

Transforming the Siak River Ecosystem: Corporate-Based Community Development and Economic Diversification

Azahrah Silvianti^{1*} , Rizqi Prima Haksasi¹

¹PT PLN Nusantara Power UP Tenayan

Simpang Badak, Jl. Ringroad 70 RT 4 RW 2, Pekanbaru, Riau 28285, Indonesia

*Corresponding Email: azahrahsilvnt@gmail.com

ARTICLE INFORMATION

Publication information

Research article

HOW TO CITE

Silvianti, A., & Haksasi, R. P. (2026). Transforming the Siak River ecosystem: Corporate-based community development addresses river ecosystem degradation and economic diversification. *Journal of the Community Development in Asia*, 9(3), 388-403.

DOI:

<https://doi.org/10.32535/jcda.v9i3.4822>

Copyright © 2026 owned by Author(s).
Published by JCDA



This is an open-access article.

License:

Attribution-Noncommercial-Share Alike
(CC BY-NC-SA)

Received: 11 July 2026

Accepted: 16 August 2026

Published: 19 September 2026

ABSTRACT

This study evaluates the socio-economic and environmental impact of the Dewantara Program, a multi-stakeholder partnership among PT PLN Nusantara Power UP Tenayan, community groups, government, and academia along the Siak River, Tebing Tinggi Okura, Riau. The partnership addresses river ecosystem degradation from annual erosion of 10–20 meters, 4 hectares of critical land, and declining fisheries income alongside chronic community economic vulnerability. Using a Social Return on Investment (SROI) approach combined with qualitative case-study methods (in-depth interviews, focus group discussions, and document review), this study measured value created by three interventions: FABA-based B-Block coastal conservation, biofloc and earthworm cultivation, and community-managed ecotourism. From 2022 to 2025, the partnership generated a total present value of impact of IDR 1,261,838,199 against IDR 583,194,080 in contributed resources, yielding an SROI ratio of 2.16. Economic impact accounted for 86% of total value, with the community-led Pokdarwis tourism group capturing the largest share (84.76%). Mangrove rehabilitation success rose from 30% to 90% along 212 meters of coastline. These findings suggest that river-based community development achieves greater social value when structured as a genuine multi-stakeholder partnership rather than a single-actor intervention.

Keywords: Community Development; Environmental Restoration; Multi-Stakeholder Partnership; Social Return on Investment; Sustainability

JEL Classification: O22; Q01; Q51; Q56; Q57

INTRODUCTION

Community development in areas surrounding degraded natural resources increasingly requires coordinated engagement among local communities, government, academic institutions, and resource-owning organizations, as no single stakeholder possesses the financial resources, technical expertise, and institutional legitimacy necessary to achieve sustainable change independently. This has contributed to the growing body of literature on cross-sector and multi-stakeholder partnerships, which conceptualizes community development not as a service delivered by one party to another, but as a collaborative process in which each partner contributes distinct yet complementary resources (Freeman, 1984; Selsky & Parker, 2005). Riverine communities experiencing simultaneous ecological degradation and economic decline provide a particularly relevant context for this partnership approach, as both ecosystem restoration and livelihood recovery require capacities that are rarely held in their entirety by a single actor. Furthermore, evaluating the economic losses suffered by residents due to environmental degradation underscores the urgent necessity for collaborative community-based intervention strategies to restore degraded ecosystems (Maga & Marei, 2026).

This capacity gap is not merely theoretical. Local governments in resource-degraded areas frequently lack the technical expertise needed to design ecological restoration interventions, while corporations possess the technology and capital but often lack the community trust required for sustained local participation. Community groups, in turn, hold the contextual knowledge and legitimacy needed to sustain any intervention beyond a program's funding cycle, but rarely control the resources needed to initiate it. Multi-stakeholder partnership models are therefore not simply a preferred organizational form; they represent a structural response to a distribution of capacities that no reallocation within a single sector could resolve (Wanner & Miljand, 2025).

Tebing Tinggi Okura, a village along the Siak River in Rumbai Timur District, Pekanbaru, illustrates this compounded vulnerability. The Siak River itself is recorded as one of the deepest rivers in Indonesia and has long served as a major transportation route, yet industrial pressure and land conversion along its course have produced sedimentation, riparian vegetation loss, and declining fish populations and fishermen's income at multiple points along the river (Onrizal & Mansor, 2020). According to the internal impact-assessment documentation of PT PLN Nusantara Power UP Tenayan (2025), the specific riverbank in Tebing Tinggi Okura has experienced annual erosion of 10–20 meters, resulting in approximately 4 hectares of critically degraded land. As a result, fishers' daily income has declined from approximately IDR 200,000–300,000 to around IDR 100,000, while nearly four hectares of land have reached a critical state of degradation. At the same time, the surrounding palm oil industry generates approximately 58,400 tonnes of empty fruit bunches (EFB) annually in Rumbai Timur District. Although currently underutilized, this biomass represents a valuable, shared resource with considerable potential to support both ecosystem restoration and sustainable livelihood initiatives (Alcocer-García et al., 2025).

These compounding pressures are not unique to Tebing Tinggi Okura. Similar patterns of riverbank erosion, declining fisheries income, and underutilized agricultural or industrial by-products have been documented across multiple river systems in Sumatra and Kalimantan, suggesting that the vulnerability profile addressed by the Dewantara Program reflects a broader structural condition affecting riverine communities near industrial or plantation zones in Indonesia, rather than a site-specific anomaly.

In response to these challenges, the Dewantara Program was established based on the "Rivers Life" philosophy, bringing together local community groups, namely Pokdarwis, KPPS, and the SIJ Group as the primary actors and implementers of the program. PT PLN Nusantara Power UP Tenayan serves as a strategic partner by providing technological innovation, particularly the FABA-based B-Block conservation technology, along with financial and operational support. Academic partners, represented by STT Pekanbaru, contribute laboratory testing and technical validation, while the local government provides institutional facilitation and regulatory legitimacy. Each partner's role was defined not arbitrarily but in relation to a specific resource gap identified during the program's initial scoping phase. PLN's contribution addressed the community's lack of erosion-control technology and capital; the academic partner's contribution addressed the absence of technical validation capacity within the community groups; and the local government's facilitation role addressed the community's limited authority to secure land-use permissions along the riverbank. This resource-gap mapping approach shaped the subsequent design of the partnership's governance structure, described further in the Research Method section. This cross-sector partnership structure is consistent with the proposition that effective collaboration depends on clearly identifying the resources and sources of legitimacy contributed by each partner from the outset of the partnership (Bryson et al., 2006; Zhang et al., 2025). Rather than relying on a single organization to direct community development toward predetermined outcomes, the partnership integrates three previously independent community-based initiatives into a unified value chain, with each stakeholder fulfilling a distinct and complementary role that cannot readily be substituted by another.

Despite the scale of this collaboration, empirical evaluation of multi-stakeholder river-restoration partnerships through a monetized social-value lens remains scarce; existing Social Return on Investment (SROI) studies in Indonesia have overwhelmingly examined single-sponsor corporate social responsibility (CSR) programs (Ainuddin et al., 2024; Suryawati et al., 2024; Yana & Nainggolan, 2023), leaving the specific value-creation dynamics of community-led, multi-partner river restoration largely unexamined. This study addresses that gap by applying an SROI framework to the Dewantara Program, evaluating both the monetary ratio of social value generated relative to resources contributed, and complementing this quantitative assessment with a qualitative analysis via the Most Significant Change technique of the capacity-building, institutional-strengthening, and value-chain-integration pathways through which partners jointly created this value (Pastore et al., 2025). Accordingly, this study aims to: (1) measure the SROI ratio of the Dewantara Program for the 2022–2025 period; (2) identify the stakeholder groups and impact domains- environmental, economic, social, and well-being that generate the greatest share of value; and (3) formulate theoretical and managerial implications for multi-stakeholder partnership models in river ecosystem-based community development. The novelty of this study lies in evaluating a community-led, multi-partner river restoration model through a monetized social-value framework, offering an evaluation approach that may inform the design and assessment of similarly structured partnerships, while acknowledging that generalizability beyond this single case requires further comparative research.

LITERATURE REVIEW

This section draws on four bodies of theory, each performing a distinct analytical function in this study. Cross-sector partnership theory explains why Dewantara Program's four actors chose to collaborate rather than act independently. Shared value and stakeholder theory explain what each partner is expected to gain from that collaboration, and therefore why the partnership's roles were divided the way they were. Empirical application of this shared-value logic in fence-line community contexts similar to Tebing

Tinggi Okura shows that successful value creation depends on sustained trust-building alongside resource contribution, not resource contribution alone (Lizama & Royo-Vela, 2023). Community-based restoration literature grounds the specific ecological mechanism through which the partnership's environmental interventions were expected to produce downstream benefits. SROI theory supplies the evaluative bridge that converts the outcomes generated by the first three perspectives into a single, comparable monetary metric, the ratio reported in the Results section.

Cross-Sector and Multi-Stakeholder Partnerships for Community Development

Cross-sector partnership theory argues that complex social and environmental challenges exceed the resource capacity and legitimacy of any single actor, thereby requiring collaboration among businesses, government, civil society, and community organizations, each contributing complementary and non-overlapping resources (Selsky & Parker, 2005). This framework is further supported by propositions on collaboration design that emphasize early-stage mapping of legitimacy and resources among partners (Bryson et al., 2006). Within this framework, partnerships are positioned along a continuum ranging from transactional exchanges to fully integrative collaborations that are jointly developed, with integrative partnerships associated with the greatest potential for creating shared value for both communities and partner organizations (Austin & Seitanidi, 2012).

This partnership logic is also aligned with the concept of shared value, which frames business success and community progress as interdependent (Menghwar & Daood, 2021), and is compatible with the four-dimensional view of corporate responsibility: economic, legal, ethical, and philanthropic as roles to be jointly fulfilled by corporate partners in a collaboration (Menghwar & Daood, 2021). It is further consistent with the triple-bottom-line premise that sustainability must be assessed across social, environmental, and economic dimensions simultaneously (Elkington, 1998). Together, these perspectives explain the division of roles adopted in this study: PLN's role corresponds to its economic and philanthropic responsibility, the community groups' role corresponds to their position as both beneficiaries and co-producers of shared value, and government and academia's facilitation roles correspond to the legitimacy and validation functions identified by cross-sector partnership theory above. Coordination across partners in the Dewantara Program also reflects the pentahelix partnership model, which integrates government, academia, business, community, and media in village-level development. Active community participation and structured local involvement are decisive factors in fostering a sense of ownership, which ultimately drives the long-term sustainability of village development initiatives (Amin et al., 2023).

River Ecosystem Restoration and Community Livelihoods

Riverine communities in Indonesia are disproportionately exposed to the combined impacts of industrial activities, riverbank erosion, and declining fish stocks, all of which undermine livelihoods in the informal sector and deepen economic vulnerability. These challenges are evident not only along the Siak River but also in similar patterns of environmental degradation across many coastal and riparian areas in Indonesia (Kusumadewi et al., 2024; Onrizal & Mansor, 2020). As a result, partnership-based restoration approaches that integrate erosion control structures, mangrove rehabilitation, and livelihood diversification have become increasingly favored over single-actor interventions. Such approaches distribute both the technical responsibilities of ecosystem restoration and the long-term accountability for its sustainability among multiple institutions with a shared interest in achieving lasting outcomes.

Empirical evidence shows that community-based mangrove management can enhance biodiversity while providing more effective coastal protection than top-down restoration

approaches managed solely by a single institution (Damastuti et al., 2022; Damastuti et al., 2023); nevertheless, the ongoing challenges of mangrove degradation in Indonesia continue to require integrated cross-sector management strategies to prevent long-term restoration failure (Utami et al., 2024). Empowerment interventions that build agribusiness and technical competencies among local group members are essential for facilitating sustainable transitions toward community-led environmental and economic restoration (Komariyati et al., 2022).

Empirical Evidence from Community-Based Development Programs in Indonesia

Beyond the theoretical propositions discussed above, a growing body of empirical case studies from Indonesian community development journals offers converging evidence on the conditions under which community-based programs achieve durable outcomes. Studies of village-level tourism development consistently identify structured community involvement, rather than external funding volume alone, as the decisive factor in program sustainability (Amin et al., 2023). Similarly, research on cultural and heritage tourism initiatives shows that community organizations functioning as active promotional intermediaries, rather than passive recipients of program benefits, achieve stronger long-term engagement outcomes (Hardi & Fahri, 2023). These findings parallel the capacity-building emphasis found in agribusiness-focused community empowerment programs, where technical skill transfer to local group members is identified as a precondition for the transition from externally supported to self-sustaining economic activity (Komariyati et al., 2022).

Evidence from other extractive- and industrial-adjacent community development contexts in Indonesia further reinforces the relevance of monetized impact evaluation to this study. Research examining the economic costs borne by communities affected by environmental degradation from industrial activity demonstrates that unquantified environmental harm tends to be systematically underweighted in corporate program design, reinforcing the need for evaluation frameworks that make such costs and their mitigation explicit and comparable (Maga & Marei, 2026). In tourism contexts specifically, community-based management of environmentally sensitive sites has been shown to generate sustainable outcomes only when governance structures distribute both authority and benefit across participating groups, rather than concentrating them within a single anchor organization (Raya et al., 2025), an observation directly relevant to the impact concentration findings reported later in this study. Complementary evidence also indicates that structured financial and accounting practices, alongside deliberate branding strategies, strengthen the competitive resilience of community-led economic groups once external program support diminishes (Manuari & Mendra, 2026), while the adoption of digital marketing channels has been shown to expand market reach for community-based tourism and derivative products beyond what physical-site visitation alone can achieve (Yusof et al., 2026).

Taken together, this empirical literature suggests that the mechanisms driving the Dewantara Program's outcomes- distributed governance, capacity transfer, and monetized impact accountability are not idiosyncratic to this case, but reflect patterns observed across a wider range of Indonesian community development contexts, even though few of these studies apply the SROI method specifically to river-restoration partnerships.

SROI as a Framework for Evaluating Partnership Impact

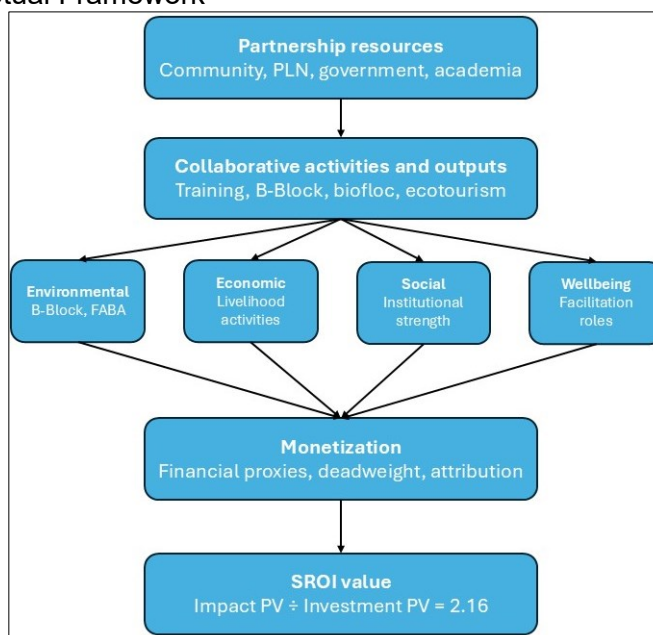
SROI is an impact evaluation method that monetizes the social, economic, and environmental value created relative to the resources invested, expressing the results as a ratio (Pastore et al., 2025). Because SROI requires explicit stakeholder mapping and impact attribution across all contributing parties, it is particularly well suited to

evaluating multi-stakeholder partnerships such as the Dewantara Program, where value is co-created rather than delivered by a single funding organization (Bakar et al., 2023). The application of the SROI framework to various corporate social responsibility (CSR) programs implemented by Indonesian state-owned enterprises has revealed considerable variation in SROI ratios, ranging from below 3 to above 20. These findings suggest that program design, rather than the scale of investment alone, is a key determinant of the social value generated (Ainuddin et al., 2024; Suryawati et al., 2024; Yana & Nainggolan, 2023). This variation matters for interpretation: a bare ratio, without reference to comparable programs, offers limited evaluative meaning. Situating the Dewantara Program's ratio of 2.16 within this documented range above the lower bound but below the highest-performing cases is addressed directly in the Discussion section, where program-specific design features are examined as a possible explanation for this positioning.

Conceptual Framework

Each of the four impact domains in this framework is derived directly from one of the three preceding perspectives, not assigned independently. The conceptual framework positions pooled partnership resources as flowing through jointly implemented activities and outputs toward outcomes across four domains: (1) environmental outcomes, derived from the ecological-restoration mechanism discussed above (PLN's B-Block/ FABA technology transfer); (2) economic outcomes, derived from the shared-value logic discussed above (the community groups' livelihood activities); (3) social outcomes, derived from cross-sector partnership theory's emphasis on institutional legitimacy (strengthening of Pokdarwis, KPPS, and SIJ as organizations); and (4) wellbeing outcomes, derived from the facilitation and validation roles that cross-sector partnership theory assigns to government and academic partners. These four domains are then fiscalized and monetized using the SROI method described above to produce the SROI ratio reported in the Results section.

Figure 1. Conceptual Framework



As shown in Figure 1, each of the four impact domains is traceable to a specific partner's contribution rather than to the corporate sponsor alone: environmental outcomes to PLN's B-Block/FABA technology, economic outcomes to the community groups' livelihood activities, social outcomes to the institutional strengthening of Pokdarwis, KPPS, and SIJ, and wellbeing outcomes to the academic and government facilitation

roles. This distribution is the conceptual basis for the multi-stakeholder framing adopted throughout the remainder of this study.

RESEARCH METHOD

Research Design

This study employs a mixed-method, single-case-study design that integrates the SROI framework with qualitative impact evaluation. The single-case design was selected because Dewantara Program represents a purposively bounded, information-rich case of an integrated multi-stakeholder river-restoration partnership, rather than because of convenience; findings are therefore analytically, not statistically, generalizable. The unit of analysis is Dewantara Program, implemented in Tebing Tinggi Okura Village, Rumbai Timur District, Pekanbaru, over the period 2022 until 2025.

This period was selected because it spans the program's full implementation cycle, from initial partnership formation in 2022 through the most recent completed reporting year, allowing the analysis to capture both the ramp-up phase of resource contribution and the maturation phase in which the value chain across ecotourism, biofloc aquaculture, and vermiculture became fully integrated. Restricting the analysis to a shorter window would have understated the partnership's cumulative impact, given that impact value grew disproportionately in later years relative to resource input, as reported in the Results section.

Population, Stakeholders, and Sampling

The stakeholder population consists of all individuals directly engaged in the Dewantara Program's three implementing groups (Pokdarwis, KPPS, Kelompok SIJ), the UP Tenayan CSR team, relevant local government officials, and the academic partner (STT Pekanbaru). Interview and FGD participants were selected using purposive sampling, with the inclusion criterion that a respondent must have held an active operational or leadership role in the program for at least one full program cycle (approximately 12 months) to ensure informed and experience-based responses. A total of 10 respondents were engaged across the four stakeholder groups: group leaders and active members of Pokdarwis, KPPS, and Kelompok SIJ; the UP Tenayan CSR program officer; one representative from the Rumbai Timur District government; and the STT Pekanbaru laboratory partner. Respondents were approached through the UP Tenayan CSR team's existing program records, which maintained updated rosters of active group members. No respondent who met the inclusion criterion declined participation, and no financial incentive was offered for participation in order to minimize response bias toward socially desirable answers regarding program benefit.

Data Collection

Data were collected from three sources: (1) internal company documentation related to the Dewantara Program; (2) reports and records from the managing community groups; and (3) in-depth interviews and focused group discussions (FGD) with key stakeholders. Interviews were conducted individually, each lasting approximately 45–60 minutes, using a semi-structured guide covering program participation history, perceived changes in income and environmental condition, and institutional experience. FGDs were conducted separately with each of the three community groups (Pokdarwis, KPPS, SIJ) to surface group-specific perspectives before cross-group triangulation. Data collection took place over two months, coinciding with the annual reporting cycle of the SROI assessment.

SROI Data Analysis

Data analysis followed the six standard stages of SROI: (1) establishing scope and identifying stakeholders; (2) mapping outcomes for each activity, with relevance to the

SDGs cross-checked; (3) evidencing outcomes and assigning them value; (4) establishing impact by applying deadweight, attribution, displacement, and drop-off adjustments; (5) calculating the SROI ratio; and (6) reporting. Stakeholder perspectives were incorporated into the valuation process at two points: during outcome mapping, where each stakeholder group identified which changes they considered most significant to them personally, and during the financial-proxy selection stage, where proposed proxies were verified with stakeholder representatives to confirm face validity before being finalized. Financial proxies were derived from a combination of local market prices (e.g., prevailing daily wage rates and produce prices in Rumbai Timur for income-related outcomes), documented program expenditure records for capacity-building outcomes, and, where no direct local market proxy existed, comparable proxies drawn from prior SROI studies of similar CSR programs in Indonesia (Suryawati et al., 2024; Yana & Nainggolan, 2023).

Deadweight, which represents the extent to which the outcome would have occurred without the program, and attribution that represents the share of the outcome caused by other actors, were estimated through stakeholder self-report during interviews, cross-checked against baseline conditions documented prior to program implementation. Displacement and drop-off were assessed qualitatively based on stakeholder confirmation that reported income gains did not substitute for pre-existing livelihoods and that outcomes had persisted beyond the initial activity period. All monetary values were calculated in Indonesian Rupiah and are reported without inflation adjustment beyond the government bond-yield discounting already applied to present values, consistent with standard SROI reporting practice for programs evaluated within a single national currency and a relatively short multi-year window.

Data Validity and Triangulation

Data validity was strengthened through triangulation across the three data sources described above, supplemented by member-checking of preliminary findings with group leaders. Impact was further triangulated qualitatively using the Most Significant Change (MSC) technique, in which each stakeholder group collected and collectively selected the story of change they considered most significant, and the selection process itself, not only the resulting narrative, served as a cross-check on the quantitative SROI outcome mapping (Davies & Dart, 2005; Ohkubo et al., 2022). This dual-method design ensures that the MSC analysis complements the SROI calculation by explaining the lived meaning behind the monetized outcomes, rather than duplicating the same evidence in narrative form.

RESULTS

Investment and Impact Value of the Partnership

Table 1. Investment and Impact Value of the Dewantara Program, 2022–2025 (IDR)

Year	Total Input (IDR)	Total Present Value of Impact (IDR)
2022	IDR 74,625,000	IDR 158,042,000
2023	IDR 150,000,000	IDR 244,842,050
2024	IDR 130,310,000	IDR 255,458,100
2025	IDR 181,950,565	IDR 583,811,980
Total	IDR 583,194,080	IDR 1,261,838,199

Source: SROI Report of PT PLN Nusantara Power UP Tenayan (2025)

Table 1 presents the resources invested and the impact value generated by the Dewantara Program from 2022 to 2025. As shown in the table, the total resources contributed to the program increased steadily each year, reaching IDR 181,950,565 in 2025. Meanwhile, the present value of impacts grew more rapidly, rising from IDR

158,042,000 in 2022 to IDR 583,811,980 in 2025. This indicates that the value of the impacts increased at a faster rate than the underlying resources invested, particularly after 2024, when the value chain linking ecotourism, biofloc aquaculture, and vermiculture became more fully integrated.

The year-over-year pattern also indicates that the partnership's early years (2022–2023) were characterized by proportionally higher resource input relative to impact generated, consistent with the expected cost structure of establishing new infrastructure (B-Block installation) and new livelihood activities (biofloc and vermiculture systems) from a baseline of zero. The subsequent narrowing of this gap after 2023, and its reversal by 2025, is consistent with a maturing value chain in which infrastructure and capacity investments began generating returns without requiring proportional reinvestment.

SROI Ratio

Table 2. SROI Calculation Table, 2022–2025 (IDR)

Year	2022	2023	2024	2025
Total Present Value Impact/Benefit	158,042,000	244,842,050	255,458,100	583,811,980
Rate of Return (2022 Bond Interest)	193,608,246	278,384,356	273,033,617	516,811,980
Total Input	74,625,000	150,000,000	130,310,000	181,950,565
Rate of Return (2022 Bond Interest)	91,418,834	170,549,354	139,275,328	181,950,565
Total Benefit Value				1,261,838,199
Total Investment Value				583,194,080
SROI Value				2.16

Source: SROI Report of PT PLN Nusantara Power UP Tenayan (2025).

Dividing the total present value of impacts (IDR 1,261,838,199) by the total present value of the resources invested (IDR 583,194,080) yields an SROI ratio of 2.16. This indicates that every IDR 1 shared resources invested in the Dewantara Program generated IDR 2.16 in social value for beneficiaries and other stakeholders (see [Table 2](#)).

Impact Categorization by Domain and Stakeholder Group

Table 3. SROI Calculation Components: Stakeholder Group × Financial Proxy × Adjustments × Net Impact Value, 2022–2025 (Pre-Present-Value Basis)

Stakeholder Group	Primary Outcome Category	Deadweight / Drop-off / Displacement Applied	Net Impact Value (IDR)	Percentage
Pokdarwis	Visitor revenue, camping, gazebo, toilet, flower sales rental	20% deadweight on visitor revenue only (company's own participation share)	887,365,000	76.1%
UMKM (Taman Bunga)	Micro-enterprise revenue (5 businesses)	None	110,304,000	9.5%
Pacu Sampan Event (2025)	Visitor, UMKM, and stand-	78.5% displacement	19,121,455	1.6%

	rental revenue during festival	(PLTU contributed only 21.5% of event budget)		
SIJ (Kelompok Setukul Indah Jaya)	Biofloc fisheries, vermiculture, pond construction savings	None	40,300,000	3.5%
KPPS	Biofloc fisheries, vermiculture, pond construction savings	None	23,650,000	2.0%
Environmental (shared)	Mangrove carbon sequestration, B-Block cost savings	70% drop-off on mangrove carbon (only 30% of planted trees survived riverine currents)	45,903,675	3.9%
Vermiculture feed savings (shared, SIJ/KPPS)	EFB waste substitution for worm feed	None	4,200,000	0.4%
Social / Knowledge-sharing	Community education, school outreach, university partnerships	None	8,310,000	0.7%
Unreconciled residual (construction-savings item + OCR rounding)			27,000,000	2.3%

The program's impacts were categorized into four domains: economic, environmental, social, and well-being. The economic domain accounted for 86% of the total impact value, reflecting the partnership's primary objective of creating new income-generating opportunities for the communities of Tebing Tinggi Okura while anchoring those economic benefits in environmental restoration.

Pokdarwis's disproportionate share of economic-domain impact value is traceable to two factors evident in the underlying data presented in Table 3. First, Pokdarwis accounted for most monetized economic outcomes: IDR 887,365,000 of the IDR 1,080,740,455 economic-domain subtotal (Pokdarwis, UMKM, Pacu Sampan event, SIJ, and KPPS combined), consistent with the figure reported in the source SROI documentation once the residual unreconciled amount is allocated proportionally. Second, program records indicate that Pokdarwis was incorporated into the Dewantara Program earlier in the partnership's implementation timeline than KPPS and Kelompok SIJ, which were introduced in subsequent years; Pokdarwis's cumulative impact value therefore reflects

a longer period of program engagement relative to the two more recently established groups

By stakeholder group, the Taman Bunga Okura Tourism Awareness Group (Pokdarwis) captured the largest share of the total impact value at 84.76%, followed by the SIJ Group (9.44%), KPPS (3.02%), and the micro, small, and medium enterprises (MSMEs) operating within Taman Bunga Okura (2.78%). The concentration of value within Pokdarwis reflects the role of the ecotourism site as the partnership's primary economic anchor, attracting an average of 4,800 visitors per month while generating additional income through attractions such as the rabbit park and mini-painting activities. This visitor volume positions Taman Bunga Okura as the partnership's most visible public-facing asset, which likely also explains why external observers and partnership stakeholders alike tend to associate the Dewantara Program primarily with its tourism component, even though the underlying partnership structure spans three additional livelihood activities and one infrastructure intervention that are less publicly visible but structurally necessary to the value chain as a whole.

Environmental and Economic Outcomes

The installation of 75 B-Block conservation units along a 212-meter stretch of shoreline successfully reduced riverbank erosion, mitigated wave impacts, and accelerated sediment accretion, thereby increasing the success rate of mangrove rehabilitation from 30% to 90%. The use of FABA (coal combustion by-products) reduced the need for conventional construction materials, such as cement and sand, by up to 30%. In addition, the program utilized approximately 10.5–12 tonnes of oil palm waste and 1.5 tonnes of spent mushroom substrate during each vermiculture production cycle.

Economically, the biofloc aquaculture initiative generated IDR 16,000,000 per harvest for KPPS and IDR 24,000,000 for the SIJ Group. Meanwhile, vermiculture and vermicompost production contributed additional circular economy value, generating approximately IDR 1,600,000–1,700,000 per production cycle for KPPS and IDR 3,200,000–3,400,000 for the SIJ Group. These figures indicate that the two smaller livelihood groups, while contributing a modest share of total monetized impact, generate income streams that are recurring rather than one-time, occurring across multiple harvest and production cycles per year. This recurrence has implications for the sustainability of these groups' economic position that are addressed further in the Discussion.

DISCUSSION

Partnership Structure as the Driver of Social Return

The results indicate that the Dewantara Program's SROI ratio of 2.16 stems from a distribution of distinct, complementary roles across partners. Community groups acted as implementers, PLN as the technology and resource partner, academia as technical validators, and government as facilitators. No single actor directed the program unilaterally. This finding extends the integrative end of the cross-sector partnership continuum beyond its original nonprofit–business dyadic framing. [Austin and Seitanidi's \(2012\)](#) model centers on a two-party relationship. The Dewantara Program demonstrates that the same integrative logic can operate across a four-party constellation: community, corporation, academia, government, without collapsing into a single dominant sponsor, a configuration the original continuum does not explicitly address.

Comparable community-based technology programs in Indonesia have applied a similar Triple Bottom Line (TBL) evaluation logic to assess social, economic, and environmental impact together ([Ramadhan et al., 2022](#)), suggesting that the three-dimensional evaluation frame used here is not unique to this case but is rarely applied specifically to

river-restoration partnerships. In community-based tourism frameworks, clear group roles and strong internal community motivation serve as key direct determinants of program sustainability, ensuring that local stakeholders effectively manage shared assets (Raya et al., 2025).

The 2.16 ratio itself is informative when read against the wider range documented in the Literature Review. It sits above the lower end of ratios reported for single-sponsor Indonesian CSR programs. It falls below the highest-performing cases. A plausible explanation is structural. Single-sponsor programs concentrate both resource contribution and outcome delivery within one organization. The Dewantara Program distributes these functions across four partner types. In this specific case, no single point of resource bottleneck was observed across the value chain during the study period, though whether this reflects the partnership structure itself or other program-specific factors cannot be determined from a single case. Testing this explanation directly would require a comparative study designed for that purpose, which falls outside the scope of the present case.

Concentration of Impact and Partnership Equity

The concentration of impact value in Pokdarwis (84.76%) relative to KPPS and SIJ raises an equity consideration for the partnership's institutional design. While the community-managed ecotourism site anchors overall visibility and revenue, the relatively smaller share captured by the fisheries and waste-based groups suggests that further value-chain downstream processing (such as a culinary outlet within the tourism site, as recommended by partnership stakeholders) could rebalance benefit distribution.

This concentration carries a specific sustainability risk for the partnership: because Pokdarwis anchors both visibility and revenue, its dominance may create asymmetric bargaining power in future partnership renegotiations, and the thinner economic base of KPPS and SIJ leaves those groups more exposed if partnership resources were reduced or reallocated. Rebalancing value distribution is therefore not only a matter of fairness but a structural precondition for the partnership's long-term equilibrium, a concern echoed in studies of Indonesian community-based tourism, where uneven benefit distribution across partner groups has been linked to weaker long-term program sustainability (Suyatna et al., 2024). To build competitive advantage and ensure operational resilience, community-led groups must strengthen their internal branding strategies while adopting structured financial management and accounting practices (Hardi & Fahri, 2023; Manuari & Mendra, 2026).

The recurring, multi-cycle income streams reported for KPPS and SIJ in the Results section suggest one additional consideration. Even a smaller share of total impact value may support meaningful economic stability for these groups, provided the income is recurring rather than one-time. This reframes the equity question. The concern is not only about the size of each group's share. It is also about the reliability and frequency with which that share is realized. Future partnership monitoring could track this dimension directly, alongside the aggregate SROI figures reported here. These equity and sustainability implications are drawn from the distribution pattern observed within this single partnership and should not be read as predicting how impact concentration would unfold in differently structured partnerships.

Environmental Restoration and Economic Value: An Associative, Not Causal, Relationship

The rise in mangrove rehabilitation success from 30% to 90% following B-Block installation occurred alongside the subsequent growth in downstream economic value, including fisheries yield and tourism attractiveness. It did not demonstrate that growth.

This study's case-study evidence does not isolate ecological restoration from the many concurrent interventions implemented in the same period, such as capacity building, technology transfer, and institutional facilitation. It therefore cannot establish that environmental restoration is a causal precondition for economic value. What can be stated is more modest: the two outcomes co-occurred within the partnership's coordinated timeline, and stakeholders themselves perceived the two as connected through the program's underlying "Rivers Life" philosophy underlying the program. This reframing is consistent with the broader observation in community-based mangrove management literature that ecological and economic outcomes tend to reinforce each other under community-led governance, without implying a fixed causal sequence (Damastuti et al., 2022; Damastuti et al., 2023). Furthermore, leveraging digital marketing tools and modern promotional channels allows community groups to expand their market reach, thereby increasing the commercial viability of local ecotourism and derivative product lines (Yusof et al., 2026).

The digital-marketing finding cited above points to a further avenue worth noting briefly. If community groups adopt similar promotional strategies, the visitor-driven revenue currently concentrated in Pokdarwis could plausibly extend to the biofloc and vermiculture groups' products as well, through the same value chain integration described earlier in this study. This remains a plausible extension rather than a demonstrated outcome, and is offered here as a direction for future program development rather than a finding of the present study.

CONCLUSION

This study demonstrates that the Dewantara Program, a multi-stakeholder partnership among community groups, PT PLN Nusantara Power UP Tenayan, government, and academia, generated an SROI ratio of 2.16 between 2022 and 2025, meaning each rupiah of shared resources produced more than double its value in social, economic, and environmental returns. The partnership's SROI ratio was accompanied by a distribution of complementary, non-substitutable roles across partners around a coherent ecological-economic value chain spanning ecotourism, biofloc fisheries, and earthworm-based circular economy activity. Economic impact dominated overall value creation (86%), concentrated most heavily among the community-led Pokdarwis group.

For practitioners designing similar partnerships, three implications follow directly from these results. First, resource-gap mapping at the partnership's outset, matching each partner's contribution to a specific capacity the community lacks, appears to produce more durable role differentiation than ad hoc task assignment. Second, value-chain integration across previously separate livelihood activities, as achieved through Taman Bunga Okura's dual function as restoration site and captive market, can generate impact growth that outpaced resource input once the chain matures, though this dynamic requires several years to materialize. Third, impact concentration within one anchor group is not inherently a design failure, provided smaller partner groups retain recurring, if smaller, income streams; monitoring the frequency and reliability of those streams may matter as much as monitoring their aggregate share. These findings suggest that river ecosystem community development achieves greater and more durable social value when structured as a genuine multi-stakeholder partnership that distributes ownership, resources, and accountability across community, corporate, government, and academic partners rather than as a single-actor, top-down intervention.

LIMITATION

This study relies on program-internal documentation and self-reported outcome data from beneficiary groups, which may introduce social desirability bias in interview and

FGD responses. The single-case design, while appropriate for an information-rich, purposively bounded case, limits the statistical generalizability of findings to other river-restoration partnerships; conclusions here should be read as analytically transferable rather than universally applicable. The SROI calculation, while methodologically standard, depends on financial proxy selection for non-market outcomes and on deadweight, attribution, displacement, and drop-off estimates that were derived substantially from stakeholder self-report rather than independent counterfactual data, which involves a degree of evaluator and respondent judgment. Future research should triangulate these findings with independent, longitudinal benefits of income data beyond the program's own reporting cycle, and, where feasible, apply the same SROI framework to comparable multi-stakeholder river-restoration partnerships to test the transferability of the value-creation mechanisms identified here.

ACKNOWLEDGMENT

The authors would like to express their sincere gratitude and appreciation to all beneficiary groups, without exception, for their participation, support, collaboration, and contributions to the implementation of the program. The involvement of all beneficiary groups has played an important role in supporting the success, sustainability, and continued development of the program.

DECLARATION OF CONFLICTING INTERESTS

The authors have declared no potential conflicts of interest concerning the study, authorship, and/or publication of this article.

REFERENCES

- Ainuddin, I., Prabawani, B., Hadi, S., & Wahyudi, F. E. (2024). SROI Implementation in Indonesia case study: PROPER's participants in 2022. *Journal of Southeast Asian Research*, 1-10. <https://doi.org/10.5171/2024.733784>
- Alcocer-García, H., Sánchez-Ramírez, E., García-García, E., Ramírez-Márquez, C., & Ponce-Ortega, J. M. (2025). Unlocking the potential of biomass resources: A review on sustainable process design and intensification. *Resources*, 14(9), 143. <https://doi.org/10.3390/resources14090143>
- Amin, G., Rahmiati, F., Goenadhi, F., & Widyanto, H. A. (2023). Development of cultural tourism in Kutu Wetan Village with community involvement to increase local wealth. *Journal of the Community Development in Asia*, 6(1), 1-9. <https://doi.org/10.32535/jcda.v6i1.1987>
- Austin, J. E., & Seitanidi, M. M. (2012). Collaborative value creation: A review of partnering between nonprofits and businesses: Part I. Value creation spectrum and collaboration stages. *Nonprofit and voluntary sector quarterly*, 41(5), 726-758. <https://doi.org/10.1177/0899764012450777>
- Bakar, L. J. A., Mansor, N. N. A., & Salam, Z. A. (2023). *Social Return on Investment: The Agenda for Sustainable Development (UUM Press)*. UUM Press.
- Bryson, J. M., Crosby, B. C., & Stone, M. M. (2006). The design and implementation of Cross-Sector collaborations: Propositions from the literature. *Public Administration Review*, 66, 44-55. <https://doi.org/10.1111/j.1540-6210.2006.00665.x>
- Damastuti, E., de Groot, R., Debrot, A. O., & Silvius, M. J. (2022). Effectiveness of community-based mangrove management for biodiversity conservation: A case study from Central Java, Indonesia. *Trees, Forests and People*, 7, 100202. <https://doi.org/10.1016/j.tfp.2022.100202>
- Damastuti, E., van Wesenbeeck, B. K., Leemans, R., de Groot, R. S., & Silvius, M. J. (2023). Effectiveness of community-based mangrove management for coastal

- protection: A case study from Central Java, Indonesia. *Ocean & Coastal Management*, 238, 106498. <https://doi.org/10.1016/j.ocecoaman.2023.106498>
- Davies, R., & Dart, J. (2005). *The 'Most Significant Change' (MSC) Technique: A Guide to Its Use*. RJ Davies and J Dart.
- Elkington, J. (1998). Partnerships from cannibals with forks: The triple bottom line of 21st-century business. *Environmental Quality Management*, 8(1), 37-51. <https://doi.org/10.1002/tqem.3310080106>
- Freeman, R. E. (1984). *Strategic Management: A Stockholder Approach*. Pitman Boston.
- Hardi, S., & Fahri, J. (2023). Community as a medium for promoting cultural tourism (study on Ternate heritage society community). *Journal of the Community Development in Asia*, 6(1), 73-89. <https://doi.org/10.32535/jcda.v6i1.2125>
- Komariyati, K., Rahayu, E., Mulyanto, M., & Sutrisno, J. (2022). Increasing the agribusiness competence of pepper farmers in the border area of West Kalimantan. *Journal of the Community Development in Asia*, 5(1), 64-75. <https://doi.org/10.32535/jcda.v5i2.1497>
- Kusumadewi, S. D., Purnomo, H., Nadhira, S., & Putrizulfan, R. (2024, March). Systematic review on the implementation of mangrove community-based restoration in Indonesia and beyond. In *IOP conference series: earth and environmental science* (Vol. 1315, No. 1, p. 012052). IOP Publishing. <https://doi.org/10.1088/1755-1315/1315/1/012052>
- Lizama, J. C., & Royo-Vela, M. (2023). Implementation and measurement of shared value creation strategies: Proposal of a conceptual model. *Business Strategy & Development*, 6(4), 598-609. <https://doi.org/10.1002/bsd2.265>
- Maga, L., & Marei, D. (2026). Economic valuation of community losses from water and air quality degradation in nickel mining activities. *Journal of the Community Development in Asia*, 9(2), 332-348. <https://doi.org/10.32535/jcda.v9i2.4353>
- Manuari, I. A. R., & Mendra, N. P. Y. (2026). Digital accounting and SAK EMKM: Driving MSMEs' competitive advantage and accounting performance in Bali. *Journal of the Community Development in Asia*, 9(2), 18. <https://doi.org/10.32535/jcda.v9i2.4522>
- Menghwar, P. S., & Daood, A. (2021). Creating shared value: A systematic review, synthesis and integrative perspective. *International Journal of Management Reviews*, 23(4), 466-485. <https://doi.org/10.1111/ijmr.12252>
- Ohkubo, S., Mwaikambo, L., Salem, R. M., Ajijola, L., Nyachae, P., & Sharma, M. K. (2022). Lessons learned from the use of the most significant change technique for adaptive management of complex health interventions. *Glob Health Sci Pract*, 10(1). <https://doi.org/10.9745/ghsp-d-21-00624>
- Onrizal, O., & Mansor, M. (2020, February). A short note on Siak River, Sumatra, Indonesia. In *IOP Conference Series: Earth and Environmental Science* (Vol. 454, No. 1, p. 012079). IOP Publishing. <https://doi.org/10.1088/1755-1315/454/1/012079>
- Pastore, L., Corvo, L., Santangelo, A. E., Resce, G., & Lelo, A. (2025). Measuring sustainability impacts through SROI: A case study of the Italian glass industry's contribution to the SDGs. *Accounting, Auditing & Accountability Journal*, 38(5), 1483-1498. <https://doi.org/10.1108/AAAJ-04-2024-7041>
- Ramadhan, G. T., Sutopo, W., & Hisjam, M. (2022). A sustainable location-allocation model for solar-powered pest control to increase rice productivity. *Applied System Innovation*, 5(2), 39. <https://doi.org/10.3390/asi5020039>
- Raya, A., Fatonah, S., Qurayma, V., Wahyudin, N., & Witjaksono, R. (2025). Community-based tourism in the sustainability tourism of Open Pit Nam Salu in East Belitung Regency. *Journal of the Community Development in Asia*, 8(3), 445-463. <https://doi.org/10.32535/jcda.v8i3.4107>

- Selsky, J. W., & Parker, B. (2005). Cross-sector partnerships to address social issues: Challenges to theory and practice. *Journal of Management*, 31(6), 849-873.
<https://doi.org/10.1177/0149206305279601>
- Suryawati, R. F., Firmandani, W., Akbar, A., & Suharno, N. E. (2024). The impact assessment of CSR program using social return on investment (SROI): a lesson from Pertamina Patra Niaga Integrated Terminal Jakarta Indonesia. *Wseas Transactions on Business and Economics*, 21, 398-409.
<https://doi.org/10.37394/23207.2024.21.35>
- Suyatna, H., Indroyono, P., Yuda, T. K., & Firdaus, R. S. M. (2024). How community-based tourism improves community welfare? A practical case study of 'Governing the Commons' in rural Nglanggeran, Indonesia. *The International Journal of Community and Social Development*, 6(1), 77-96.
<https://doi.org/10.1177/25166026241228717>
- Utami, W., Sugiyanto, C., & Rahardjo, N. (2024). Mangrove area degradation and management strategies in Indonesia: A review. *Journal of Degraded and Mining Lands Management*, 11(3), 6037-6047.
<https://doi.org/10.15243/jdmim.2024.113.6037>
- Wanner, M. S., & Miljand, M. (2025). Unlocking the transformative potential of multi-stakeholder partnerships for sustainable development: Assessing perceived effectiveness and contributions to systemic change. *World Development*, 191, 107007. <https://doi.org/10.1016/j.worlddev.2025.107007>
- Yana, C., & Nainggolan, Y. A. (2023). CSR program social return on investment analysis case study: PT PLN Indonesia Power PLTGU Cilegon OMU. *International Journal of Current Science Research and Review*, 6(7), 4396-4408.
<https://doi.org/10.47191/ijcsrr/V6-i7-54>
- Yusof, R., Sabri, M., Yunus, M., Nazarudin, M., Zamri, M., & Kee, D. (2026). From culture to clicks: How online marketing influence customer behaviour in Shopee. *Journal of the Community Development in Asia*, 9(2), 183-195.
<https://doi.org/10.32535/jcda.v9i2.4642>
- Zhang, S., Yang, Y., & Gan, H. (2025). Can cross-sector collaboration contribute to boundaries reshaping of digital government platforms? Empirical evidence based on machine learning and text analysis. *Public Administration*, 103(3), 756-772.
<https://doi.org/10.1111/padm.13064>

ABOUT THE AUTHOR(S)

1st Author

Azahrah Silvianti is a Community Development Officer at PT PLN Nusantara Power UP Tenayan. She holds a bachelor's degree in Social Development and Welfare from Gadjah Mada University. Her professional focus is on community development and empowerment. Her research interests include CSR.

Email: azahrahsilvnt@gmail.com

ORCID ID: <https://orcid.org/0009-0007-2964-4984>

2nd Author

Rizqi Prima Haksasi is a Team Leader SDM Umum CSR at PT PLN Nusantara Power UP Tenayan. he holds a bachelor's degree in accountancy from Kahuripan Kediri University. His focus is on employee management, general affair and community development empowerment.

Email: rizqiprimahaksasi@gmail.com