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| RESEARCH ARTICLE

SROI Analysis of Social Innovation Programme Bumi Harmoni PT PLN NP UP Paiton

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| ABSTRACT
Social investments in Corporate Social Responsibility (CSR) programs, particularly for community development, often require substantial funding to achieve community independence. The Bumi Harmoni program, implemented by PT PLN NP UP Paiton, is one such initiative. This study aims to (1) analyze social innovations, (2) assess the program's impact on carbon sequestration, and (3) evaluate program performance. Data from 2021 to May 2024 were collected through interviews with group leaders, members, and CSR teams. A descriptive qualitative analysis and Social Return on Investment (SROI) methodology were employed. Results reveal social innovations, including seed banks, tree planting, organic waste utilization for maggot cultivation, and oyster mushroom cultivation. These initiatives address organic waste management, improve community economics, and contribute to carbon sequestration. The program achieved carbon sequestration of 357.79 tons of CO2 gg e, with potential for carbon tax conversion. The SROI analysis yielded a value of 1.82, indicating positive social returns. However, challenges may arise in maintaining seed bank health and managing waste utilization processes. The study demonstrates the program's potential to solve environmental and economic issues while generating measurable social impact. Future research could focus on the long-term sustainability and scalability of these initiatives.

| KEYWORDS
CSR, community development, social investment, carbon sequestration, SROI.

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1. Introduction
The company's contribution to reducing the increase of greenhouse gases is to change the company's operations; in addition to pursuing profits, the company must also pay attention, be involved in fulfilling the community's welfare, and actively contribute to preserving the environment (Wibisono, 2007). Through CSR programs, companies can conduct programs that will support carbon sequestration such as reforestation, seed bank creation, environmentally friendly agriculture, waste utilization of both organic and inorganic, sustainable livestock and fisheries, and other programs that are also associated with the problems and potential in the area of program implementation. Implementing CSR programs focusing on environmental issues requires a relatively high social investment. PT PLN NP UP Paiton, starting in 2021, has a CSR program that focuses on environmental aspects, namely the Bumi

Harmoni program. The program begins with creating a seed bank and planting trees and is directed at greening the somewhat arid Binor village. This area is ring I. The implementation of CSR programs must bring social innovation to solve social problems/needs (more effective than current solutions), encourage improvements in social capabilities and relationships, and better utilization of assets and resources. (MOEF, 2021). Reducing CO2 from the atmosphere through tree planting essentially increases the absorption of CO2 by plants through photosynthesis. Photosynthesis occurs in chlorophyll leaves, where carbon dioxide and water, with the help of sunlight through various metabolic processes, are converted into sugar, oxygen, and water. The rate of photosynthesis differs between plant species and between habitats. Fast-growing plants have high photosynthetic rates, but this does not mean that plants with high photosynthetic rates always grow fast (Ceulmens & Sauger, 1991). The performance of social innovation can be known through a social return on investment (SROI) analysis to see how the social benefits arise from the program. Wijaya O. et al. (2021) measured the impact of social investment on mushroom agribusiness development, and the SROI value was 2.23. Salsabila et al. (2022) measured the effect of productive zakat on the Kampung Batik Cibuluh Bogor program with an SROI value of 1.53. Laba, NI et al. (2022) measured the performance of the CSR program of PT PLN UIP JBTB in the Salah Rindikit Sugarcane group, Buleleng. It was found that the SROI value for the program was 3.45. Septasawitri D et al. (2023) showed that the SROI was 7.84 in the Dendeng Village household economic and food security program. However, this study did not include the calculation of carbon uptake that can be converted into a carbon tax. The period of CSR program implementation, if it is related to performance measurement using SROI, then the longer it is, the more parties benefit from the program. Kim (2022) measured a government program called long-term care insurance. The longer the program duration, the greater the SROI value because more program participants benefit. SROI is also implemented in sustainable social enterprises (Kim, DJ and Ji, YS, 2020), where employment is the most crucial factor in social enterprises, so social innovation impacts employment, increased income for vulnerable groups, and affordable social services.

2. Literature Review

Corporate social responsibility (CSR) has emerged as a critical component of business strategy worldwide. The World Business Council for Sustainable Development (WBCSD), in its publication "Making Good Business Sense," defines CSR as a corporate commitment to act ethically, operate legally, and contribute to improving the quality of life for employees, their families, and the broader community (Wibisono, 2007). The theoretical foundation underlying the implementation of CSR programs is the Triple Bottom Line (TBL) concept, proposed by John Elkington in 1997 in his book "Cannibals with Forks: The Triple Bottom Line of Twentieth Century Business." The TBL emphasizes companies' need to balance profit, people, and the planet. Elkington posits that companies must pursue not only profit but also contribute to social welfare (people) and environmental sustainability (planet) (Wibisono, 2007). Per the TBL, the Prince of Wales International Business Forum (Suprianto, 2007) identifies five pillars of CSR:

(1) building human capital (ensuring the company has reliable internal and external human resources).
(2) strengthening economies (empowering community economies).
(3) maintaining social cohesion (preserving harmony between the company and local communities)
(4) encouraging good governance (ensuring that companies operate with good governance).
(5) protecting the environment (focusing on environmental sustainability).

Additionally, social investment is a crucial aspect of CSR, as defined by the International Petroleum Industry Environmental Conservation Association (IPIECA) as corporate contributions that benefit stakeholders. The International Finance Corporation (IFC) further posits that social innovation is a form of corporate social contribution often aimed at community development. Furthermore, Social Return on Investment (SROI) provides a framework for understanding, measuring, and assessing the net social impact of activities, organizations, or interventions. According to Nicholls et al. (2012), SROI facilitates the quantification of the social effects that were previously difficult to measure, rendering them more accessible and comprehensible for assessment.

2.1 Social Return on Investment (SROI) and Its Application

SROI constitutes a well-established methodology to evaluate the social, environmental, and economic outcomes of corporate social responsibility (CSR) and social innovation programs. As Nicholls et al. (2012) defined, SROI provides a structured approach to measuring the frequently intangible social value generated by CSR initiatives. It presents a comprehensive framework for assessing the net social impact of an activity, thereby facilitating the quantification and communication of social outcomes.

2.2 Benefits and Limitations of SROI in Evaluating Social Programs

SROI has emerged as a crucial instrument for assessing the impact of CSR programs in Indonesia, enabling organizations to quantify the broader value generated by their initiatives (Anam et al., 2023; Astuti, 2020). For instance, PT PJB UP Paiton's Mikrohydro CSR program in Andungbiru Village yielded social and economic benefits while supporting environmental sustainability (Astuti, 2020). In some instances, SROI analysis reveals unanticipated positive outcomes, as evidenced by PT Kilang Pertamina's CSR program, which achieved an SROI value of 2.5, demonstrating substantial impact relative to the initial investment (Purwanto et al. 2023). Nevertheless, not all CSR programs in Indonesia attain an SROI value of 1, indicating the necessity for enhancements in program design and implementation (Purwanto et al., 2023). While SROI serves as a valuable tool for comprehending the impact of CSR initiatives, its limitations encompass challenges related to data collection, impact measurement, and the requirement for rigorous stakeholder engagement (Pathak & Dattani, 2014).

2.3 Context of PT PLN NP UP Paiton

2.3.1 Corporate Social Responsibility in Indonesia's Energy Sector

PT PLN (Persero), Indonesia's state-owned electricity provider, has significantly shaped the country's energy landscape, implementing various CSR initiatives focused on education, health, community empowerment, and environmental conservation (Khairani, 2024; Octaviana, 2017). As a state-owned enterprise, PT PLN's CSR efforts align with Indonesia's broader sustainable development goals, demonstrating the company's commitment to improving local communities while ensuring sustainable electricity provision (Fitriadi, 2020). Given the complex challenges energy companies face in balancing profitability with social responsibility, PT PLN's CSR strategy is essential in fostering positive relations with local communities and enhancing the company's public perception (Sentoso et al., 2024). Through effective communication and program implementation, PT PLN has consistently demonstrated its capacity to integrate social responsibility into its operations (Khairani, 2024).

2.4 General Insights into Social Innovation Programs

Social innovation programs address societal challenges and create lasting social impact through collaborative efforts involving multiple stakeholders, including beneficiaries, donors, and government entities (Andries et al., 2018; Siebold, 2020). These programs aim to empower communities, improve access to essential services, and enhance financial resilience (Vermeulen & Maas, 2019). Although specific details about the Bumi Harmoni program are limited, it probably adheres to similar social innovation principles. Such programs frequently focus on collaborative community efforts to improve social welfare and environmental sustainability (Vilarinho et al., 2018; Jacobi et al., 2019).

2.5 Application of SROI to the Bumi Harmoni Program

2.5.1 Validation Techniques for Social and Environmental Impacts

The SROI methodology enables organizations to quantify the social, environmental, and economic value generated by corporate social responsibility initiatives (Charles et al., 2019). For example, the Jagapati Mangrove Conservation Program demonstrated a notable SROI ratio of 8.13, indicating substantial value creation from each unit of investment (Prasadi et al., 2023). Similarly, SROI can be utilized to evaluate the outcomes of social innovation programs such as Bumi Harmoni by comparing the value of benefits generated to the initial investment. However, while SROI is a valuable tool, its practical implementation can be challenging due to difficulties in impact measurement and data collection (Moody et al. 2015).

2.6 SROI Analyses of Other Social Innovation Programs in Indonesia

Several CSR and social innovation programs in Indonesia have undergone SROI analysis, yielding diverse outcomes. For instance, PT PLN Indonesia Power's CSR program in Margasari village generated an SROI value of 20.39, substantially surpassing the initial investment (Bandung et al., 2023). Conversely, PT Pertamina's mangrove conservation program in Cilacap achieved an SROI ratio of 8.13 (Prasadi et al., 2023), while the Indonesian Teaching Fellowship program by Ruangguru resulted in an SROI ratio of 2.62 (Galih Prakasita & Lestari Fawzi, 2022). These analyses demonstrate the potential of SROI to quantify the comprehensive social value generated by CSR programs across various sectors.

2.7 Strengths and Weaknesses of the SROI Approach

The SROI approach exhibits several strengths, including its capacity to monetize social outcomes and provide a comprehensive framework for assessing social impacts (Watson & Whitley, 2016). Through facilitating stakeholder engagement and promoting organizational learning, SROI enables businesses to comprehend the broader value of their CSR activities (Moody et al. 2015).

Nevertheless, SROI also encounters limitations, such as variability in application across diverse programs and sectors (Pathak & Dattani, 2014). Critics contend that reducing social impacts to a single monetary value may oversimplify complex outcomes (Mook et al. 2015), and data collection and calculation challenges frequently complicate the process (Nielsen et al. 2020).

2.8 Lessons Learned from the SROI Analysis of Bumi Harmoni

The SROI analysis of the Bumi Harmoni program can provide valuable insights into its social, environmental, and economic impact. To enhance future SROI studies, it is imperative to prioritize stakeholder engagement and utilize both qualitative and quantitative methodologies to capture comprehensive data (Banke-Thomas et al. 2015). Transparency in methods and assumptions is also crucial to ensure the validity and reliability of the results (Maier et al. 2014).

2.9 Future Research Directions

SROI presents considerable potential for monitoring long-term social impacts through longitudinal studies. By integrating SROI with other evaluation frameworks, such as Health Impact Assessments, researchers can better understand the social value generated by CSR programs (Ashton et al., 2023; Green et al., 2020). Future research should focus on optimizing the application of SROI in decision-making processes and enhancing the integration of SROI with other evaluation methodologies to provide a more comprehensive view of value and impact (Hannah-Russell et al., 2022).

3. Method

Primary data was obtained through surveys and interviews with the Chairman, Group, Secretary, Treasurer, subgroup administrators, and the CSR team of PT PLN NP UP Paiton. Secondary data was obtained from PT PLN NP UP Paiton CSR program report data, recipient group report data, and previous research. Social innovation and carbon sequestration in the Bumi Harmoni program were analyzed using a descriptive qualitative method. Meanwhile, the method used to calculate the performance of social innovation is Social Return on Investment (SROI). The SROI method involves inputs, outputs, and outcomes of social investment that are measured by involving the assessor's judgment. The following is the formula for calculating the SROI value.

SROI = PV Impact / Investment Valeu

4. Results and Discussion

4.1 Regional Overview

Binor Village has three hamlets, Klompangan, Krajan, and Pesisir, with a total population 2023 of 2,733 people, a male population of 1,372 people, and a female population of 1,361. Most of the population's education level is elementary school graduates (26.3%). Still, there are residents with a bachelor's degree as much as 6%, thus

becoming a potential human resource for the village. In terms of occupation, the majority of Binor Village residents take care of the house (homemakers), and it turns out that the number of people who do not work is 577 people (21%), a figure that is large enough to be a problem for the village to be able to employ its residents. The condition before the program's implementation, based on the results of social mapping carried out by PT PLN NP UP Paiton update 2023, was that the community in Binor Village faced several problems. These problems are poverty, unemployment, massive use of drugs and alcohol among young people, people still littering (in the river and the yard), many wild boar attacks, low business development of KUB, and public facilities are still minimal. Conservation areas are still limited, and tourists must be in great demand for educational and conservation tours. In addition to the problems mentioned above, Binor Village also has good potential for sustainable livelihoods, including:

1) Natural resource capital/assets with a score of 3.79 (good)
2) Physical capital/assets with a score of 3.94 (good)
3) Human capital/assets with a value of 3.47 (good)
4) Capital/financial resources with a score of 2.46 (fair)
5) Social capital/assets with a score of 4.03 (very good).

The potential for sustainable livelihoods with an average score of good indicates that the Binor Village community has good capital/assets to support sustainable livelihoods. Based on the problems and potentials in Binor Village and the theme of PLN NP UP Paiton's CSR program, which is environmental conservation, an integrated program that synergizes the village, youth group, PKK, and cadres was conducted under the name Bumi Harmoni Program.

4.2 Social Innovation

Social innovations in the Bumi Harmoni program include using organic waste, which is household waste with considerable potential (360 kg per month), as raw material for maggot cultivation. The results of this maggot will be used as bird feed in aviary cages to save operational costs from feeding in the Bumi Harmoni eco-tourism area.

The Bumi Harmoni program is a solution to problems in the Binor village area, including the problem of wild boar pests that often attack agricultural land, reducing the number of flora and fauna poaching because previously Perisai group members were hunters of rare animals and turned into conservators, reducing the economic inequality rate of Klompangan Hamlet, creating a new tourist area, namely an educational tourism center that can generate added value for the community, potentially overcoming problems related to organic waste through maggot cultivation and compost processing, and reducing the area of critical land with planting activities.

Until May 2024, various activities in the Bumi Harmoni Program have been carried out. The Bumi Harmoni Program has one food stall (Warung Alas), one educational pavilion, an outbound area, one vegetable greenhouse, one mushroom house, one maggot house, a mosque, an access road connecting between activity locations, as well as provides forest patrol equipment and supporting tools for other activities in the Bumi Harmoni eco-Edu Park area. There are implementing groups in the Bumi Harmoni Program that have carried out vegetable cultivation and development of derivative products, mushroom cultivation to supply the needs of Warung Alas, maggot cultivation to utilize organic waste and supply feed to aviary cages, management and certification of Warung Alas, installation of sensor devices to repel wild boars, forest patrols, flora and fauna education through tour packages, and planting carried out in Binor Village and its surroundings.

4.3 Calculation of Carbon Sequestration

The calculation of carbon sequestration in the Bumi Harmoni program includes activities in the seed bank and planting sub-program, composting in the seed bank, maggot cultivation, and oyster mushroom cultivation. Based on the results of the analysis and calculation of carbon sequestration in the three sub-programs, it can be seen that the total carbon sequestration is 357.79 tons of CO2 gg e. Details of the carbon sequestration calculation are as follows:

Table 1. Total Carbon Reduction of Bumi Harmoni Program

Greenhouse Gas Emissions Reduction (CO_2 tons/year)					
Activity	**Planting**	**Mushroom Cultivation**	**Compost**	**Maggot Cultivation**	**Total**
Nilai (ton CO_2 gg e)	238,12	14,72	39,54	65,41	357,79

4.4 Analysis of Social Return on Investment (SROI)

The Social *Return on Investment* (SROI) analysis is focused on the Bumi Harmoni program with a database from 2021 to May 2024. The analysis is carried out when the program is already ongoing or ongoing because the program has yet to be completed and will continue until the end of 2024. Here are the stages of SROI analysis.

4.4.1 Identifying Stakeholders and Calculation Approach

The key stakeholders involved in the Bumi Harmoni program that has been implemented in Binor Village are as follows:

Table 2. Identification of Key Stakeholders

Stakeholders	Role in the Program	Impact
PT PLN NP UP Paiton	Provide initial resources and assistance to target communities and foster groups.	Improved program performance
Binor Village Head	As the party that has authority in every program in Binor Village	Receive facilitation to develop Binor Village and synergize with PLN NP UP Paiton to optimize village progress.
Shield Group	As a program beneficiary, I can enhance assets, conserve flora and fauna, train on seed bank creation and planting, teach mushroom cultivation, and provide maggot cultivation training.	The group experienced increased assets, income, skills, and knowledge regarding flora and fauna conservation, nursery and planting, and mushroom and maggot cultivation. The group is vulnerable due to unemployment.
PKK Group	As a beneficiary of programs that support the Earth Harmony Program	Group experiences increased assets and skills in greenhouse planting

Each leading stakeholder group has its role and impact on the program's implementation, which can be done with a financial calculation approach. The main stakeholders of the Bumi Harmoni program are the Shield Group and PKK. For more, refer to Table 3.

Table 3. Calculation and monetization approach

Impact	Calculation Approach	Monetization Approach	Source of Information
Shield Group			
Asset enhancement	Calculating the value of increased asset value	Equivalized to the additional value of assets received	PT PLN NP UP Paiton CSR Report document and interview result with the group
Increased group Income from pedestal stalls	Calculating income level per year 2022	Equivalized to 2022 And 2023 sales values	Pedestal stall documents and interviews with groups
Improved knowledgeand skills in seed bank creation and planting, mushroom cultivating training, maggot cultivation training	Calculating the value of knowledge and skills improvement and the benefits of training outcomes	The value of the benefits received is equated to something of value; in this case, the cost of the training, if done independently.	PT PLN NP UP Paiton CSR Report document and interview results with the group
PKK Group			
Improved knowledge and skills in vegetable breeding and growing media	Calculating the value of knowledge and skills improvement and the benefits of training outcomes	The value of the benefits received is equated to something of value, in this case, the cost of the training, if done independently.	PT PLN NP UP Paiton CSR Report document and Interview results with the group
Increased income	Calculate the net sales of vegetables to supply the pedestal stalls and sell to the community	Equated to the value of sales obtained each month, and already starting from 2023	PT PLN NP UP Paiton CSR Report document and interview results with the group
Reduce the cost of media and growing media and fertilizer	Calculating cost efficiency because the growing media is obtained from mushroom blog waste and dry waste made into compost	Equalized to the value of reduced cost of planting media and fertilizer so that the group does not need to buy	PT PLN NP UP Paiton CSR Report document and interview results with the group

4.4.2 Calculation of Impact Value and SROI

The calculation of the impact value and SROI of the Bumi Harmoni Program by considering the deadweight, Displacement, Attribution, and Drop value is as follows:

Table 4. Social Investment of Bumi Harmoni Program

Input	2021 (Rp)	2022 (Rp)	2023 (Rp)	2024 (Rp)	Total (Rp)
Activities in the program					
Construction of a peacock breeding cage	40.000.000				40.000.000
Creating a garden in the aviary cage	7.000.000				7.000.000
Procurement of a breeding pair of destructive peacocks with official ownership License	2.700.000				2.700.000
Procurement of a breeding pair of destructive peacocks with an official ownership license		82.800.000			82.800.000
Seed Bank and Wood Plant Cultivation training		15.310.000			15.310.000
Faba-based Paving in Conversation		30.000.000			30.000.000
Purchase of Animal Monitoring Camera Trap			10.000.000		10.000.000
Installation of Hunting Prohibition Board			10.000.000		10.000.000
Purchase of Binoculars			6.000.000		6.000.000
Fuel for Patrol Activities			4.800.000		4.800.000
Patrol Activity Consumption			4.800.000		4.800.000
Warung Alas Chef Training			15.000.000		15.000.000
Purchase of Seed Bank Polybags			3.000.000		3.000.000
Purchase of Lamtaro Seedings			5.000.000		5.000.000

Maggot Cultivation Training			5.000.000		5.000.000
Organic Waste Basket			1.500.000		1.500.000
Expert Assistance for Maggot Cultivation (2 people)			12.000.000		12.000.000
Maggot House Making			10.000.000		10.000.000
Safety Equipment and Rope Outbound			42.250.000		42.250.000
Construction of Flying and Outbound Docks			22.750.000		22.750.000
Mushroom House Making			45.000.000		45.000.000
Seedling Purchase			11.000.000		11.000.000
Baglog purchase			5.000.000		5.000.000
100 Kg Goods			850		850
Scale					
Mushroom Harvest Basket			500		500
Conservation, education, and ecotourism assistance term 2			65.000.000		65.000.000
Conservation, education, and ecotourism assistance term3			62.350.000		62.350.000
Making smart hydroponics			1.500.000		1.500.000
Manufacture of mushroom production shed				15.737.000	15.737.000
Creation of flora and fauna monitoring Documents				45.343.500	45.343.500
Wild boar repellent tool				34.965.000	34.965.000
Vegetable cultivation				5.480.070	5.480.070

Earth Harmony outbound equipment				30.375.150	30.375.150
Development of a learning pavilion				17.538.000	17.538.000
Vegetable and maggot cultivation equipment				23.977.110	23.977.110
Oyster mushroom processing Equipment				49.950.000	49.950.000
Total investment	49.700.000	128.110.000	343.300.000	223.365.830	744.475.830
Total PV investment	49.700.000	123.182.692	312.147.663	199.076.949	684.107.305

The total input value as a social investment in the Bumi Harmoni program is IDR 744,475,830, which is the sum of the investments made by PT PLN NP UP Paiton from 2021, 2022, 2023, and 2024. By using the BI 7-Day Reverse Repo rate (BI&DRR) in 2021 of 3.5%, 2022 at 4%, 2023 at 5.75%, and 2024 at 6.1%; it is known that the present value of the total social investment is IDR 684,107,305.

Table 5. Calculation of Social Impact Fixation and SROI of Bumi Harmoni Program

Outcome/Social benefit	2021 (Rp)	2022 (Rp)	2023 (Rp)	2024 (Rp)	Total (Rp)
Saung alas revenue		205.884.500	130.335.000		336.219.500
PKK group income: Vegetable cultivation and processing			34.480.000		34.480.000
Reduced cost of planting media and fertilizer for vegetable cultivation groups			4.320.000		4.320.000
Increase in group assets	49.700.000	112.800.000	172.850.000		335.350.000
Improved skills of group members					-
Seed Bank and Wood Plant Cultivation Training (10 people)		15.310.000			15.310.000
Pedestal stall chef training (5 people x Rp4,500,000)			22.500.000		22.500.000
Mushroom cultivation training (15 people x Rp1,500,000)			22.500.000		22.500.000
Maggot Cultivation Training (12 people x Rp1,000,000)			12.000.000		12.000.000
savings (per month IDR 750,000)			3.000.000	9.000.000	12.000.000
Bumi Harmoni development cost savings			127.350.000		127.350.000
Increase in group assets (smart hydroponics)			1.500.000		1.500.000
Increase in group assets (mushroom production warehouse)				15.737.000	15.737.000
Increase in group assets (flora and fauna monitoring document equipment)				45.343.500	45.343.500

Increase in group assets (wild boar repellent)				34.965.000	34.965.000
Cost savings on vegetable cultivation				5.480.070	5.480.070
Increase in group assets (Earth Harmony outbound equipment)				30.375.150	30.375.150
Increased value of group assets (Development of learning pavilion)				17.538.000	17.538.000
Increase in group assets (Vegetable and maggot cultivation equipment)				23.977.110	23.977.110
Increase in group assets (oyster mushroom processing equipment)				49.950.000	49.950.000
Proceeds from oyster mushroom sales				2.055.000	2.055.000
Pedestal stall revenue			344.461.000	36.940.000	381.401.000
Proceeds from the sale of vegetables and vegetable sticks				5.205.000	5.205.000
Konversi serapan karbon dalam pajak karbon (357.790 kg x Rp30)				10.733.700	10.733.700
Total Outcome	49.700.000	333.994.500	875.296.000	287.299.530	1.546.290.030
PV Total Outcome	49.700.000	321.148.558	827.703.073	270.781.838	1.469.333.469
Deadweight (without company intervention)	0	0	0	0	
Displacement (positive activities lost due to the program)	0	0	0	0	
Attribution (impact due to other parties: independent construction of the pedestal shop building by the group)	0	0,15	0,15	0,15	
Drop Off (decrease in impact: depreciation)	0	0,01	0,01	0,01	

Impact fixation	49.700.000	270.246.511	696.512.136	227.862.917	1.244.321.564
SROI Ratio	**1,00**	**2,19**	**2,23**	**1,14**	**1,82**

The result of the calculation of the impact value **is Rp1,546,290,030.** Then, it is known that the present value of the total outcomes is **1,469,333,469.** After the input and outcome values are known, the following process is to fix the impact by considering the value of deadweight, attribution, displacement, and drop-off. PT PLN NP UP Paiton initiated this program, so the deadweight value is 0, and displacement is 0 because there is no positive activity lost due to the program, where shield group members previously hunted rare animals. Meanwhile, from attribution in 2022, the pedestal stalls that were built Independently by the group have started to operate, so it is assumed that there is a contribution of 15% of the overall impact in 2022-2024, while the drop off is 1% of the overall impact because it is only from the decrease in asset value. Based on the SROI calculation, it is known that Rp1 social investment brings Rp1.82 social benefits. When viewed from its development, the SROI value is increasing from 2021, which is only 1, to 2.19 in 2022, increasing in 2023 to 2.23. Meanwhile, 2024 became 1.14 because the impact calculation was only until May 2024.

4.4.3 Triple Loop Learning

The Bumi Harmoni program has been implemented since 2021 and will end in 2024 (according to the roadmap). Based on the results of in-depth interviews with the Shield Group as a group that cooperates with other groups that can work together and the CSR team of PT PLN NP UP Paiton regarding key factors and improvement/development plans. The key factors that are considered to contribute to the success of the program according to the program initiator, in this case, PT PLN NP UP Paiton, are the many local heroes in Binor Village and the commitment of the Village to support not only approve but also contribute in real terms in encouraging its citizens to succeed the program even with the support of independent funding from the Village to be able to optimize the impact and extent of the impact of the program. On the other hand, there are still weaknesses, especially regarding administration. This makes it difficult for the CSR team to detect how much impact the program recipients feel. The future program plan is to optimize the impact because all development programs have been implemented so that in the following year, there will be an expansion of the impact and more parties involved in the program. The facilitation that will be provided is support for the promotion carried out by the group, processing the original product so that there is added value, and asking for the group's commitment to be able to tidy up the administration to facilitate tracking the impact of each activity that has been carried out. The key factors that are considered to contribute to the success of the program, according to the beneficiaries, are the Village Head, the Heads of the integrated groups such as the Shield Group, Pustaklim Group, Warung Alas Group, Maggot Cultivation Group, Green House Group, Youth Organization, cadres, and PKK. As analyzed in the social mapping, the social capital in Binor Village is outstanding. In addition to the actors in the group, PT PLN NP UP Paiton also supports any development of group activities so that they can have a more significant impact. The plan that the Village and the Perisai group will carry out is to develop facilitation in nature tourism and increase the productivity of each group to improve the economy of group members in particular and the community in general, such as mushroom processing, vegetable processing, and provide nature tourism packages to schools so that more parties will benefit from this nature tourism education.

5. Conclusion

The Bumi Harmoni program implemented by PT PLN NP UP Paiton demonstrates significant social and environmental impacts:

1. Social innovations include seed bank creation, flora and fauna conservation, maggot cultivation, mushroom cultivation, and greenhouse development. These initiatives address community issues related to waste management, land aridity, low economic levels, and high unemployment.

2. The program achieved substantial carbon sequestration, totaling 357.79 tons of CO2 equivalent. This includes 238.12 tons from seed banks and annual plant cultivation, 39.54 tons/year from oyster mushroom cultivation, 14.72 tons/year from seed bank composting, and 65.41 tons/year from maggot cultivation.
3. The Social Return on Investment (SROI) analysis yielded a value of 1.82, indicating that for every 1 IDR invested, 1.82 IDR of social benefits are generated. This demonstrates the program's effectiveness in creating a positive social impact beyond the initial investment.

5.1 Study Limitations

1. Time constraint: The study covers data only up to May 2024, which may limit the long-term impact assessment of the Bumi Harmoni program.
2. Limited geographical scope: The study focuses solely on Binor Village, which may not be representative of other areas where similar programs could be implemented.
3. Potential bias in stakeholder interviews: The reliance on interviews with group leaders, members, and CSR teams may introduce some bias in the data collected.
4. Challenges in quantifying social impact: While SROI provides a numerical value, some social impacts may be difficult to accurately quantify in monetary terms.

5.2 Suggestions for Future Research

1. Long-term impact assessment: Future studies could extend the timeframe to evaluate the program's sustainability and long-term effects beyond 2024.
2. Comparative analysis: Research comparing the Bumi Harmoni program with similar initiatives in other regions or by other companies could provide valuable insights.
3. In-depth analysis of specific social innovations: Further studies could focus on individual components of the program, such as the seed bank or maggot cultivation, to assess their replicability and scalability.
4. Environmental impact assessment: While carbon sequestration is addressed, future research could delve deeper into other environmental impacts of the program.
5. Economic multiplier effects: Studies examining the broader economic impacts on the community beyond the direct program beneficiaries could be valuable.
6. Refinement of SROI methodology: Research into improving SROI calculations for CSR programs, particularly in quantifying intangible benefits, could enhance future evaluations.

5.3 Recommendations

1. Develop value-added processing for oyster mushrooms to increase group income and economic benefits.
2. Expand market reach for environmentally friendly vegetable products by targeting specific market segments.
3. Enhance carbon sequestration efforts through:
    a) Maintenance and expansion of fruit tree plantations (e.g., guava, crystal guava, petai, jackfruit, and avocado) to increase community income through fruit harvests.
    b) Mapping and integrating short-cycle crops (e.g., corn, rice) and animal feed crops creates a measurable, integrated agricultural system with higher carbon sequestration potential.
    c) Improved management and utilization of agricultural, plantation, and forestry waste biomass for fertilizer, baglog media, and maggot feed, providing additional carbon sequestration value.
4. Strengthen administrative processes to better track and measure program impacts across all activities.
5. Expand program reach by involving more community members and stakeholders to maximize impact and sustainability.
6. Enhance promotion and marketing efforts for the eco-tourism aspects of the program to increase visibility and potential income generation.
7. Develop nature tourism packages targeting schools to broaden the educational impact and increase the number of beneficiaries.
8. Continue to foster strong partnerships between PT PLN NP UP Paiton, local government, and community groups to ensure long-term program sustainability and impact.

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