarding the program implementation schedule based on information from the Ministry of Energy and Mineral Resources conveyed through fisheries extension agents and the Palembang City Fisheries Service. In line with the opinion of Pathony *et al.* (2020) that timeliness can be seen from the extent to which the program is carried out according to schedule. Irma *et al.* (2022) added that a program that is carried out according to schedule can effectively achieve predetermined goals.

The very high effectiveness of the aid utilization indicator shows that all Joint Business Group members receiving the program have utilized LPG converter kits for fishing activities using BBG. In terms of engine servicing indicators, 12 Joint Business Group

members who received the program stated that engine service activities had been carried out on a regular basis. On the other hand, most Joint Business Group members who received the program stated that they had never participated in engine servicing activities. Engine servicing activities are intended as training for engine maintenance and are carried out twice (every 6 months) during the year of program implementation. The engine service participants were selected randomly and given priority to those who had problems with the engine, while still prioritizing the representation of each group or region. However, the achievement value for the effectiveness of engine servicing indicators was obtained at 60.29% and is classified as medium.

In terms of supervision indicators, 28 Joint Business Group members who received the program stated that they had not been audited. This is because monitoring activities are carried out using random sampling. The purpose of monitoring activities is to identify the extent of aid utilization, success, deficiencies and deviations that occur. The supervision effectiveness achievements obtained remain relatively high with an achievement value of 72.06%.

Even though engine servicing and supervision activities are not applied to all program recipients, overall the effectiveness of the process dimensions obtained remains very high. This shows that program implementation has been running very effectively and according to plan.

In the product dimension, the effectiveness achieved in energy security indicators is very high. The assistance from The Oil to Gas Fuel Conversion Program makes it easier for Joint Business Group members who received the program to obtain fuel for fishing both around their homes and along fishing work areas at affordable prices. This change shows that energy security has been created for Joint Business Group members who received the program.

Furthermore, according to the assessment of Joint Business Group members who received the program on the expenditure cost indicator, fuel cost savings from using a LPG converter kit with gas fuel resulted in cost savings for going to sea. In this research, the average cost of going to sea incurred by members of the Joint Business Group program recipients was IDR. 526,371/month, 23.80% more economical when compared to the average seagoing

costs incurred by Joint Business Group members who did not receive the program, namely Rp. 690,812/month (Table 5). In accordance with the research results of Haryono & Purwanto (2018), the use of LPG in boat engines can reduce engine compression, thereby reducing operational costs.

Lower fuel costs increase the income of Joint Business Group members who received the program. The average income of Joint Business Group members who received the program was Rp. 1,997,366/month, an increase of 35.38% compared to the income of Joint Business Group members who did not receive the program, namely Rp. 1,475,421/month (Table 5).

Meanwhile, regarding environmental indicators, Joint Business Group members who received the program assessed that the use of LPG converter kit engines with LPG cylinders reduces environmental pollution, such as air pollution and noise pollution. This is supported by Sulistyono's (2014) statement that gas fuel has very low carbon emissions compared to petrol, so it has a positive impact on environmental sustainability by helping reduce global warming. The research results of Fattah *et al.* (2023) also show that the use of gas fuel provides user comfort where the vehicle operates with a smoother sound than oil-fueled vehicles, thereby reducing noise pollution.

The achievement of effectiveness in the product dimension which is classified as very high shows that all indicators are in accordance with the program objectives. The achievement of the program objectives is the creation of energy security conditions for program recipients, cost savings, increased income and an environment that is protected from pollution.

Overall, the assessment of the effectiveness of The Oil to Gas Fuel Conversion Program was found to be very high. If we look at the indicators for all dimensions of Context, Input, Process and Product, it is known that 20 indicators are in the very high category, while the other 3 indicators are in the high and medium category. The Oil to Gas Fuel Conversion Program has been implemented very effectively because the majority of indicators show very high effectiveness. According to Nasila (2014), a program can be declared effective if the planned targets or objectives can be achieved. A program is declared

successful if it achieves a good level of effectiveness.

Income analysis of Joint Business Group members who received the program and those who did not receive the program

The assistance of a LPG converter kit engine that saves fuel costs has made Joint Business Group members who received the program catch fish more often and dare to explore further than their previous fishing areas. Increasing fishing distances cause an increase in the number of fish catches (production) and income of Joint Business Group members who received the program. In line with the research results of Indara *et al.* (2017), where the distance traveled to sea has a significant effect on increasing fishermen's income.

However, the LPG fuel costs incurred by Joint Business Group members who received the program are still less than the fuel costs incurred by those who did not receive the program. In accordance with research findings by Lumi *et al.* (2023), the average cost of consuming LPG with gasoline as fuel for *katinting* engines is 234.46% more economical at low RPM, 262.43% more economical at medium RPM, and 271.36% more economical at high RPM. According to Kalana's research results (2023), fishing operational costs have a negative and significant influence on fishermen's income. When operational costs increase, income decreases. Conversely, if operational costs decrease, then income increases.

Boat engines with 9-13 HP power have higher speeds and can travel further than boat engines with 6.5 HP power. So that the average production, receipts, costs, and income of members of the Joint Business Group program recipients who have boat engines with a power of 9-13 HP are greater. In line with the research results of Rahim (2016) and Putra (2019), technology or the size of boat engine power has a positive and significant effect on fish catches. The greater the engine power, the wider the fishermen's reach and the number of fish catches increases.

Differences in prices obtained by Joint Business Group members can occur due to differences in fish size, level of freshness of fish, certain types of fish that are difficult to catch, and close relationships with collectors. Where the larger the size of the fish, the fresher the fish and the harder the fish to catch, the higher the price of the fish, and vice versa. In line with the statement by Saraswati

& Khusaini (2018), that price shows the quality of the products sold and purchased. Familial relationships or economic relationships that have existed for a long time because they have been customers or because it is easy for Joint Business Group members to obtain capital by borrowing money from collectors, means that Joint Business Group members get higher prices than other people, even though the price difference is not large. According to Zulfa & Yuswadi (2021), this relationship occurs because both parties feel they benefit from each other.

The research results obtained from the mean difference test, namely that the calculated t value is greater than the t table, show that statistically there is a real difference in the income of Joint Business Group members who received the program and those who did not receive the program, either overall or based on the size of the boat's engine power. Where the average income of Joint Business Group members who received the program is greater than the average income of those who did not receive the program. This shows that The Oil to Gas Fuel Conversion Program has had a positive impact on increasing the income of Joint Business Group members as fishermen.

The relationship between program effectiveness and the income of Joint Business Group members who received the program

The relationship between program effectiveness and the income variable of Joint Business Group members who received the program is very weak and insignificant with a positive coefficient value of 0.032, indicating that the income variable can only be explained by the effectiveness variable of 3.2%. Meanwhile, around 96.8% of the remainder is influenced by other factors not included in the variables of this research. Even though the effectiveness of the program does not have a tendency to directly influence income, the assistance of the LPG converter kit engine increases the fishing effort (effort) carried out by Joint Business Group members who received the program which then has an impact on increasing income. Utilization of LPG converter kit engines with more cost-effective use of LPG, improves fishing operations and expands the reach of fishing areas carried out by Joint Business Group members who received the program. The increase in effort is directly proportional to the increase in production and income of Joint Business Group members who received the program. According to Budiasih & Dewi

(2015), basically catch is the output resulting from fishing activities, while fishing effort (effort) is the input from fishing activities. The comparison between output and input shows the level of technical efficiency in the use of each input. Other research results that support this show that certain factors have a significant influence on fishermen's income, including boat engine power (Rahim 2016; Putra 2019), distance traveled (Indara *et al.* 2017; Ruswanti *et al.* 2019), number of fish catches (Amiruddin 2021; Ridha 2017) and costs (Kalana 2023; Sabu & Sofyan 2022). The Oil to Gas Fuel Conversion Program for fishermen has proven to bring benefits to the welfare of Joint Business Group members who received the program as shown by the increase in income they have experienced since they received and utilized the assistance of the LPG converter kit engine.

Meanwhile, the relationship between the process dimension and income is quite strong and significant with a positive coefficient value of 0.400**, meaning that the higher the achievement of the process dimension in program implementation, the higher the income. Programs that are implemented according to plan can increase the income of Joint Business Group members who received the program, whereas program implementation that is not according to plan can hamper or reduce income.

The results of the correlation test show that the correlation coefficient values for the context, input, process and product dimensions are partially significant and explain the effectiveness variable. A positive value means that all dimensions in the effectiveness variable support program effectiveness. It is known that the correlation coefficient value for the context dimension is the lowest, namely 0.351*. This shows that the context dimension which consists of background indicators, program goals and objectives has the lowest relationship in increasing program effectiveness. In other words, when the context dimension increases, the increase in program effectiveness tends to be lower compared to other dimensions. Meanwhile, the input dimension correlation coefficient value is the highest, with a value of 0.684**. This means that the input dimensions, namely budget, natural resources, human resources, supporting infrastructure, gas cylinder facilities and spare parts facilities, have the most dominant relationship in achieving program effectiveness. When the input dimension increases, the increase in program

effectiveness is the highest compared to other dimensions.

CONCLUSION

1. Overall, the effectiveness of The Oil to Gas Fuel Conversion Program in Palembang City was very high. This shows that The Oil to Gas Fuel Conversion Program has been implemented very effectively.
2. The results of the mean difference test show that there is a significant difference between the income of Joint Business Group members who received the program and the income of those who did not receive the program. Where the average income of Joint Business Group members who received the program after receiving the LPG converter kit engine is greater than those who did not receive the program.
3. The results of the correlation test between the program effectiveness variable and the income variable of Joint Business Group members who receiving the program have an insignificant and very weak relationship. The effectiveness of the program does not have a tendency to affect income directly, however the assistance of the LPG converter kit engine increases the fishing effort (effort) carried out by Joint Business Group members who received the program which then has an impact on increasing income.

SUGGESTION

1. To increase the effectiveness of the Oil to Gas Fuel Conversion Program in the future, in locations where the program has been implemented, the local government can provide easy business licensing for parties who want to open LPG cylinder sales places, service places or spare parts shops around the program recipient locations. Meanwhile, the Ministry of Energy and Mineral Resources can provide other licensing facilities required by official LPG sub-distributors/agents. The Ministry of Energy and Mineral Resources also needs to increase the number of program recipients who are targeted for machine servicing and monitoring and evaluation activities as program guidance and supervision.

2. Further research needs to be carried out to analyze the sustainability of The Oil to Gas Fuel Conversion Program for fishermen.
3. Seeing the high value achieved in the effectiveness of the program and the increase in income of Joint Business Group members after receiving the LPG converter kit engine, the Oil to Gas Fuel Conversion Program must continue. The success of The Oil to Gas Fuel Conversion Program can be followed by the central and regional governments in the maritime and fisheries sector to hold similar programs, so that more fishermen can experience the benefits.

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