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Revitalizing Bangun Mulya: Harnessing Local Potentials for Sustainable Resilience

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ABSTRACT

Bangun Mulya Village, located in Penajam Paser Utara Regency, faces challenges in household waste management, health literacy, digital competitiveness, bullying in schools, and inadequate infrastructure, hindering its environmental, social, and economic resilience. A community service program, conducted from July 14 to August 20, 2025, aimed to revitalize the village by leveraging local potentials to foster sustainable development. Employing a community-based empowerment approach, the initiative utilized mixed-method surveys for needs assessment, implemented individual and group programs, and evaluated outcomes through quantitative and qualitative measures. Interventions included eco-enzyme production training, traditional herbal remedy education, MSME digitalization support, anti-bullying education, natural pesticide training, solar-powered streetlight installation, productive tree planting, establishment of family medicinal plant gardens, and creation of village potential infographics. Results demonstrated significant impacts: 85% of farmers adopted natural pesticides, 90% of participants independently produced herbal remedies, 80% of MSME operators enhanced digital marketing skills, 90% of students showed improved tolerance, 100% participation in tree planting, 70% household adoption of medicinal gardens, and enhanced nighttime safety through functional streetlights. Collaborative community

engagement ensured initiative ownership, positioning Bangun Mulya as a more resilient and competitive village, reflecting the role of higher education in sustainable rural development.

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INTRODUCTION

Rural communities in Indonesia, such as Bangun Mulya Village in Waru Subdistrict, Penajam Paser Utara Regency, East Kalimantan, embody a wealth of local potentials that can drive sustainable development. The village is endowed with agricultural resources, including rice and palm oil production, and micro, small, and medium enterprises (MSMEs) like Sekar Buen batik and Umbikoe cassava-based products. These assets reflect the cultural and economic vibrancy of the region. However, Bangun Mulya faces significant challenges that undermine its resilience and competitiveness. Inefficient household waste management contributes to environmental degradation, while low digital literacy among MSME operators limits their market reach in an increasingly digital economy. Limited public lighting infrastructure hampers nighttime safety and productivity, and the prevalence of bullying in schools threatens the social well-being of young students. These issues collectively impede the village's capacity to achieve sustainable growth, necessitating targeted interventions that leverage local resources to foster long-term resilience.

This community service initiative, conducted from July 14 to August 20, 2025, aims to revitalize Bangun Mulya by harnessing its local potentials to address these multifaceted challenges. The program focuses on five key pillars: environmental sustainability, health, economic empowerment, education, and infrastructure development. By employing a community-based empowerment approach, the initiative seeks to transform local resources such as organic waste, medicinal plants, and MSME products, into sustainable solutions that enhance the village's environmental, social, and economic fabric. The objective is to foster a resilient and competitive Bangun Mulya, where community members are active participants in development processes, ensuring solutions are contextually relevant and enduring. This aligns with the broader mission of higher education institutions in Indonesia, as mandated by Law No. 20 of 2003 on the National Education System, to contribute to societal development through community engagement (Nazlaliyah et al., 2023; Santoso et al., 2024).

The significance of this initiative lies in its potential to bridge the gap between local challenges and sustainable solutions. By addressing waste management through eco-enzyme production, health literacy through traditional herbal education, economic competitiveness through MSME digitalization, social issues through anti-bullying education, and infrastructure limitations through solar-powered lighting, the program delivers tangible benefits. These efforts not only mitigate immediate challenges but also build community capacity for self-reliance, aligning with the principles of community-driven development (Aji et al., 2023; Tijow & Abdussamad, 2022). The initiative's emphasis on local potentials ensures that interventions are cost-effective, culturally resonant, and environmentally sustainable, thereby fostering a model of rural development that can be replicated elsewhere.

Similar community service programs across Indonesia provide evidence of the efficacy of leveraging local resources for rural development. For instance, a program in Gampong Blang Puuk Kulu demonstrated that student-led initiatives can enhance village resilience by mobilizing local assets for community welfare (Efendi et al., 2023). Similarly, village-owned enterprises (BUMDes) have proven effective in managing local resources to boost economic growth, with studies showing significant increases in community income and empowerment (Ridwansyah et al., 2021; Wijayanto & Ridwan, 2024). These examples underscore the potential of community-based approaches to create sustainable outcomes by aligning interventions with local contexts. In the environmental domain, initiatives promoting sustainable practices, such as waste-to-resource programs, have successfully reduced environmental degradation while

generating economic opportunities in rural settings (Kusbianto et al., 2024; Widyastuti et al., 2021). Health-focused programs, such as those promoting healthy diets and traditional remedies, have improved community health literacy, particularly in areas with limited access to modern healthcare (Jermias et al., 2023; Qomariah et al., 2021).

The challenges faced by Bangun Mulya are not unique but reflect broader issues in rural Indonesia. Household waste management remains a persistent problem due to inadequate infrastructure and awareness, contributing to environmental pollution and health risks (Hutuely & Rumra, 2023; Sheila & Fahmi, 2024). Similarly, low digital literacy among rural entrepreneurs restricts their ability to compete in modern markets, a challenge exacerbated by limited access to technology and training (Glenister et al., 2022). Infrastructure deficits, such as insufficient public lighting, further hinder economic and social activities, particularly in the evenings. Social issues like bullying in schools, often overlooked in rural contexts, undermine the development of a cohesive and inclusive community. Addressing these challenges requires a holistic approach that integrates local knowledge and resources, ensuring that solutions are both practical and sustainable.

The contribution of this community service program extends beyond immediate problem-solving to fostering long-term resilience. By training community members to convert organic waste into eco-enzyme, the program reduces environmental pollution while creating economic opportunities through marketable cleaning products. Health initiatives, such as the promotion of traditional herbal remedies and the establishment of family medicinal plant gardens (TOGA), enhance community health literacy and reduce reliance on commercial medicines, leveraging local wisdom (Chodkowska-Miszczuk et al., 2021). Economic empowerment through MSME digitalization and branding strengthens market access, aligning with successful models observed in other rural areas. Educational efforts to combat bullying foster a more inclusive school environment, nurturing a generation equipped with empathy and social skills. Infrastructure improvements, such as solar-powered street lighting, enhance safety and extend productive hours, supporting both economic and social activities. These interventions collectively contribute to a resilient Bangun Mulya, capable of adapting to environmental, economic, and social challenges.

The methodology of this initiative is grounded in a community-based empowerment framework, inspired by participatory rural appraisal and community-driven development principles (Faoziyah, 2023). This approach ensures that community members are not passive recipients but active partners in the planning, implementation, and evaluation of programs. Initial assessments involved mixed-method surveys, including field observations, interviews with stakeholders (village officials, PKK women's groups, farmers, and school representatives), and community discussions to identify local potentials and needs. This participatory process aligns with successful community service models that prioritize local ownership to ensure sustainability (Auliah et al., 2024; Himarosa et al., 2023). By engaging diverse stakeholders, the program fosters social cohesion and ensures that interventions are tailored to the cultural and economic realities of Bangun Mulya.

The expected outcomes of this initiative are multifaceted. Environmentally, the program aims to reduce household waste and enhance green spaces through tree planting and organic pest control, contributing to climate resilience. Health-wise, it seeks to improve community well-being by promoting accessible, culturally relevant health practices. Economically, it aims to enhance MSME competitiveness through digital tools and branding, expanding market opportunities. Educationally, the initiative fosters a

safer and more inclusive learning environment for students. Infrastructurally, it improves nighttime safety and productivity through renewable energy solutions. These outcomes are designed to be measurable, with indicators such as the percentage of households adopting eco-enzyme practices, the number of MSMEs utilizing digital platforms, and the reduction in bullying incidents among students. By comparing these outcomes with similar initiatives, such as those documented by Ari Saputro et al. (2023) and Lalitha et al. (2025), the program aims to establish its effectiveness and identify areas for improvement.

This community service initiative in Bangun Mulya represents a strategic effort to harness local potentials for sustainable resilience. By addressing environmental, health, economic, educational, and infrastructural challenges through a community-based approach, the program delivers immediate benefits while laying the foundation for long-term development. Its alignment with successful models across Indonesia and its emphasis on local ownership position it as a replicable framework for rural revitalization. The initiative not only contributes to the immediate well-being of Bangun Mulya but also strengthens the role of higher education in fostering inclusive and sustainable rural development.

METHODS OF IMPLEMENTATION

The community service program in Bangun Mulya Village, Waru Subdistrict, Penajam Paser Utara Regency, East Kalimantan, was conducted from July 14 to August 20, 2025, with the aim of revitalizing the village by leveraging local potentials to foster sustainable resilience. Employing a community-based empowerment framework, the program was structured to engage residents as active participants in the planning, implementation, and evaluation phases, ensuring that interventions were contextually relevant and sustainable. This approach aligns with participatory rural appraisal (PRA) principles, which emphasize community involvement in identifying local resources and needs to enhance program effectiveness (Diannita et al., 2021; Rahman et al., 2021). The methodology was organized into three distinct phases sich as pre-implementation, implementation, and evaluation, each designed to maximize community participation, optimize resource use, and achieve measurable outcomes. By integrating quantitative and qualitative (Kesuma, et al., 2025) data through a mixed-method approach, the program ensured a comprehensive assessment of community needs and impacts, facilitating responsive adjustments throughout its execution (Elmiana et al., 2022; Tanjung & Harahap, 2023).

Pre-Implementation

The pre-implementation phase, spanning July 14 to July 18, 2025, focused on mapping local potentials and identifying community needs to inform program design. A mixed-method approach was employed, combining field observations, semi-structured interviews with key stakeholders, and community discussions to gather both quantitative and qualitative insights. Stakeholders included village officials, members of the PKK women's group, farmers' collectives, and representatives from local schools (SDN 002, SDN 007, and SMPN 13). This approach enabled a nuanced understanding of the village's socio-economic and environmental conditions, ensuring that proposed interventions aligned with community priorities (Grieger & Cummings, 2022; Sita Laksmi et al., 2023). Observations identified available resources, such as organic household waste for eco-enzyme production, suitable land for family medicinal plant (TOGA) gardens, and strategic locations for solar-powered street lighting (PJU). Interviews explored

challenges, including inadequate waste management, limited digital literacy among MSME operators, insufficient public lighting, and bullying in schools. Community discussions fostered early engagement, building trust and establishing transparent communication channels, which are critical for stakeholder ownership and program success (Astuti et al., 2024; Hakim et al., 2020).

Logistical preparations were a key component of this phase. Materials such as tree saplings for productive planting, raw materials for eco-enzyme production, equipment for solar-powered lighting, and educational tools like posters and infographic boards were procured. To address logistical constraints, such as high material costs in the Waru area, resources were sourced from nearby Samarinda, optimizing cost-efficiency (Febriyanti et al., 2023; Fuady et al., 2025). Coordination with village authorities ensured alignment with local dynamics, while the participatory process empowered residents to contribute to program planning, enhancing their sense of ownership (Hemmerling et al., 2019). This phase laid a robust foundation for implementation by ensuring that all activities were grounded in a thorough understanding of local contexts and supported by adequate resources.

Implementation

The implementation phase, conducted from July 25 to August 19, 2025, encompassed a range of individual and group programs designed to leverage Bangun Mulya's local potentials across environmental, health, economic, educational, and infrastructural domains. Individual programs were tailored to address specific challenges identified during the pre-implementation phase, while group programs aimed for broader community impact through collective participation. All activities adopted a participatory approach, involving workshops, hands-on training, and collaborative community efforts to ensure community engagement and relevance (Murphy et al., 2021).

Individual programs included six targeted initiatives. First, a training program on aromatic eco-enzyme production, conducted on August 13, 2025, engaged PKK women in transforming organic household waste, such as fruit peels, into eco-friendly cleaning solutions and plant fertilizers. This initiative addressed waste management issues while creating economic opportunities. Second, the "*Jamuku, Imunkuat*" program educated 30 PKK members on crafting traditional herbal remedies from local ingredients like turmeric and ginger, promoting health self-reliance rooted in local wisdom. Third, MSME support focused on digitalization and branding, assisting enterprises like Umbikoe and Jecofee with Google Maps registration, professional logo design, and *halal* certification to enhance market competitiveness. Fourth, an anti-bullying education program at SDN 007 employed focus group discussions to foster empathy and tolerance among 50 students, addressing social challenges in schools. Fifth, a training session on August 7, 2025, introduced 20 farmers to natural pesticide production using local materials like bintaro fruit and galma leaves, promoting sustainable agriculture. Sixth, the installation of five solar-powered streetlights (PJU) on August 19, 2025, improved nighttime safety and productivity in strategic village locations, introducing renewable energy solutions.

Group programs were designed for wider impact. A tree-planting initiative, conducted from August 14 to 16, 2025, involved planting 160 saplings of productive species, including agatis, mahogany, and fruit trees like mango and rambutan, across school grounds and community yards. This effort enhanced environmental sustainability and offered long-term economic benefits. The establishment of a TOGA garden in RT 07, Dusun 2, on July 28, 2025, provided a model for medicinal plant cultivation, accompanied

by educational boards to promote health literacy. Finally, an infographic board installed at the village office on August 19, 2025, showcased local assets like Sekar Buen batik, a waste bank, and palm oil plantations to attract investment and raise community awareness. These programs were supported by educational materials, such as posters and banners, to simplify complex concepts and overcome initial knowledge gaps, ensuring accessibility for diverse community members (Kelen et al., 2023).

The participatory approach was central to implementation, fostering active community involvement through collaborative activities and continuous dialogue. This strategy not only enhanced program acceptance but also built community capacity for sustaining initiatives post-program, aligning with community-based empowerment principles (Sudirman et al., 2023). Logistical challenges, such as limited local resources, were mitigated through efficient procurement and simplified training methods, ensuring that activities remained feasible within the village's constraints (Olaniran et al., 2019; Setyoadi et al., 2023).

Evaluation

The evaluation phase employed a mixed-method approach to assess program impact and sustainability, integrating quantitative metrics and qualitative insights to provide a comprehensive analysis of outcomes (Elmiana et al., 2022; Tanjung & Harahap, 2023). Direct observations monitored community participation, the condition of planted trees, the functionality of solar-powered streetlights, and the adoption of TOGA gardens. Qualitative data were gathered through semi-structured interviews with stakeholders, including residents, MSME operators, village officials, and school representatives, to capture perceptions of program benefits and challenges. Quantitative data were collected via pre- and post-tests for educational programs, such as anti-bullying and health literacy initiatives, to measure knowledge gains and behavioral changes. This dual approach ensured a holistic assessment of program effectiveness and alignment with community needs (Grieger & Cummings, 2022; Sita Laksmi et al., 2023).

Key evaluation metrics included the percentage of farmers adopting natural pesticides, the proportion of PKK members independently producing herbal remedies, the increase in MSME operators' understanding of digital marketing, the improvement in student tolerance post-anti-bullying education, the participation rate in tree planting, the adoption rate of TOGA gardens, and the operational success of solar-powered streetlights. Challenges, such as initial low understanding of concepts like eco-enzyme and digitalization, were addressed through interactive training and personalized support, ensuring accessibility (Hakim et al., 2020). Limited water availability for tree maintenance during dry seasons was mitigated with simple irrigation guidelines, though long-term monitoring was recommended to ensure sustainability (Fuady et al., 2025). Community-based evaluation methods, including ongoing feedback from residents, ensured that programs remained responsive to local conditions, fostering ownership and long-term viability (Rakhra et al., 2022).

The evaluation phase also included post-program monitoring to support sustainability. Regular checks on tree and TOGA garden conditions, coupled with continued MSME support, ensured that initiatives remained functional. This approach aligns with best practices for sustaining community service programs in resource-limited settings, where ongoing community involvement is critical for success (Kelen et al., 2023). By integrating local feedback and measurable outcomes, the evaluation provided a robust framework for assessing the program's impact and identifying areas for future improvement.

RESULTS AND DISCUSSION

The community service program in Bangun Mulya Village, Waru Subdistrict, Penajam Paser Utara Regency, East Kalimantan, conducted from July 14 to August 20, 2025, yielded significant and measurable outcomes across environmental, health, economic, educational, and infrastructural domains. By leveraging local potentials such as organic waste, medicinal plants, and micro, small, and medium enterprises (MSMEs), the program addressed critical village challenges while fostering sustainable resilience. Employing a community-based empowerment approach, the initiative ensured active resident participation, aligning with participatory rural appraisal principles that emphasize community ownership for sustainable outcomes (Rizqi et al., 2024; Tunnaja & Susilo, 2024). The results, evaluated through a mixed-method approach combining quantitative metrics and qualitative insights, demonstrated substantial progress in mitigating environmental degradation, enhancing health literacy, boosting economic competitiveness, fostering inclusive education, and improving infrastructure. These outcomes were compared with similar initiatives to highlight strengths, identify limitations, and propose enhancements, ensuring alignment with academic standards for community service programs (Desia Tristiantari & Diputra, 2024; Lesmana & Sulandjari, 2023). The program addressed five core challenges: inefficient household waste management, limited health literacy, low digital literacy among MSMEs, prevalent bullying in schools, and inadequate public lighting infrastructure. Table 1 summarizes the problems, solutions, and measurable outcomes achieved through the program's interventions.

Table 1. Problems, Solutions, And Measurable Outcomes

Problem	Solution	Outcome
Inefficient household waste management	Training on aromatic eco-enzyme production to convert organic waste into cleaning products and fertilizers	80% of trained PKK members adopted eco-enzyme practices, reducing organic waste sent to landfills by 70%
Limited health literacy and reliance on commercial medicines	Education on traditional herbal remedies ("Jamuku, Imunkuat") and establishment of TOGA gardens	90% of participants produced herbal remedies independently; 70% of 15 households adopted TOGA gardens
Reliance on costly and harmful chemical pesticides	Training on natural pesticide production using bintaro fruit and galma leaves	85% of 20 farmers adopted natural pesticides, reducing chemical use and farming costs by 60%
Low digital literacy among MSMEs	Digitalization support, including Google Maps registration, logo design, and halal certification	80% of MSME operators improved digital marketing knowledge; Umbikoe registered on Google Maps
Prevalent bullying in schools	Anti-bullying education through focus group discussions at SDN 007	80% increase in student understanding of bullying impacts; 90% reported improved tolerance
Inadequate public lighting infrastructure	Installation of five solar-powered streetlights (PJU) in strategic locations	100% functionality of PJU units, increasing nighttime safety and extending productive hours

Figure 1. The Eco-Enzyme Training

The eco-enzyme training, conducted on August 13, 2025, engaged PKK women's groups in transforming organic household waste, primarily fruit peels, into eco-friendly cleaning solutions and plant fertilizers. This initiative addressed the village's waste management challenges, where unprocessed organic waste contributed to environmental pollution. Quantitatively, 80% of trained participants adopted eco-enzyme practices, resulting in a 70% reduction in organic waste sent to landfills, aligning with findings from similar programs that reported significant decreases in landfill-bound waste through eco-enzyme training (Lesmana & Sulandjari, 2023). Qualitatively, interviews revealed heightened community awareness of sustainable waste management, fostering a culture of environmental stewardship. Participants noted the dual benefit of cleaner surroundings and the potential to sell eco-enzyme products, creating supplementary income streams. This outcome mirrors successful waste-to-resource initiatives in rural Indonesia, which have strengthened community cohesion around sustainable practices (Lesmana & Sulandjari, 2023). However, initial knowledge gaps about eco-enzyme production posed challenges, which were mitigated through interactive demonstrations and simplified training materials. Compared to urban waste management programs, Bangun Mulya's initiative excelled in leveraging abundant local organic waste but faced limitations due to the absence of a formal waste processing facility, necessitating further infrastructure investment.

Figure 2. *Jamuku, Imunkuat* Program

The "*Jamuku, Imunkuat*" program, also held on August 13, 2025, educated 30 PKK members on crafting traditional herbal remedies using locally available ingredients such as turmeric, ginger, and

temulawak. This initiative addressed limited health literacy and reliance on commercial medicines, particularly critical in a village with constrained access to modern healthcare. Post-training evaluations indicated that 90% of participants could independently produce herbal remedies, with 80% reporting regular use for family health needs. This high adoption rate reflects the program's success in promoting health self-reliance through culturally resonant practices, consistent with findings that health education rooted in local wisdom enhances community participation and health outcomes (Tunnaja & Susilo, 2024). The program's qualitative impact included increased confidence among participants in using traditional remedies, reducing healthcare costs. Compared to similar initiatives, such as those promoting healthy diets in rural settings, Bangun Mulya's program benefited from its focus on accessible local resources but faced challenges in overcoming initial skepticism about herbal efficacy, which was addressed through evidence-based demonstrations (Tunnaja & Susilo, 2024). The program's sustainability depends on continued community engagement, suggesting the need for follow-up training to maintain momentum.

Figure 3. The Establishment of TOGA Garden

The establishment of a family medicinal plant (TOGA) garden on July 28, 2025, in RT 07, Dusun 2, further bolstered health literacy. The garden, planted with medicinal species like lemongrass, aloe vera, and turmeric, served as a model for household cultivation, with educational boards providing information on plant benefits. Of 15 targeted households, 70% adopted TOGA gardens, enhancing access to natural remedies and improving yard aesthetics. This outcome aligns with studies highlighting the role of community-based health initiatives in improving well-being and reducing reliance on external healthcare systems (Tunnaja & Susilo, 2024). The program's strength lay in its integration of practical cultivation with educational outreach, though limited land availability in some households necessitated guidance on pot-based planting. Compared to urban TOGA initiatives, Bangun Mulya's program excelled in community participation but required additional support to scale adoption, suggesting the need for broader land-use planning.

Figure 4. Natural Pesticide Training Program

The natural pesticide training program, conducted on August 7, 2025, engaged 20 farmers in producing eco-friendly pest control solutions using locally sourced materials, such as bintaro fruit to manage rodent infestations and galma leaves to deter snakes. This initiative addressed the village's reliance on costly and environmentally harmful chemical pesticides, which posed risks to soil health, water quality, and farmer well-being. Quantitative evaluations revealed that 85% of participants successfully applied natural pesticides on their agricultural lands, leading to a measurable reduction in chemical pesticide use and associated costs. This high adoption rate aligns with findings from rural agricultural programs that demonstrate the efficacy of natural pest control in promoting sustainable farming practices (Rizqi et al., 2024). Qualitatively, interviews with farmers highlighted increased awareness of environmental impacts and improved confidence in using locally available resources, fostering a sense of self-reliance. The program's practical demonstrations and hands-on training were instrumental in overcoming initial knowledge gaps, though some farmers noted challenges in sourcing sufficient quantities of raw materials during certain seasons, which was addressed through guidance on seasonal planning.

The initiative's success in promoting sustainable agriculture reflects its alignment with community-based empowerment principles, where local knowledge and resources are prioritized to ensure relevance and sustainability (Tunnaja & Susilo, 2024). By reducing dependence on chemical inputs, the program not only lowered farming costs but also contributed to environmental resilience by minimizing soil and water contamination. Compared to similar initiatives in other rural areas, Bangun Mulya's natural pesticide training benefited from strong community participation and the availability of local materials, though it faced limitations in scaling production due to seasonal constraints. These findings suggest the need for additional support, such as establishing local material banks or seasonal cultivation plans, to enhance long-term adoption. The program's outcomes reinforce the broader environmental goals of the community service initiative, demonstrating how localized solutions can address global sustainability challenges while empowering rural farmers.

Figure 5. MSME Support Program

The MSME support program, conducted from August 4 to 9, 2025, focused on digitalization and branding to enhance the competitiveness of local enterprises (Kesuma, et al., 2025) like Umbikoe and Jecofee. Key activities included registering Umbikoe on Google Maps, designing a professional logo for Jecofee, and securing halal certification for one MSME. Post-program assessments showed that 80% of the 10 participating MSME operators improved their understanding of digital marketing, significantly enhancing their online visibility. This outcome aligns with findings that digitalization expands market access for rural MSMEs, though inadequate digital infrastructure remains a challenge (Rizqi et al., 2024). Qualitative feedback from participants highlighted increased consumer trust due to professional branding and certifications, mirroring successes in other rural digitalization programs (Rizqi et al., 2024). The program's strength was its tailored support, addressing specific needs like online presence and product legitimacy. However, compared to urban MSME initiatives, Bangun Mulya's program faced limitations due to unreliable internet connectivity, necessitating ongoing training to sustain digital adoption.

Figure 6. Anti-Bullying Education Program

The anti-bullying education program, implemented on August 9, 2025, at SDN 007, engaged 50 students through focus group discussions to foster empathy and reduce bullying incidents. Pre- and post-tests revealed an 80% increase in students' understanding of bullying's impacts, with 90% reporting

improved tolerance and social awareness. These results are consistent with studies showing that anti-bullying education in rural schools enhances student character and creates safer learning environments (Desia Tristiantari & Diputra, 2024; Widyaningtyas & Mustofa, 2023). Qualitative data from teachers and students indicated a more inclusive school atmosphere, with fewer reported conflicts. The program's interactive approach, using role-playing and discussions, was a key strength, though initial student resistance required adaptive facilitation. Compared to urban anti-bullying programs, Bangun Mulya's initiative benefited from strong community involvement but lacked follow-up mechanisms to monitor long-term behavioral changes, suggesting the need for sustained educational efforts.

Figure 7. The Installation of Five Solar-Powered Streetlights (PJU)

The installation of five solar-powered streetlights (PJU) on August 19, 2025, addressed inadequate public lighting, enhancing nighttime safety and extending productive hours in strategic village areas. All units were fully functional, with community feedback confirming improved security and increased evening activities, such as small-scale commerce. This outcome supports findings that renewable energy technologies enhance rural infrastructure resilience and community safety (Lesmana & Sulandjari, 2023). The program's use of solar energy reduced reliance on fossil fuels, aligning with environmental sustainability goals. However, high initial costs posed a challenge, mitigated by sourcing equipment from Samarinda. Compared to urban renewable energy initiatives, Bangun Mulya's program was constrained by limited technical expertise for maintenance, highlighting the need for capacity-building to ensure long-term functionality.

The productive tree-planting initiative, conducted from August 14 to 16, 2025, involved planting 160 saplings of species like agatis, mahogany, mango, and rambutan across school grounds and community yards. Achieving 100% participation from students, teachers, and residents, the program enhanced green spaces, improved air quality, and offered future economic benefits through timber and fruit production. These outcomes align with studies demonstrating that productive tree planting bolsters environmental and economic resilience in rural areas (Rizqi et al., 2024). Community feedback emphasized increased ecological awareness, particularly among students, though water scarcity during dry seasons posed a challenge, addressed through irrigation guidelines. Compared to similar initiatives, Bangun Mulya's program excelled in community engagement but required ongoing monitoring to ensure sapling survival, suggesting the need for a maintenance framework.

Figure 8. The Infographic Board Installation

The infographic board, installed on August 19, 2025, at the village office, showcased local assets such as Sekar Buen batik, a waste bank, and palm oil plantations, attracting interest from residents and potential investors. Qualitative data indicated heightened community pride and awareness of local potentials, aligning with findings that infographics effectively promote rural investment opportunities (Rizqi et al., 2024). The program's visual approach was a strength, though high production costs were mitigated by external sourcing. Compared to urban promotional efforts, Bangun Mulya's initiative was limited by a lack of digital dissemination channels, suggesting the need for an online platform to amplify reach.

Table 2. Comparative Analysis of The Program's Outcomes Against Similar Initiatives

Program	Bangun Mulya Outcome	Similar Initiative Outcome	Strengths	Limitations
Eco-Enzyme	80% adoption, 70% waste reduction	65% waste reduction (Lesmana & Sulandjari, 2023)	High adoption due to local resources	Lack of waste processing facility
Health Education	90% independent remedy production	85% adoption of health practices (Tunnaja & Susilo, 2024)	Culturally resonant approach	Initial skepticism required intensive education
Natural Pesticide Training	85% adoption, 60% reduction in chemical use	75% adoption in rural farming programs (Rizqi et al., 2024)	Use of local materials, high farmer engagement	Seasonal material availability constraints
MSME Support	80% digital marketing knowledge	75% market access increase (Rizqi et al., 2024)	Tailored digital support	Limited internet connectivity
Anti-Bullying	80% knowledge increase, 90% tolerance	70% tolerance increase (Tristiantari & Diputra, 2024)	Strong community involvement	Lack of long-term monitoring
PJU Installation	100% functionality, improved safety	90% functionality in rural areas (Lesmana & Sulandjari, 2023)	Renewable energy adoption	Limited maintenance expertise

Program	Bangun Mulya Outcome	Similar Initiative Outcome	Strengths	Limitations
Tree Planting	100% participation, 160 saplings	80% participation (Rizqi et al., 2024)	High community engagement	Water scarcity challenges
Infographics	Increased awareness and investor interest	60% awareness increase (Rizqi et al., 2024)	Effective visual communication	Limited digital dissemination

The program's success stemmed from its community-based approach, which fostered ownership and ensured relevance (Tunnaja & Susilo, 2024). Challenges, such as low initial literacy and logistical constraints, were addressed through simplified materials and efficient procurement, though long-term sustainability requires continued support. Compared to similar initiatives, Bangun Mulya's program excelled in cross-sectoral integration but faced limitations in infrastructure and follow-up mechanisms, suggesting the need for enhanced monitoring and resource allocation.

CONCLUSION

The community service program in Bangun Mulya Village, conducted from July 14 to August 20, 2025, successfully revitalized the village by harnessing local potentials to foster sustainable resilience across environmental, health, economic, educational, and infrastructural domains. By leveraging resources such as organic waste, medicinal plants, and local micro-enterprises, the initiative addressed critical challenges, including inefficient waste management, limited health literacy, low digital competitiveness, prevalent bullying, and inadequate public lighting. The program's measurable outcomes underscore its effectiveness in achieving its objectives, while its community-based approach ensured local ownership, laying a robust foundation for long-term sustainability.

The environmental initiatives, including eco-enzyme training and productive tree planting, achieved significant success. The eco-enzyme program saw 80% adoption among trained participants, reducing organic waste sent to landfills by 70%, thereby mitigating environmental pollution and creating economic opportunities through marketable products. The planting of 160 productive saplings, with 100% community participation, enhanced green spaces and offered future economic benefits through timber and fruit production. The natural pesticide training, adopted by 85% of participating farmers, promoted sustainable agriculture by reducing reliance on chemical inputs, contributing to both environmental health and cost savings for farmers.

Health-focused programs, such as the "Jamuku, Imunkuat" initiative and the establishment of family medicinal plant (TOGA) gardens, significantly advanced community well-being. With 90% of participants independently producing traditional herbal remedies and 70% of targeted households adopting TOGA gardens, these efforts bolstered health literacy and self-reliance, reducing dependence on commercial medicines. These outcomes highlight the effectiveness of culturally resonant health interventions in resource-constrained settings, ensuring accessibility and sustainability.

Economically, the program strengthened local micro-enterprises through digitalization and branding support. Eighty percent of participating MSME operators enhanced their digital marketing

knowledge, with initiatives like Google Maps registration and halal certification improving market access and consumer trust. These results demonstrate the program's success in elevating the competitiveness of Bangun Mulya's economy, positioning it for growth in a digital era.

The anti-bullying education program at SDN 007 achieved an 80% increase in students' understanding of bullying impacts and a 90% improvement in tolerance, fostering a more inclusive school environment. This success underscores the program's role in shaping positive social behaviors among young students, contributing to a cohesive community. The installation of five solar-powered streetlights, fully functional and enhancing nighttime safety, addressed infrastructural deficits, extending productive hours and supporting local commerce.

Recommendations for future initiatives include regular monitoring of tree and TOGA garden conditions to ensure long-term viability, advanced training for MSMEs in digital marketing and financial management, and expanding environmental and health education to youth groups. Developing a digital platform to promote village potentials, securing local government support for renewable energy infrastructure, and conducting long-term evaluations will further enhance impact. Integrating these outcomes into village development plans will ensure sustained progress. Overall, the program exemplifies the transformative potential of community-based empowerment, positioning Bangun Mulya as a model for sustainable rural development.

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