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Analysis of Biogas Assistance Program in Dairy Farm Development

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Abstract

Corporate Social Responsibility (CSR) is a form of corporate social responsibility towards the community and environment around the company. The biogas assistance program is one of PJT II's CSR programs in order to accelerate the handling of damage to the Citarum river watershed (DAS) and for the purpose of empowering the community, especially dairy farmers who come from members of the KPBS Pangalengan dairy farmer group. The aim of this research is to determine the mechanism for implementing the biogas assistance program as part of CSR activities and to analyze the benefits of implementing the biogas assistance program in developing the sustainability of dairy farming businesses. This research was conducted in November – December 2023. This research was conducted using a qualitative approach using the case study method. Primary data was obtained through in-depth interviews with informants selected purposively from twenty-one people consisting of the company, participants receiving assistance and implementing parties. The results of the research show that the implementation of the biogas assistance program has been implemented through a process planning, organizing, actuating, controlling (POAC) in the program mechanism, apart from that, the analysis of the program's objectives is to reduce pollution and damage to the Citarum watershed as a result of breeder activities and provide opportunities to increase income independently and sustainably and is an effort to increase breeder awareness to better protect the surrounding environment so that it can speed up the handling of damage to river watersheds that is currently occurring.

Introduction

Handling damage to the Citarum river watershed (DAS) has been carried out since 1980, but various policy and program interventions have not been able to resolve the complexity of the problem of pollution of the Citarum river watershed, in fact, from year to year the damage that occurs is actually getting worse (Syabillah et al., 2023). The Citarum River has an area of 297 kilometers with its headwaters at Situ Cisanti which is located close to the foot of Mount Wayang, Bandung Regency and empties into the North Coast of Java Island. The Citarum watershed drains 13 districts/cities including Bandung Regency, West Bandung Regency, Karawang Regency, Purwakarta Regency, Bekasi Regency, Sumedang Regency, Cianjur Regency, Bandung City and Cimahi City. The Citarum watershed is not only used as a source of drinking water but also functions as irrigation to irrigate rice fields and for the islands of Java and Bali it is used as a hydroelectric power plant (PLTA) (Oginawati et al., 2023).

Pollution and damage to the Citarum watershed have an impact on health, economic, social and environmental resources and threaten to achieve environmental protection and management goals. The main cause of pollution of the Citarum River is the high level of domestic and industrial activity near the banks of the river basin (Riyadi et al., 2020). Agricultural waste, fishery waste and livestock waste can also cause pollution and damage to

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the Citarum River. The central government responded to international criticism of the damage to the Citarum River through Presidential Regulation Number 15 of 2018. This policy was implemented through the formation of a collaborative institution that combines the bureaucracy with the military to speed up the handling of damage to the Citarum River by preparing an action plan which aims to guide stakeholders in preparing more technical. Therefore, the program scheme and management of the Citarum watershed by controlling pollution and damage was formed through quality checks or water quality monitoring which aims to overcome and restore the Citarum watershed (Leckel et al., 2020).

State-Owned Enterprises (BUMN) are one of the agencies that monitor water quality to provide an overview of environmental conditions, especially at water sources such as rivers, reservoirs and lakes (Supangat et al., 2023). Monitoring is carried out based on each regional authority and the interests of institutions with the aim of being a benchmark for successful performance in controlling pollution and damage to the Citarum River. Perum Jasa Tirta II (PJT II) as a BUMN in the field of water resources management (SDA) is one of the stakeholders who plays a role in resolving the Citarum issue related to the idea of accelerating the handling of Citarum. Based on Law Number 19 of 2003 which states that BUMN has a goal not only to pursue profits but is dedicated to supporting the welfare of all stakeholders through guidance or assistance. Based on this policy, PJT II carries out social responsibility activities consistently through environmental development and corporate social responsibility programs in the company's operational areas with the aim of ensuring that the community can receive benefits from the company's presence. Environmental preservation and community empowerment are part of Corporate Social Responsibility (CSR) which is carried out consistently by the company because PJT II realizes that the results of a company's performance are not only measured by the company's positive growth or business performance alone (Chiu & Hirt, 2023).

Based on Law Number 40 of 2007 article 74 paragraph 1 concerning corporate Environmental Social Responsibility (TJSL), PJT II as a state-owned company adheres to principles and complies with rules in implementing policies for managing CSR activities. Implementation of community and environmental social activities is a concrete form of PJT II's implementation of this law so that in its organizational structure chart the Environmental Development Partnership Program (PKBL) sector is formed which is one part of the company's general division. PJT II's CSR activities cover several fields including agriculture, plantations, fisheries and animal husbandry (Kuo et al., 2023).

The Citarum watershed has several sub-watersheds that pass through areas producing cow's milk and milk-based products. This milk production is produced from dairy farms spread across Pangalengan District. The activities of farmers who still throw dairy cow feces into river basins have resulted in serious problems with river pollution. One dairy cow produces an average of 7 kilograms of feces and urine waste per day for young cows and 19 kilograms per day for adult cows (Budiyanto, 2011).

River pollution can be overcome by utilizing dairy cow feces waste through the development of renewable energy known as biogas. Biogas is produced from dairy cow feces and has prospects as an alternative to renewable energy that is easy to develop. Therefore, processing dairy cow feces is carried out using biogas technology as a solution to deal with the problem of river pollution due to dairy cow feces and has a positive impact on the community in reducing the purchase of Liquefied Petroleum Gas (LPG) fuel and also reducing the use of firewood because it produces high quality heat. which is better for the household needs of each farmer. Another benefit of biogas is that it can increase income from the sale of biogas by-products in the form of fertilizer and earthworms (Adoe & Selan, 2022).

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The form of CSR activities carried out by PJT II in order to reduce pollution of the Citarum watershed is carried out through community empowerment with a cash biogas assistance program that has been carried out since 2017 at the Milk Collection Point Mobile (MPCM) Pangkalan Margamukti Village. The location chosen for the first biogas production by PJT II was in accordance with the mapping that MCPM Pangkalan was located close to the banks of the Cisangkuy River which is part of the upstream flow of the Citarum River. The implementation of the biogas assistance program was carried out by PJT II in collaboration with Rumah Biogas (BIRU) which was implemented by the Rumah Energi Foundation (YRE) in 2017 – 2019. Even though the cooperative relationship between PJT II and Biru has now ended, the biogas assistance program is still being implemented by PJT II until now and is starting a new collaborative relationship with the Bumi Generation Foundation in 2021 – now. This research aims to analyze the mechanism for implementing the biogas program as part of PJT II's CSR activities.

Methods

The method used in this research is a case study using a qualitative approach. The strategy in a case study is appropriate for a study related to the "how" aspect and the why aspect, directed at a series of events where the researcher only has a small opportunity or no opportunity at all to exercise control over an event (Mauludin, 2014). Qualitative methods are based on a phenomenological philosophy that prioritizes appreciation (verstehen). The case study research method with a qualitative approach pays more attention to the process as well as the results, oriented towards a sense of life and experience as well as a structure to describe the process and meaning (Silalahi, 2006).

Results and Discussion

Condition of the Pangalengan District Area

Pangalengan District is one of the areas in the southern part of Bandung Regency, West Java Province. If you look at its geographical location, Pangalengan District is at the coordinates 1070 20 - 1070 39 East Longitude (BT) and 7006 - 70019 South Latitude (LS), while based on the topography most of the Pangalengan District area is a plateau or mountainous area located at an altitude of 700 – 1,500 meters above sea level (masl). Based on administration, Pangalengan District has an area of 27,294.79 Ha consisting of 13 villages, 766 Neighborhood Units (RT) and 161 Resident Associations (RW). The administrative area boundaries of Pangalengan District are as follows North is Cimaung District, South ias Garut District, East side is Kertasari District, and West is Pasir Jambu District.

The climate in Pangalengan District has rainfall of around 1,996 millimeters with an estimated rainfall duration of around 5 months, apart from that the humidity conditions in the area are around 19 degrees Celsius with an average temperature of 15-20 degrees Celsius. The population of Pangalengan District according to data from the Pangalengan District Statistics Agency in 2021 is 157,921 people with a female ratio of 77,784 people and a male ratio of 80,137 people. The average livelihood of the population is in the agricultural sector of 20,275 people and the livestock sector of 7,932 people. Pangalengan District has facilities and infrastructure like the infrastructure owned by Pangalengan District, namely 1 unit of general hospital. The educational infrastructure owned by Pangalengan District is 79 elementary school (SD) buildings, 20 junior high school (SMP) buildings and 10 high school (SMA) buildings. Apart from that, Pangalengan District is famous as a tourist area and producer of dairy products because it is a dairy farming area.

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Margamukti Village

Margamukti Village is one of 13 villages in Pangalengan District, Bandung Regency, West Java Province. The area of Margamukti Village is 2,613,949 hectares with longitude coordinates 1070575 and latitude coordinates 70178 with an altitude of 1,484.99 meters above sea level (masl) with an average temperature of 12 – 20 degrees Celsius and humidity of around 60 – 70%. Based on the general village profile in 2022, Margamukti Village has a total population of 15,452 with a female ratio of 7,567 and a male ratio of 7,885.

Table 1. Education Level of Margamukti Village Residents

Education	Number of people	Percentage
Not finished elementary school yet	1665	13%
Elementary School/Equivalent	2991	23%
SLTP/Equivalent	3187	25%
High school/equivalent	4436	34%
Diploma III	137	1%
Diploma IV / Strata I	479	4%
Stratum II	30	0%
Stratum III	7	0%

Source: Margamukti Village Profile, 2022

Seen from table 1, the majority of the people of Margamukti Village have received the most education, namely high school level as much as 34%, junior high school as much as 25%, elementary school as much as 23%, diploma as much as 1% and Strata I 4%. Meanwhile, the percentage of those who have not completed their education at elementary school level is still quite large, namely 13%. The level of education influences the skills in carrying out work carried out by the community so that the residents of Margamukti Village have a variety of livelihoods, for more details can be seen in the following table:

Table 2. Livelihoods in Margamukti Village

Group	Amount	
	Person	Percentage
Doesn't work	5848	43%
Taking care of household	3343	24%
Student/Students	1074	8%
Pension	153	1%
Civil servants	204	1%
TNI	20	0%
POLRI	15	0%
Trade	106	1%
Farmer	50	0%
Breeder	7	0%
Laborer	47	0%
Construction	2	0%
Private sector employee	1801	13%
BUMN employees	25	0%
Tailor	6	0%

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Lecturer	2	0%
Teacher	68	0%
Driver	14	0%
Self-employed	916	7%
Doctor	3	0%
Nurse	1	0%

Source: Margamukti Village Profile, 2022

Table 2 shows the diversity of livelihoods of the residents of Margamukti Village. The biggest source of income is taking care of the household at 24% and private employees at 13%. Meanwhile, the livelihoods with the lowest ratio are doctors with 3 people and nurses with 1 person. Margamukti Village was chosen to be one of the villages close to the banks of the Cisangkuy river which is a tributary of the Citarum watershed. Apart from that, in Margamukti Village there are many dairy farms even though this profession is mostly used as a side business for some people.

Tirta Services Corporation II

PJT II was originally built for the benefit of the Republic of Indonesia government's national project for the construction of the Ir Dam. H. Djuanda whose aim is to support national food security by providing irrigation water for agricultural land in the West Java region, as a supplier of water raw materials for the benefit of the Regional Drinking Water Company (PDAM) and is needed for the hydropower industry, as flood control for some areas Karawang is also one of the tourism and water sports areas in West Java. The PJT II construction project started from 1957 – 1967.

Based on Government Regulation Number 8 dated 24 July 1967, the government of the Republic of Indonesia established a management and development body for Lake Jatiluhur called the Jatiluhur State Company (PN Jatiluhur) which has the task of raising funds for maintenance operations by managing facilities and infrastructure that have been built such as hydroelectric dams, irrigation canals, as drainage and accessories as well as pioneering for the development of further projects. In 1970 the central government decided to replace PN Jatiluhur into the Jatiluhur Public Company known as Perum Otorita Jatiluhur (POJ) which had the aim of being a source of income for the authority for rehabilitation costs, major repairs in network construction as well as a place for utilization and development of the potential of the Jatiluhur Reservoir based on economic principles that can be held accountable to society.

Based on Government Regulation Number 35 of 1980, Government Regulation Number 42 and Government Regulation Number 13 of 1998 changed the name of POJ to Perum Jasa Tirta II (PJT II) by adjusting the scope of duties and business activities based on the policy of Government Regulation Number 7 of 2010. This aims to implement and support government policies and programs in the field of national economic development, especially in the field of exploitation and management of water resources (SDA) to more optimally utilize company resources so that they can produce goods and services in accordance with the principles of a good and healthy company.

With the changes that have been made, it is hoped that PJT can transform into a more dynamic, responsive company and be able to elevate its role as a leading company in the field of water resources management through providing services for the public benefit and being able to generate profits based on better company management principles. responsible and credible. Through Government Regulation Number 7 of 2010, PJT II as a State-Owned Enterprise (BUMN) has the responsibility to manage water resources in the Citarum River area by

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focusing on management, protection, development and provision of water needs, as a provider of public services in the field of water resources such as the issue of flood control in the downstream locations of the Citarum River, especially in Karawang and Bekasi Regencies as well as providing irrigation for national rice barns. PJT II has several work areas which include the Citarum River area and parts of the Ciliwung - Cisadane River so that the area for PJT II services is divided into two provinces, namely West Java Province and DKI Jakarta Province.

Informant Identity

Informant data collection was carried out using interview techniques with informants to obtain the data required for research. The selection of informants was carried out using a purposive method, which is a deliberate sampling technique or designating among members of the population to be used as samples according to research needs. The informants in this research are parties who are directly related to the biogas assistance program, both the organizers of the CSR program who are PJT II employees and the community who are participants in the biogas assistance program. The informants in this research consisted of 17 informants, with details of two people being the organizers, namely PJT II and 15 people from the community who received the biogas assistance program. The biogas assistance program is one of PJT II's CSR activity programs which is one of SDP's CSR activities, therefore the company chosen is the manager of the SDP program. The informant has the initials (DMS, 48 years old) as a manager in the PKBL unit as one of the officers in charge of implementing the assistance program who is assisted by his assistant manager with the initials (AWD, 49 years old). These two people are officials involved in implementing the CSR activity program so they are considered informants who know all the information related to the program implementation mechanism which takes place from start to finish.

The people who became informants are alumni of biogas assistance participants who live in Margamukti Village and are still using biogas from the results of the program since its inception in 2017. Apart from that, the people receiving biogas program assistance are part of the members of the KPBS MCPM Pangkalan dairy farming group. These informants include the initials (A, 53 years old) who is the head of group 1, (DO, 48 years old) is a member of group 1, (AK, 55 years old) is a member of group 1, (C, 65 years old) is a member of group 1, (S, 49 years old) is a member of group 1, (UG, 56 years old) is a member of group 1, (K, 67 years old) is part of a member of group 1, (T, 55 years old) is a member of group 1, (A, 65 years old) part of group 1 members, (UR, 66 years old) as a recipient of biogas assistance program assistance from group 1 members, (W, 75 years old) is a member of group 1 breeders, (W, 48 years old) as a member of the group 1, (AS, 68 years old) is the recipient of biogas assistance from members of group 1, (R, 52 years old) is a member of group 1, (U, 53 years old) is the head of group 2, (AK, 45 years old) is the recipient of biogas assistance from group 2 and (D, 40 years old) as a recipient of biogas assistance who is part of group 2 members.

In order to complete the required data information, informants were also taken from the implementing team who were members of the Home Biogas (BIRU) which has now changed its name to the Bumi Generation Foundation (YGB). The informants taken were (RS 42, years) as chief executive and (D, 40 years) as an executive member of BIRU. They were chosen because they are the team implementing the biogas assistance program which was carried out for the first time since 2017, so they can be considered as informants who know all aspects related to the implementation of the biogas program.

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Table 3. Informant data and its classification

Name	Age	Gender	Education	Information
Dani Mochamad S	48 years old	Man	Associate	Manager
Agus Wahyu Dana	49 years old	Man	Bachelor	Assistant manager
Apid	53 years old	Man	high school	Group 1 Leader
Dede Okking	48 years old	Man	elementary school	Group member 1
Ade Karmana	55 years old	Man	elementary school	Group member 1
Light	65 years old	Man	elementary school	Group member 1
Solomon	49 years old	Man	elementary school	Group member 1
Uun Gunawan	56 years old	Man	elementary school	Group member 1
Koko	67 years old	Man	elementary school	Group member 1
Tati	55 years old	Woman	elementary school	Group member 1
Paragraph	65 years old	Man	elementary school	Group member 1
Usep Rusidin	66 years old	Man	elementary school	Group member 1
Warso	75 years old	Man	elementary school	Group member 1
Wahyudin	48 years old	Man	elementary school	Group member 1
Acu Samsudin	68 years old	Man	elementary school	Group member 1
Rusmana	52 years old	Man	elementary school	Group member 1
Ugun	53 years old	Man	high school	Group 2 Leader
Ai Kartini	45 years old	Man	elementary school	Group 2 members
Depi	40 years old	Man	elementary school	Group 2 members
Redi Saputra	42 years old	Man	Bachelor	Chief Executive
Dadang	40 years old	Man	high school	BIRU member

Source: Primary data from research results

Table 2 shows the age range of informants starting from 40 years to 75 years. According to the 2018 Central Statistics Agency, the productive age group is those aged 15 – 64 years. According to Masloch in Hastuti (2003), younger workers tend to experience higher levels of helplessness compared to older workers. If you look at the table, it clearly states that not all workers are of productive age, it can be seen from several informants who are over 64 years old, so this has a big influence on the quality of work.

Based on gender in table 2. Explains that the informants are dominated by male with a nominal number of seventeen people and only two female. The gender factor influences work values, especially for farmer informants. Because in general, livestock work has a big influence on strength, such as mowing grass, cleaning drums and providing feed, so men generally dominate more than women. According to table 2, based on the last level of education, the average informant, especially breeders, only reached elementary school (SD) level, which is different from the last level of education of the organizers, so it has an influence on the mindset and acceptance of renewable innovation.

It can be seen from table 2 that there are significant differences in the type of work between the organizer and the recipient, which influences a person's skills in carrying out their work. So, it is very necessary for the recipients of program assistance to receive training, guidance and supervision to be able to independently carry out the program until it is successful. So that the goal of empowerment through the biogas program can be achieved so as to reduce the impact of pollution on the Citarum watershed so that the issue of damage to the Citarum watershed can experience improvements in quality. The biogas assistance implementation program includes a training, coaching and supervision process. The biogas assistance program is one way of empowering people who work as livestock breeders who live close to riverbanks

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which aims to be an effort to control pollution damage to river watersheds resulting from livestock activities. This program is implemented referring to the company's Corporate Social Responsibility Goal Process in accordance with the SOPs that apply to the program.

Objectives of Implementing the Biogas Assistance Program

Based on the SOP, the biogas assistance program is to speed up the handling of river watershed pollution due to the activities of breeders who live close to the banks of the river watershed and to create independent breeders through training and coaching in the MCPM Pangkalan Margamukti Village area. According to the organizers, this goal is in line with what is expected so that it can reduce the impact of pollution due to livestock activities, help increase farmers' monthly income and can become an additional business opportunity for breeders. The following is the response from the organizers regarding the program objectives:

It is hoped that the biogas assistance program can increase the awareness of breeders to better protect the environment so that it can reduce the amount of pollution in river watersheds due to the discharge of untreated feces and can make this program an additional opportunity for breeders so that they can increase their income. needs of every farmer's household. This aim was known by the participants who received program assistance and who was the head of group 1, namely (A, 53 years old) that according to him, this program was not only a supporting tool to speed up the issue of dealing with damage to the Citarum watershed, but it could also help farmers save on purchasing LPG gas and could increase income from the biogas by-product.

This biogas assistance program is very good, apart from being able to reduce the amount of river pollution caused by dairy cow feces that are thrown carelessly, it is also very helpful in reducing the purchase of LPG gas for cooking purposes. Now thanks to biogas I no longer buy gas and I also get additional income from proceeds from the sale of earthworms.

The same thing was also conveyed by other participants who received biogas assistance, as conveyed by (C, 65 years old) who said that the aim of the program was to help farmers in managing dairy cow feces into something more useful. The organizers said the purpose of this biogas is so that we farmers don't throw waste directly into the ditch. In the past, for cooking, my father had to look for firewood first because his wife was afraid of using gas, but because there is biogas, he no longer needs to look for firewood for his wife's cooking needs. The following are the objectives of the biogas assistance program which can be described in tabular form, as follows:

Table 4. Objectives of the Biogas Assistance Program

Data source	Program Objectives
Company SOP	Controlling waste from dairy cow feces which pollutes the Citarum watershed, PJT II hopes for TJSL's participation to join in the biogas program which is being implemented so that it becomes a sustainable program.
Organizer	Accelerate control of pollution damage to the Citarum watershed and provide business opportunities for breeders to earn additional income.
Aid Recipient Participant Informants	It is beneficial for the community to reduce livestock waste pollution and can help in the household economy of farmers.

Source: Primary data from research results

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Based on table 3 above, the informants have the same perception regarding the objectives of the biogas assistance program. This goal has a positive impact on reducing pollution due to dairy cow feces and providing increased income from biogas by-products by providing training and assistance to create successful programs and independent and sustainable farmers.The biogas assistance program, which is a CSR activity of PJT II, is a better activity compared to the programs provided by previous agencies. This is proven to be true because it can be seen from the sustainability of breeders who are currently still using biogas even though there is no longer any guidance and supervision. Therefore, judging from the continuity of the activities of breeders who still use biogas to date and no damage has been experienced, it can be said that the community empowerment program has been assessed as a successful program implementation.

PJT II chose to carry out CSR activities through the assistance of the biogas program due to the condition of the location which is a dairy farming area which is very close to the riverbanks of the Citarum watershed. This was conveyed by AWD, 49 years old as follows: PJT II chose the biogas renewable energy assistance program because it was seen from the potential of the Pangalengan District area, which is a dairy farming area which has thousands of populations, so it produces abundant dairy cow feces but is not utilized and is immediately thrown away without processing it first, resulting in pollution of the Citarum watershed. increasing as a result of dairy farming activities (AWD, 49 years).

The above considerations are in accordance with the issues that are currently occurring in the Citarum watershed area, so it is necessary to accelerate pollution control in order to reduce the damage that is occurring so as to create better quality water resources. Apart from that, another consideration regarding the program is that it can help the community's economy to create an increase in income for each household.

Biogas Assistance Program Implementation Mechanism

The mechanism for implementing the biogas renewable energy assistance program that has been implemented at MCPM Pangkalan Margamukti Village is reviewed through four basic management functions consisting of planning, organizing, actuating and controlling (POAC).

Planning (Planning)

The biogas assistance program is a program that uses funds from PJT II with the provisions that have been included in the draft budget (RAB) for the CSR activity program. Initially carrying out activities to control water quality was carried out by the SDA and SDL Operations and Maintenance division (Opsdal) which had the obligation to control quality and control water discharge. However, by looking at the aim of implementing the biogas assistance program which is not only to improve water quality by reducing pollution resulting from livestock activities in the Pangalengan area and seeing that there is community empowerment in these activities and with the RAB required is not small, therefore the company transferred the activity in the general division of TJSL.

At the start of planning the implementation of the biogas assistance program, PJT II was only the provider of funds to be distributed to the implementing team, namely BIRU, which has changed its name to the Earth Generation Foundation. The chief executive of BIRU (RS, 42 years old) initially communicated directly with the head of group 1 (A, 53 years old) to explain the aims and objectives of the biogas assistance program. Before the construction of the biogas installation, the head of group 1 had doubts about the success of the biogas assistance program because previously government agencies had provided the same assistance, but after one month the biogas installation was destroyed, causing other group members to also doubt its sustainability. from the program. According to Mr. A, 53 years old, he said the following:

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Initially, my group members and I were doubtful about the results of the biogas assistance program. Because it was not from PJT II, biogas assistance was previously provided by government agencies, but it only lasted one month because the biogas installation was not sturdy and was destroyed so it could not function. However, the implementing party, namely BIRU, provides a guarantee in the form of insurance one year after construction and regular checks every month. Therefore, I started to believe, but not with my members, they wanted to use me as an experiment to see whether the assistance program provided by PJT II was of better quality compared to previous assistance programs provided by government agencies.

However, after one month the installation was carried out for the first time by A, 53 years old, who is the head of group 1 members, it turned out to be a success, which was marked by no damage and a reduction in the use of LPG gas, therefore group 1 members began to believe in the quality of the program. implementation of biogas which has been provided by PJT II. For the next stage of biogas production, the first step taken by BIRU is to bring in members who want to install biogas. This data was obtained directly from the group leader who had recorded data from each member who wanted to receive assistance from the biogas program. After carrying out data collection and site surveys to follow up on the construction of the biogas installation, special criteria or requirements are made for groups/individuals who can be provided with assistance, including: 1) Availability of land for the biogas installation covering an area of 6 x 7 square meters, 2) Willingness to assist in the mentoring process to process biogas by-products in the form of vermicompost and earthworm cultivation, 3) Committed to working together in managing and caring for biogas. If breeders are able to fulfill these requirements, BIRU will immediately proceed with the construction of biogas installations for each breeder who is willing. In the first stage in 2017, there were 20 farmers who were willing and able to commit to providing assistance with biogas facilities.

Table 5. Planning Matrix (Planning)

Observed indicators	Observation result
Background to the program for implementing the biogas assistance program	One of the CSR activity programs carried out by PJT II is in the livestock sector as an effort to deal with pollution and damage to river watersheds. The implementation of biogas is very efficient in the middle of a dairy farming area so that it can process dairy cow feces into something more valuable and useful
The basis for implementing the biogas assistance program	Law Number 40 of 2007 concerning limited companies. Government Regulation Number 47 of 2012 concerning social and environmental responsibility. RI Presidential Regulation Number 59 of 2017 concerning sustainable development goals
Objectives of the biogas assistance program	As one of PJT II's efforts to handle the issue of accelerating damage control to the Citarum watershed. Improving community welfare, especially for livestock farmers
Target of the biogas assistance program	Farmers no longer throw dairy cow feces into ditches/banks of river basins. Able to manage and utilize biogas facilities optimally so that they can be utilized as much as possible for the welfare of the community

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Preparation stages for the biogas assistance program	PJT II acts as a fund provider in a cooperative relationship with BIRU as the implementation team to implement biogas installations for farmers who are willing to fulfill the requirements and are committed. Before the biogas installation was built, PJT II collaborated with BIRU to provide guidance and training to farmers so that they were able to independently maintain their biogas. The creation of the biogas installation was carried out by BIRU, which was assisted by farmers in building the installation

Source: Primary data from research results

Based on table 7, it shows that the biogas assistance program at MCPM Pangkalan Margamukti Village has implemented basic planning functions, although there needs to be re-evaluation such as preparing the planning stage in a more structured manner.

Organizing (Organizing)

Programs have goals to be achieved together by a group of people who are formally united through an organization. Organizing or planning is the process of forming the arrangement and relationship between each part in a positional manner. This includes grouping human resources, dividing tasks and functions and coordinating with each other (Terry, 2008).

The parties involved in organizing the biogas assistance program are a combination of PJT II and BIRU. Even though PJT II is only a fund provider, PJT II still collaborates in coaching, training and supervision with BIRU. The cooperative relationship between PJT II and BIRU went well so that the implementation of the program could be assessed as successful, however there was no organizational structure specifically created during the program implementation process. Following is one of the informants, namely Mr. AWD, 49 years old as assistant manager of TJSL. We do not have an official organizational structure created for the implementation of the biogas assistance program, we are here only as funders for the implementation mechanism in the field, that is BIRU's task, so we are here only working together with BIRU so there is no special organizational structure for carry out the implementation of these activities. BIRU is responsible for the biogas assistance program implemented by PJT II as an implementing team in the field to assist in installation, coaching, training and ongoing supervision. The main duties and functions of the organizer in the biogas assistance program were explained by the chief executive of the Blue Party, namely Mr. RS 42, year, as follows:

Our main task as BIRU is as an implementation team for the biogas assistance program and as partners in establishing collaborative relationships. We rely on PJT II as the party that funds the program, but even though PJT II is only a provider of funds, PJT II does not fully delegate this task. It's just us, but PJT II also participates in the training, coaching and supervision because it is PJT II's responsibility to provide reports related to CSR activities being carried out by the company. From the above statement, it can be seen that PJT II gave authority to BIRU to become a partner in the biogas assistance implementation program whose task is to manage, assist and assist coordination in program implementation. The results of the research on the mechanism of the biogas assistance program in terms of the basic function of organizing can be seen from the following table:

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Table 6. Planning Matrix (Planning)

Observed indicators	Observation result
Organizational structure in implementing the biogas assistance program	There is no organizational structure created specifically for program implementation
Arrangement of human resources in implementing the biogas assistance program	The organizer and implementer is PJT II who collaborates with BIRU
Division of tasks and functions in implementing the biogas assistance program	PJT II: As the organizer who provides funds for implementing CSR activity programs for recipients of biogas assistance BIRU: As the implementing party in implementing the biogas assistance program and coordinating with PJT II for training, coaching and supervision.

Source: Primary data from research results

Table 5 shows that the biogas assistance program at MCPM Pangkalan Margamukti Village has implemented the basic organizing function, although improvements still need to be made. This improvement includes making the organizational structure as well as duties and functions official and efficient.

Actuating (Implementation)

Actuating is the implementation of a biogas assistance program which includes a communication process and direction given to program recipients. Carried out directly when there is a certain event or gathering, for example during direct training delivered by the organizer or implementing party. Indirect implementation can be done via social media group messages such as WhatsApp. The following is the statement of one of the informants, namely Mr. UG, 56 years old:

"Information related to training or coaching is usually often carried out by gathering breeders at the RT bale. Apart from that, we usually like to hold discussions with the organizers while carrying out periodic checks directly at Neng's house."

Participants who receive biogas assistance consist of breeders who have had long-term farming experience. This is because livestock farming has been carried out from generation to generation so that the average farmer is now the successor of his family business. So there is no need to doubt that in terms of their farming skills, they have been around for a very long time, but due to a lack of insight and concern for the environment, this has resulted in an increase in pollution of river watersheds as a result of livestock activities that are continuously carried out to this day. The results of research related to the mechanism of the biogas assistance program can be viewed from the basic actuating function (implementation) which can be seen from the following table:

Table 7. Actuating Matrix (implementation)

Observed indicators	Observation result
Communication channel for directing the community in the biogas assistance program	Directly; This is done by gathering breeders at certain association events, for example training is carried out before providing biogas assistance Indirectly: Done via group messages on social media, namely Whatsapp

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Biogas assistance program participants	People who have long-standing experience in farming and have long been members of the KPBS dairy farm
Description of the implementation of the biogas assistance program	Training and assistance on the use of biogas Supervision of the biogas program Monitoring and evaluating biogas implementation Marketing of biogas by-products

Source: Primary data from research results

Table 6 shows that with the biogas assistance program at MCPM Pangkalan, the basic actuating function is implemented well, so that no improvements need to be made. This is proven by the entire series of implementation which is in accordance with what has been planned.

Controlling (Supervision)

Controlling or supervision of the biogas assistance program is carried out by PJT II which is coordinated with BIRU every month. Monitoring and evaluation will continue until one year after the biogas installation is built. If for one year there are no complaints or damage experienced by the participants receiving biogas program assistance, the monitoring and evaluation of the program will be stopped, and it can be assessed as a successful program. This can be proven by the communities receiving biogas assistance who still use biogas today.

Social Benefits for Perum Jasa Tirta II

The social benefits felt by the organizers of the biogas assistance program and the communities receiving the assistance, with the biogas assistance program which has been running since 2017, the company feels that it has a closer social relationship with the community. The public also feels the benefits of the company's existence through easy interaction with the organizers. This was conveyed by the company from the TJSL Manager, as follows: Relationships with breeders are going well, they have become closer, making it easier to establish better interaction relationships. This also supports us in achieving success in a program so that livestock breeders can feel the benefits to this day (DMS, 48 years).

Apart from social relations with the community, another social benefit that can be felt by the company is the establishment of good cooperative relations with BIRU partners so that the program can run well until it receives the ASEAN ENERGY AWARDS award in 2019 in Bangkok, Thailand. This award is the highest award in Southeast Asia in the energy sector and is expected to be an instrument for promoting more innovative technologies for the development of more efficient and effective renewable energy. This was conveyed by the head of the program who is a member of BIRU, as follows: The cooperative relationship between the companies is going well, along with the existence of programs for breeders, we are working together to achieve these goals until in the end it goes according to plan and is considered a successful program as proven by receiving the ASEAN ENERGY AWARDS award in 2019 ago (RS 42, year).

Social Benefits of Farmers with Farmers

The community feels that with the biogas assistance program, the relationship and interaction between breeders and companies and breeders with other breeders is getting better so that participants who receive biogas assistance feel closer and feel togetherness from the activity program held in their villages. This was conveyed by participants who received biogas assistance. The relationship between breeders and companies and the relationship between breeders and other breeders is getting better and feels closer, apart from that, the existence of the biogas assistance program makes breeders and other breeders more often able to discuss

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experiences and also share their knowledge with each other (UG, 56 year). Based on the statement of one of the recipients of biogas assistance from the implementation of PJT II CSR activities, it is very beneficial for the continuation of closer social relations, both between the organizer and the implementer, the organizer and the recipient and between the recipient and other recipients.

Adding Insight to Reducing Dairy Cow Feces into Biogas

Before the construction of the biogas installation, PJT II coordinated with BIRU to carry out guidance and training so that farmers could carry out processing of dairy cow fecal waste independently. It is hoped that after providing guidance and training, it can increase farmers' awareness and knowledge in reducing dairy cow feces so that they can be more aware of preserving the environment, especially for the Citarum watershed area in order to create river flows with the potential for good water quality.

Table 8. Breeder Knowledge

Material	Breeder Knowledge
How to use biogas properly and correctly	Farmers know how to use biogas properly and correctly to produce the desired fire Farmers are becoming more concerned about the environment by processing dairy cow feces into something more useful
How to maintain a biogas installation	Farmers know how to care for the installation so that it can continue to function well and produce food that meets household needs
How to process biogas by-products	Farmers are taught how to cultivate earthworms using biogas mud media The media for cultivating worms can be used after harvesting earthworms to become vermicompost fertilizer
Marketing of biogas by-products	Farmers know how to market biogas by-products properly and correctly and to the right people.

Source: Primary data from research results

In general, farmers know the aim of the biogas assistance program so that it can reduce pollution of river watersheds due to dairy cow feces that are not processed first. Therefore, based on the material that has been conveyed by the organizers to breeders, the breeders can understand it well so that the implementation process runs smoothly.

Provides the potential to reduce unemployment rates

The biogas assistance program provides economic benefits for the participants who receive assistance, because the biogas assistance program provides business opportunities or opens up employment opportunities in the livestock sector for the community, either as a main or side business. These benefits were conveyed by one of the informants as follows: With this biogas assistance program, my younger brother can develop a better earthworm cultivation business. Initially, I asked my younger brother to cultivate earthworms because I couldn't take care of it because I was too busy with my work as a breeder and farmer. Coincidentally, my younger brother didn't work yesterday so I just told him to take care of the worm cultivation business and apparently, he studied it carefully. so seriously that in the end he is now successful in running an earthworm cultivation business for pharmaceutical purposes and also a vermicompost business (U, 53 years old). Based on this statement, it is proven that the biogas assistance program can provide new business opportunities to become new jobs for local people who still do not have jobs, thereby reducing the number of unemployed people in the village.

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Increased income from carrying out activities

Another benefit of the biogas assistance program is the savings in purchasing LPG gas which can have an effect on increasing the income of each farmer, apart from the presence of biogas by-products which, if taken seriously, will become additional income for the farmers who run the business. According to Mr (UR, 66 years old) stated the following: In the past, before the biogas assistance program existed, my family and I had to spend IDR 100,000 to buy 4 3 kilogram LPG gas cylinders every month, but now with biogas my family can save on purchasing this gas every month. Apart from that, we also get additional income from selling tiger type earthworms which we sell per kilogram, namely Rp. 25,000 and for a bag of fertilizer IDR 25,000 so it is clear that there is an increase in the source of income every month so that we don't just make a profit from selling milk.

Table 9. Savings on Farmer Expenses Every Month

Biogas Program Assistance Recipients	The fuel used before the existence of biogas		The fuel used after the presence of biogas		Cost savings every month
	LPG (tbg)	Wood (krg)	LPG (tbg)	Wood (krg)	
A	4		0		IDR 100,000
DO	3		1		IDR 50,000
AK	3		0		IDR 75,000
C		10		0	
S	3		2		IDR 25,000
U.G	3		1		IDR 50,000
K	2		1		IDR 25,000
Q	3	5	1	0	IDR 50,000
A	4		0		IDR 100,000
U.R	4		0		IDR 100,000
W	3		0		IDR 75,000
W	4		1		IDR 75,000
US	4		1		IDR 75,000
R	4		2		IDR 50,000
U	5		0		IDR 125,000
AK	4		1		IDR 75,000
D	3		1		IDR 50,000

Based on statements made by one of the informants who was a recipient of biogas assistance which started in 2017, he really felt the benefits from an economic aspect because the presence of biogas can not only reduce the purchase of LPG gas cylinders, but can also increase an additional source of income for each farmer.

Conversion of Firewood Use

Extensive or continuous use of firewood for energy purposes to meet household needs will have a severe impact on local forests. According to Osei (1993), firewood contributes 17 – 25% of GHG emissions, making it the main cause of increasing GHG emissions. Apart from that, the impact of using firewood will result in high deforestation activities in an area which can cause soil erosion and land degradation. According to Ktuwal & Bohara (2009) estimates that the use of renewable energy in the form of biogas can reduce the increase in GHG emissions and can reduce the occurrence of erosion and land degradation due to deforestation,

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this is because the heat produced from biogas is hotter so it does not take up much time at the time of use. its use.

Table 10. Reducing Firewood Use

Biogas Program Assistance Recipients	Use of Firewood before the existence of biogas (bag)	Use of Firewood after biogas (bag)
A		
DO		
AK		
C	10	0
S		
U.G		
K		
Q	5	0
A		
U.R		
W		
W		
US		
R		
U		
AK		
D		

The table above shows the appropriate results that with biogas the use of firewood will decrease because people feel more efficient in using biogas for their daily needs. Therefore, significantly reducing deforestation and replacing firewood with biogas will reduce the impact of GHG emissions.

Converting Dairy Cow Feces to LPG

Dairy cow feces is the main raw material for making biogas. Based on the number of livestock populations from each ownership, calculations can be made regarding the conversion of dairy cow feces into gas stove fuel energy. By trying to make assumptions based on the data that has been obtained regarding how much feces each dairy cow produces per day. In this case we can carry out calculations to determine the volume of biogas that can be produced from the feces produced each day. By taking an average of 18 kilograms of dairy cow feces produced per day with the provision that 1 kilogram of dairy cow feces produces 0.3 m3 volume of biogas, then one cow every day produces a volume of biogas as much as:

1 cow = 18 kilograms x 0.3 m3 biogas volume

= 5.4 m3 biogas

For the case at MCPM Pangkalan which has an average population of 5 individuals, the total volume of biogas per day is:

TVBH = 5 heads x 5.4

= 27 m3 biogas, where 1 m3 biogas is equivalent to 0.46

kilogram volume of LPG.

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So it is equivalent to = 27 X 0.46 kilograms

= 12.42 kilograms of LPG

The above volume of biogas will be obtained if the anaerobic process from dairy cow feces takes place according to the conditions, namely for 18 – 28 days. So, if left for 18 – 28 days it will produce biogas energy with a volume of 27 m3 or the equivalent of 12.42 kilograms of LPG. So it is necessary to recalculate and search for data that can show the stability of the biogas that can be produced daily to be used as fuel for gas stoves (Semin et al., 2014).

Table 11. Reducing Dairy Cow Feces into Biogas

Breeder Name	Total PopulationI	Number of Dairy Cow Feces/kg/day	Biogas Reactor Size (m3)	Total Biogas Volume Per Day (kg)
DO	6	108	8	14,904
AK	7	126	10	17,388
C	5	90	4	12.42
S	4	72	4	9,936
U.G	4	72	4	9,936
A	10	180	10	24.84
K	1	18	6	2,484
Q	7	126	6	17,388
A	6	108	8	14,904
U.R	7	126	10	17,388
U	12	216	20	29,808
AK	13	234	10	32,292
W	1	18	10	2,484
D	2	36	6	4,968
W	5	90	4	12.42
US	2	36	6	4,968
R	2	36	10	4,968

Based on the results of calculations that have been carried out to analyze the volume of biogas produced from 1 cow every day, it is 27 m3 or 2,484 kilograms of LPG. Therefore, it can be said that biogas is a renewable energy source that has quite large potential for availability to meet the needs of livestock farmers and can help in saving on purchasing LPG gas cylinders every month.

Conclusion

Based on the research results and discussion descriptions, conclusions can be drawn about the aim of the biogas assistance program, apart from accelerating the handling of damage to the Citarum watershed, but it also has the opportunity to provide farmers with additional income by providing regular coaching and training to create independent and sustainable farmers. The biogas assistance program mechanism that has been implemented in Margamukti Village is reviewed from the four basic management functions (POAC) which have been implemented with the processes of planning, organizing, actuating and controlling although evaluation needs to be carried out in the planning and organizing functions.

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