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Acceleration of Circular Economy Based on Waste-to-Wealth Toward Environmental Sustainability

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Abstract
The transition toward a circular economy has become essential in addressing environmental challenges and economic limitations in resource-based rural communities. Bentek Village, North Lombok Regency, faces persistent problems related to unmanaged bamboo waste generated from satay stick industries, which poses environmental risks and lacks economic value. This community service program aimed to accelerate the implementation of a waste-to-wealth–based circular economy by enhancing technical capacity, social entrepreneurship, and digital marketing skills. The target partners were the Kelompok Tani Hutan (KTH) "Lengkah Pangkok" and the youth organization Karang Taruna "Bareng-Bareng," involving 40 participants. The program employed a participatory action research approach through stages of socialization, focus group discussions, training on bamboo waste processing into organic fertilizer and bio-briquettes, social entrepreneurship strengthening, infrastructure development, and continuous mentoring and evaluation. The results indicate an average competency improvement of 40.3% based on pre-test and post-test analyses, covering technical knowledge, social entrepreneurship, and digital marketing competencies. Qualitatively, the program enhanced environmental awareness, community participation, the establishment of two new waste-based business units, and reduced bamboo waste by approximately 60%. These findings demonstrate that a community-based circular economy approach is effective in promoting social empowerment, economic resilience, and environmental sustainability at the village level.

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1. INTRODUCTION

Over the preceding two decades, the global development framework has undergone a significant transformation from a linear economic model toward a circular economy that prioritizes the principles of waste minimization, resource reutilization, and the creation of sustainable value-added propositions. This transformation has been driven by increasing pressure on ecosystem capacity stemming from inefficient consumption and production methodologies, alongside the growing imperative to integrate economic, social, and environmental dimensions into a cohesive green development paradigm [1]. Indonesia, endowed with rich biodiversity and abundant biomass resources, possesses strategic potential to advance the circular economy, particularly through the optimization of organic waste and village-based biomass [2], [3]. A critical challenge confronting the nation is the insufficient utilization rate of bamboo waste, which in many production areas remains merely a by-product devoid of economic significance. This phenomenon is also prevalent in Bentek Village, located in North Lombok Regency, where activities in the satay skewer industry generate substantial quantities of bamboo waste that potentially cause environmental pollution if not managed sustainably. By employing the waste-

to-wealth paradigm, tangible bamboo waste can be transformed into economically valuable outputs such as organic fertilizer, bioenergy briquettes, and materials for ecotourism, thereby creating new pathways for the economic self-sufficiency of rural populations [4], [5]. In this context, the Kosabangsa Program, themed "Acceleration of Circular Economy Based on Waste-to-Wealth Toward Environmental Sustainability in Bentek Village, North Lombok Regency," emerges as a manifestation of collaboration among universities, village government, and local communities aimed at enhancing green production capabilities, fostering social entrepreneurship, and promoting sustainable resource governance with a focus on community welfare and environmental stewardship [6].

Despite the substantial bamboo resource potential in Bentek Village, which has emerged as the foundation of the community's economic endeavors through the satay skewer industry, the governance of generated waste continues to face numerous structural and technical impediments. The extensive volume of bamboo waste has not been matched by the community's capacity to transform it into value-added products, culminating in the disposal of the majority of residues and posing detrimental ecological impacts on the adjacent environment [7]. Conversely, the community's limited knowledge and technical expertise regarding appropriate technologies and sustainable production methodologies contribute to suboptimal levels of productivity and innovation in local resource utilization. These issues are further intensified by inadequacies in market accessibility, product branding, and digital marketing proficiency, which impede the competitiveness of local products driven by the green economy in broader markets. Moreover, the absence of production facilities and infrastructure conducive to the circular economy creates dependency among village communities on traditional economic practices that are less efficient and environmentally detrimental. This situation underscores a capacity deficit in the realization of an integrated circular economic system, thereby necessitating the formulation of collaborative intervention models capable of simultaneously addressing technical, social, and economic challenges through a participatory waste-to-wealth framework.

The Kosabangsa Program entitled "Acceleration of Circular Economy Based on Waste-to-Wealth Toward Environmental Sustainability in Bentek Village, North Lombok Regency," is structured to realize socioeconomic transformation within the village community through the implementation of sustainable circular economy principles. This initiative aims to enhance the technical and managerial competencies of the community in managing bamboo waste into economically viable products such as organic fertilizer and bioenergy briquettes, while simultaneously cultivating ecological awareness regarding the importance of environmentally sustainable production systems [8], [9]. Through participatory strategies involving the Forest Farmers Group (KTH) "Lengkah Pangkok" and Youth Organization (Karang Taruna) "Bareng-Bareng," the program is expected to strengthen social entrepreneurship capabilities, stimulate appropriate technological innovation, and facilitate the digitalization of marketing for green economy-based products. Furthermore, the initiative aims to integrate local potential with environmentally-focused educational tourism development, thereby expanding economic benefits and reinforcing Bentek Village's identity as a competitive eco-village paradigm. Strategically, the implementation of this program is also projected to generate an applicable community-based circular economy model that can be replicated in other regions, while simultaneously supporting the achievement of the Sustainable Development Goals (SDGs), particularly concerning sustainable consumption and production, inclusive economic growth, and environmental conservation.

2. IMPLEMENTATION METHOD

The implementation of the Kosabangsa Program themed "Acceleration of Circular Economy Based on Waste-to-Wealth Toward Environmental Sustainability in Bentek Village, North Lombok Regency" was conducted in a phased and structured manner throughout September 2025. The activities commenced with a socialization and Focus Group Discussion (FGD) phase, which functioned to align perceptions among the implementation team, community partners, and village

government regarding the program's direction and priorities. The subsequent phase continued with training on bamboo waste processing technology into value-added products, such as organic fertilizer and bioenergy briquettes, as a tangible manifestation of the waste-to-wealth concept implementation. Following this, a series of advanced training sessions were conducted focusing on strengthening social entrepreneurship capacity, digital marketing strategies, and sustainable business model development for the primary partners, namely the Forest Farmers Group (KTH) "Lengkah Pangkok" and Youth Organization (Karang Taruna) "Bareng-Bareng". The activities subsequently progressed to the development phase of supporting infrastructure in the form of waste processing installations, agrotourism pathways, and educational demonstration plots that integrate the economic, social, and ecological aspects of the village. In the final phase, mentoring and sustainability evaluation were conducted to ensure that all activity outcomes could be operated independently and sustainably by the local community. Overall, this chronology of activities reflects the synergy among academics, village government, and community in realizing a circular economy ecosystem based on collaboration and social innovation.

The activity design of the Kosabangsa program in "Acceleration of Circular Economy Based on Waste-to-Wealth Toward Environmental Sustainability in Bentek Village, North Lombok Regency" was constructed using a participatory action research approach that emphasizes collaboration among academics, community, and village government as equal partners in the empowerment process [10], [11]. This approach integrates the dimensions of capacity building, technological empowerment, and eco-digital entrepreneurship to create a comprehensive and sustainable intervention system. The design positions the community as the primary subject of social change, wherein each activity stage is designed iteratively—generating feedback that becomes the foundation for refinement of subsequent stages. Conceptually, this design is grounded in the principles of sustainability, social inclusivity, and utilization of local wisdom as crucial social capital in strengthening the circular economy at the village level [12], [13], [14]. This community service design model also adopts the triple helix collaborative framework that connects the role of academics as knowledge sources, government as policy facilitators, and community as the principal actors of green economic innovation [15], [16]. Through the integration of these three elements, the program focuses not only on technology transfer but also on social transformation that promotes village independence and sustainability based on the circular economy.

The implementation of Kosabangsa activities in the program "Acceleration of Circular Economy Based on Waste-to-Wealth Toward Environmental Sustainability in Bentek Village, North Lombok Regency" was conducted through structured, systematic, and community participation-based procedures. The activity procedures consist of eight principal interrelated stages conducted continuously. The first stage commenced with socialization activities and Focus Group Discussion (FGD) to align perceptions, identify priority issues, and build collaborative commitment among stakeholders. The second through fifth stages focused on enhancing community capacity and skills through a series of training sessions, encompassing bamboo waste processing technology into organic fertilizer and briquettes, product marketing and branding strategies, social business model development, and village-based tour guiding and digital marketing training. The sixth and seventh stages included the construction of supporting physical facilities such as waste processing installations, agrotourism pathways, and educational demonstration plots that function as circular economy learning facilities for the community and tourists. The eighth stage constitutes the mentoring and evaluation phase aimed at ensuring activity sustainability, effectiveness of technology implementation, and partner independence in operating waste-to-wealth-based enterprises. The entire procedure is designed with emphasis on the integration of knowledge transfer, socio-economic capacity strengthening, and sustainable innovation implementation as the foundation for green economy reinforcement at the village level.

The testing methods in the Kosabangsa Program themed "Acceleration of Circular Economy Based on Waste-to-Wealth Toward Environmental Sustainability in Bentek Village, North

Lombok Regency" were designed to measure the effectiveness, success, and sustainability of activity achievements objectively and measurably. Testing was conducted through complementary quantitative and qualitative approaches to obtain a comprehensive overview of the level of understanding, skills, and behavioral changes of partner communities following program implementation. Quantitatively, testing was performed using pre-test and post-test instruments to assess participant competency improvement in technical aspects of waste processing, social entrepreneurship, and marketing digitalization [15], [16]. Meanwhile, the qualitative approach was conducted through in-depth interviews, field observations, and participatory documentation to evaluate the social, economic, and ecological aspects of activity impacts [17], [18]. The obtained data were then analyzed using descriptive-comparative methods with success indicators encompassing knowledge enhancement, quality of training output products, and the level of partner independence in managing waste-to-wealth-based enterprises [19], [20]. Additionally, result validation was conducted through sustainability assessment involving academic experts and local stakeholders, ensuring that all program achievements are relevant, applicable, and oriented toward long-term sustainability [21], [22].

Data acuisition in the Kosabangsa Program themed "Acceleration of Circular Economy Based on Waste-to-Wealth Toward Environmental Sustainability in Bentek Village, North Lombok Regency" was conducted using a mixed-methods approach to obtain comprehensive, valid, and reliable data regarding all aspects of activity implementation. Data collection was performed through three primary sources: primary data, secondary data, and observational data. Primary data were obtained through surveys (pre-test and post-test), in-depth interviews, and Focus Group Discussions (FGD) with stakeholders, including partner communities, village government, and academic teams. Secondary data were collected from activity reports, village policy documents, and training outcome records. Meanwhile, observational data were obtained through direct field observations to assess the process and results of activity implementation contextually.

The data acquisition process was implemented through three main stages: (1) data collection, (2) data processing, and (3) data analysis. In the data collection stage, each respondent was provided with a questionnaire instrument using a Likert scale (1–5) to measure the level of understanding, satisfaction, and perception toward the program. The data processing stage was conducted through tabulation and data matrix compilation using simple statistical software. Meanwhile, the analysis stage was performed with quantitative approaches (descriptive analysis and percentage gain) and qualitative approaches (thematic analysis) to interpret patterns of social, economic, and ecological changes. Data validity was ensured through triangulation of sources, methods, and time, enabling the community service results to be scientifically accountable.

Table 1 Types, Sources, and Data Collection Techniques of the Kosabangsa Program

No	Data Type	Primary Data Source	Data Collection Technique	Data Utilization Purpose
1	Quantitative Data	Training participants (KTH & Karang Taruna)	Pre-test and post-test questionnaires	Measure technical and social competency improvement
2	Qualitative Data	Village government, community leaders	In-depth interviews and FGD	Assess social impact and community participation
3	Secondary Data	Activity reports, village policy documents	Documentation and literature study	Compile context and validate activity results

4	Observational Data	Field and production/tourism sites	Participatory observation and photo documentation	Verify implementation results in the field

With this comprehensive data acquisition design, the results of the Kosabangsa community service can be ensured to possess a robust empirical foundation, both quantitatively and qualitatively. This approach not only guarantees the objectivity of results but also strengthens academic credibility and data reliability to serve as a reference in developing replicable circular economy models based on communities in various rural areas throughout Indonesia.

3. RESULTS AND DISCUSSION

Research Results

The implementation of the Kosabangsa Program themed "Acceleration of Circular Economy Based on Waste-to-Wealth Toward Environmental Sustainability in Bentek Village, North Lombok Regency" demonstrates significant achievements both quantitatively and qualitatively. Evaluation results based on the mixed-methods approach reveal that all established success indicators were achieved according to targets for both primary partners, namely the Forest Farmers Group (KTH) "Lengkah Pangkok" and Youth Organization (Karang Taruna) "Bareng-Bareng". Quantitatively, the improvement in community competency is evident from pre-test and post-test results showing an average score increase of more than 40% across all training aspects, encompassing bamboo waste processing, social entrepreneurship, and SIWADIGI-based digital marketing. Meanwhile, qualitatively, substantial improvements were identified in environmental awareness, social participation, and community capacity to initiate productive economic activities based on waste management. This program also stimulated the establishment of two new waste-to-wealth-based business units and the development of educational agrotourism pathways that strengthen the ecotourism identity of Bentek Village. Consequently, the results of these activities not only fulfill administrative indicators but also generate sustainable socio-economic and ecological impacts for the local community.

Table 2 Achievement of Success Indicators of the Kosabangsa Program

No	**Achievement Indicator**	**Partner 1: KTH "Lengkah Pangkok"**		**Partner 2: Karang Taruna "Bareng-Bareng"**		**Average Achievement (%)**
		Before	After	Before	After	
1	Enhancement of Knowledge about Circular Economy	63,0	88,5	60,5	85,0	40,5
2	Bamboo Waste Processing Skills	58,0	85,5	55,0	84,0	50,0
3	Social Entrepreneurship Capability	61,0	83,0	59,0	82,0	37,5
4	Digital Marketing Implementation (SIWADIGI)	54,5	81,0	52,0	79,0	50,3
Average Alignment						**44,6**

The table demonstrates that all activity success indicators experienced significant increases above 35%, with an "Excellent" category in nearly all aspects of partner competency. These results indicate a 41.7% improvement in community competency, signifying the effectiveness of activities in enhancing the technical and managerial capacity of partners.

Qualitatively, interviews and field observations confirm that Kosabangsa activities positively impacted the enhancement of community social capacity. Partner 1 is now capable of

operating bamboo waste processing installations and independently producing briquettes and organic fertilizer, while Partner 2 successfully developed digital promotional content for environment-based educational tourism that increased tourist visits by approximately ±30% during the implementation period. Overall, activity implementation demonstrates that the waste-to-wealth-based circular economy approach can be effectively adapted in village contexts, generating mutually reinforcing economic, social, and environmental transformations.

The results of the Kosabangsa Program implementation demonstrate empirical consistency between field achievements and theories of sustainable development based on circular economy. Theoretically, these findings align with the Circular Economy Transition Model framework [23], which emphasizes the importance of closing the loop processes in production chains through waste utilization as new resources. The enhancement of community capacity in processing bamboo waste into economically valuable and environmentally friendly products illustrates a tangible transformation from linear economic systems toward community-based circular economic systems. This also reinforces the concept of grassroots sustainable innovation [24], whereby sustainable innovation can emerge from local communities through social learning and adaptation to available resources. Empirically, the waste-to-wealth approach implemented in Kosabangsa activities successfully promoted integration among technology, social, and digital entrepreneurship aspects. Comparative analysis between activity results and theoretical models demonstrates that activities in Bentek Village have fulfilled three dimensions of sustainability: resource efficiency (economic), social empowerment (social), and ecosystem preservation (environmental). These findings strengthen the triple bottom line concept, which asserts that sustainable development can only be achieved when these three dimensions operate in balance.

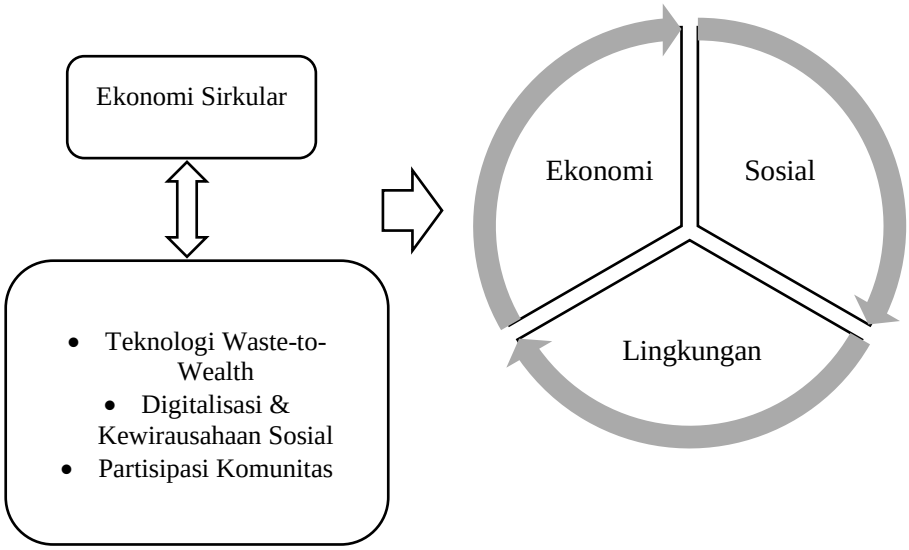
Table 3 Comparison Between Empirical Findings of the Kosabangsa Program and Theoretical Framework

No	Development Dimension	Theoretical Framework (Reference)	Empirical Findings of Kosabangsa Program	Level of Alignment (%)
1	Economic	*Circular Economy Transition [23]*	Utilization of bamboo waste into valueadded products (organic fertilizer, briquettes, bamboo souvenirs).	95
2	Social	*Grassroots Sustainable Innovation* [24]	Active community involvement in training and management of communitybased social enterprises.	90
3	Environmental	*Closed-Loop Material Flow Theory* [25]	Reduction of solid bamboo waste by up to 60% and increased environmental awareness among village communities.	88
Average Alignment				**91,0%**

The table demonstrates a high level of alignment between empirical activity findings and principal theories of circular economy, indicating the validity of the Kosabangsa concept within the global scientific framework. The value of 91.0% indicates that the implementation

of the Kosabangsa program possesses very high theoretical consistency and is valid in the context of community-based circular economy application at the village level.

Figure 1 Empirical-Theoretical Integration Model of the Kosabangsa Program



The figure illustrates the interconnection between circular economy theory and empirical implementation of Kosabangsa, generating sustainable development impacts at the community level.

Discussion

he discussion of this research focuses on the interpretation of the findings and how they relate to theory, literature, or previous research. The research results are critically analyzed to understand the patterns, relationships, or differences found. In the discussion, it explains how the findings support or challenge existing theories as well as factors that may have influenced the results. In addition, the discussion includes the practical and theoretical implications of the research, including how these results can be applied or further developed. Limitations of the study are also identified to provide greater context, followed by suggestions for future research to deepen or extend the findings.

From this interpretation of results, it can be concluded that the success of the Kosabangsa Program not only fulfills technical success indicators but also strengthens theoretical validity regarding the role of village communities in accelerating the circular economy. This program demonstrates that collaborative and participatory approaches are capable of accelerating the transition toward green economic systems based on local resources. Consequently, the results of this community service provide academic contributions in expanding conceptual models of circular economy that are applicable in rural areas, while simultaneously serving as an empirical foundation for replicating sustainable development policies in various regions throughout Indonesia.

Although the implementation results of the Kosabangsa Program demonstrate success in achieving all established achievement indicators, field implementation was not without various technical, social, and institutional constraints. These constraints emerged as consequences of the complexity of socio-economic transformation processes in implementing community-based circular economy. From a technical perspective, limitations in production facilities and bamboo waste processing equipment caused some participants to be unable to achieve optimal production efficiency. Meanwhile, from the social aspect, differences in participation levels among partner group members, particularly during advanced training phases, became a distinct challenge in maintaining consistency of community involvement. On the other hand, administrative coordination among institutions also faced obstacles

because activity reporting and documentation systems had not been fully digitalized. These constraints are dynamic in nature and constitute part of the collective learning process that actually strengthens the adaptive capacity of the community and enriches the implementation team's understanding of social dynamics in the field.

Table 4 Problem Identification and Strategic Solutions of the Kosabangsa Program

No	Constraint Category	Primary Problem Description	Impact on Program	Academic and Practical Solution Recommendations
1	Production Technical	Limited bamboo waste shredding equipment and briquette drying machines	Slow production process, non-uniform product quality	Provision of community-based appropriate technology tools and local technician training
2	Social Participatory	Uneven participant attendance rates in several training sessions	Competency imbalance among group members	Participatory incentive system and flexible training schedules
3	Institutional	Limited coordination among partners, village, and academic team	Strategic decision-making becomes slow	Formation of permanent cross-institutional coordination team
4	Administrative & Digital	Documentation and reporting not fully digitalized	Obstacles in monitoring and activity accountability	Development of SIWADIGI Admin digital reporting platform
5	Local Economic	Limited market access and branding for waste-based products	Products struggle to penetrate regional markets	Collaboration with e-commerce platforms and tourism digitalization promotion

demonstrates that primary constraints originate from technical and social aspects, which can be addressed through technological innovation, institutional strengthening, and participation-based incentive strategies.

Overall, this constraint analysis confirms that every problem emerging during Kosabangsa activities functions as a learning point in strengthening the community-based circular economy ecosystem. Constraint management through collaborative and adaptive approaches demonstrates that program success is determined not only by final outcome achievements but also by the capacity of teams and communities to respond to social, technological, and institutional dynamics in the field. Consequently, this empirical experience constitutes an important contribution to the development of community-driven circular economy-based service models [26] in Indonesia.

Although the Kosabangsa Program successfully achieved all planned performance indicators and demonstrated positive impacts on partner communities, this activity still possesses several limitations that need to be identified scientifically. The primary limitation lies in the aspect of relatively short implementation time, such that the process of knowledge and skill internalization among communities could not be evaluated longitudinally. This condition restricts research capacity to observe the sustainability of socio-economic effects post-program, particularly in the context of business development and partner independence. Additionally, limitations in technical infrastructure and production equipment became factors hindering the optimization of training results, especially in the production of briquettes and

organic fertilizer based on bamboo waste. From the social perspective, variation in participation levels among partner group members also became a challenge, where some participants still faced time and resource constraints to engage consistently.

Methodologically, the mixed-methods approach [27] employed was effective in measuring program achievements, yet did not fully capture social dynamics in depth due to limitations in the number of respondents and observation duration. This impacts the level of result generalization, which remains limited to the local context of Bentek Village and cannot yet be used to assess replication in other regions. Furthermore, weather factors and geographical conditions of the area also affected the process of activity implementation in the field, particularly during the facility construction and outdoor training phases. Nevertheless, these limitations do not diminish the significance of community service results; rather, they become important reflections for developing more adaptive, sustainable, and transformative research-based community service models in subsequent periods.

Table 5 Summary of Limitations and Implications

No	Limitation Aspect	Brief Description	Implication for Results	Recommendations for Development
1	Implementation Time	Activity duration of ±5 months insufficient for long-term evaluation	Sustainability results cannot be measured comprehensively.	Longitudinal study required.
2	Infrastructure and Technology	Bamboo waste production equipment remains manual.	Production efficiency and volume limited.	Longitudinal study required.
3	Social Participation	Not all members active in all training sessions.	Competency disparity among members.	Participatory incentive system.
4	Methodological Scope	Sample limited to two primary partners.	Result generalization limited to local context.	Replication in other village areas.

This optional table summarizes the primary limitations encountered in program implementation along with academic and practical recommendations for future improvement. Consequently, the limitations in the Kosabangsa Program should be understood not as fundamental weaknesses but rather as learning opportunities to strengthen the design of participatory research-based community service. Reflection on these limitations provides new directions for developing more comprehensive and contextual community-based circular economy models, while simultaneously strengthening the relationship between field practice and theory development in circular economy literature.

4. CONCLUSIONS

The Kosabangsa Program themed "Acceleration of Circular Economy Based on Waste-to-Wealth Toward Environmental Sustainability in Bentek Village, North Lombok Regency" has demonstrated the effectiveness of the circular economy approach in strengthening village community independence and supporting sustainable development. Based on mixed-methods evaluation results, all achievement indicators—encompassing knowledge enhancement, skills development, and environmental awareness—demonstrate significant improvement in both primary partners, namely KTH "Lengkah Pangkok" and Karang Taruna "Bareng-Bareng". This

program successfully integrated green economy principles with local social and cultural values through waste-to-wealth innovation, which transformed bamboo waste into products with economic and ecological value.

Conceptually, the results of these activities strengthen the theory of community-based circular economy and the triple helix collaborative model, which positions communities as principal actors in creating sustainable innovation. Meanwhile, practically, these activities generated tangible impacts in the form of income enhancement, establishment of new business units, and strengthening of social entrepreneurship capacity at the village level. The Kosabangsa Program also successfully cultivated ecological consciousness, increased cross-generational and cross-gender social participation, and strengthened community solidarity as social capital in green economic development.

Nevertheless, program limitations such as short implementation duration, production infrastructure constraints, and variation in participation levels remain challenges that require attention in subsequent community service implementations. Overall, Kosabangsa in Bentek Village has become an implementative model of community-based circular economy that is oriented not only toward economic outcomes but also toward ethical values, social justice, and environmental sustainability.

The Kosabangsa Program represents more than a successful community service initiative; it embodies a paradigm shift in how we conceptualize and implement sustainable development. By demonstrating that waste can become wealth, that communities can drive innovation, and that economic prosperity need not come at the expense of environmental health or social cohesion, this program contributes to reimagining what sustainable rural development can look like.

The journey from linear to circular, from waste to wealth, and from dependence to independence is not without challenges. Yet the experiences documented through this program—the quantitative improvements, the qualitative transformations, the obstacles overcome, and the lessons learned—provide both inspiration and practical guidance for those committed to building more sustainable, equitable, and resilient communities.

As we look toward the future, the principles and practices validated through Kosabangsa—participatory engagement, local resource optimization, cross-sector collaboration, technological empowerment, and values-based development—offer a replicable framework adaptable to diverse contexts. The ultimate measure of this program's success will not be found solely in the achievements of Bentek Village, but in its ability to inspire and inform circular economy initiatives across Indonesia and beyond, contributing to a more sustainable and just world for present and future generations.

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6. BIOGRAFFY

[1] S. Yulianti *et al.*, “Inovasi Bilik Sampah Ramah Lingkungan untuk Wilayah Pesisir Batu Licin Laut,” *Safari*, vol. 5, no. 4, pp. 144–152, 2025, doi: 10.56910/safari.v5i4.3249.

[2] S. Ikipsiliwangi, A. Setra, and T. Taufikin, "Islamic value-based community environmental literacy and education as a framework for circular economy and sustainable waste management," □□□□ □□□□□□□□ □□ □□□□□□□□□□ □□□□□□□ □□□□□□, vol. 13, no. 3, pp. 490–503, 2025, doi: 10.26436/hjuoz.2025.13.3.1620.

[3] B. As'urin, S. Sulastri, and J. Junaidi, "Pemanfaatan Limbah Plastik Menjadi Kerajinan Tangan Dalam Pengembangan Ekonomi Kreatif Pada Kelompok Bank Sampah Sultan Tanjung Kabupaten Lombok Timur," *SOROT Jurnal Pengabdian Kepada Masyarakat*, vol. 4, no. 2, pp. 99–104, 2025, doi: 10.32699/sorot.v4i2.9739.

[4] R. Ekawati and S. Rahayu, "Penerapan Ekonomi Sirkular Dalam Penanganan Sampah Di Kabupaten Sumbawa Barat," *Entrepreneur*, vol. 6, no. 2, pp. 63–70, 2025, doi: 10.31949/entrepreneur.v6i2.14093.

[5] G. M. Dwi *et al.*, "Pengolahan Limbah Pertanian Dalam Mendukung Zero Waste di Kawasan Desa Pakuan Kecamatan Narmada Kabupaten Lombok Barat," *Jurnal Sains Teknologi dalam Pemberdayaan Masyarakat*, vol. 6, no. 1, pp. 11–16, 2025, doi: 10.31599/80s70362.

[6] S. N. Fiasari, A. S. Luthfi, D. R. Yosika, M. G. Mustikarini, and D. Prayoga, "Pemberdayaan desa wandanpuro: transformasi limbah batang talas menjadi peluang ekonomi berkelanjutan," 2024.

[7] D. S. Rahmadi and T. Alawiyah, "PENANGANAN SAMPAH BERBASIS DESA MELALUI PERAN PEMUDA," *JISIP (Jurnal Ilmu Sosial dan Pendidikan)*, vol. 3, no. 3, 2019, doi: 10.58258/jisip.v3i3.807.

[8] D. Ekawati, L. Karlinasari, R. Soekmadi, and Machfud, "A Model of Integrated Community-Based Bamboo Management for the Bamboo Industry in Ngada Regency, East Nusa Tenggara, Indonesia," 2023. [Online]. Available: https://www.mdpi.com/2071-1050/15/2/977/pdf?version=1673493240

[9] P. J. Kaur, P. Yadav, M. Gupta, V. Khandegar, and A. K. Jain, "Bamboo as a source for value added products: Paving way to global circular economy," 2022. [Online]. Available: https://bioresources.cnr.ncsu.edu/wp-content/uploads/2022/05/BioRes_17_3_5437_Kaur_Review_Bamboo_Source_Value_Added_Products_19888.pdf

[10] A. Gamage, "Participatory Action Research (PAR): An Alternative Approach to Development Planning," 2025.

[11] J. Richter, "Research design: Participatory Action Research (PAR)," 2016.

[12] C. E. Puspitasari *et al.*, "Pemberdayaan masyarakat desa aik darek melalui ekonomi hijau dalam program kkn pmd," 2025.

[13] M. A. Firmansyah *et al.*, "Memperkuat Komunitas Melalui Program Pengelolaan Sampah untuk Keberlanjutan di Desa Suka Makmur," 2024.

[14] S. Sujono, S. Roekminiati, S. Pramono, and D. P. W, "Transformasi Ekonomi Hijau: Pemberdayaan Pemuda Desa Kedungsekar Melalui Bank Sampah," 2025. [Online]. Available: https://journal.appisi.or.id/index.php/risoma/article/download/1211/1209

[15] S. Sukriyah, Susiyanti, Maemunah, and B. Suhartono, "Kesadaran lingkungan melalui bank sampah sebagai model partisipasi masyarakat untuk pengelolaan sampah berkelanjutan: kolaborasi pt torabika, pksm banten, dan faida cendikia," 2025. [Online]. Available: https://abdimas.unipem.ac.id/abdimas/article/download/137/75

[16] A. Yasin and D. I. Pratiwi, “Pemberdayaan masyarakat dalam pengelolaan sampah berkelanjutan: studi kasus di kampung salo kendari,” 2024.

[17] A. Yulianto, W. Wahyono, V. W. Putri, F. Istanti, and E. A. Wicaksari, “Mengelola Sampah, Menjaga Desa: Strategi Optimalisasi Sampah Rumah Tangga Menuju SDG’s,” 2025.

[18] A. Urrahman, “Efektivitas program pokdarwis melka terhadap penanganan sampah di pantai pandanan desa malaka kecamatan pemenang kabupaten lombok utara tahun 2021,” 2023.

[19] A. Hidayati and M. A. Rofi, “Peningkatan Daya Saing Bank Sampah melalui Inovasi Produk dan Pemasaran Digital Berkelanjutan,” 2025.

[20] H. Yuliamir, S. Hadi, I. K. Dewi, and E. Rahayu, “Pemasaran Produk Daur Ulang dari Bank Sampah untuk Meningkatkan Daya Saing Wirausaha Lokal,” 2025.

[21] Q. Z. Yang, Y. Z. Sheng, and Z. Q. Shen, “Agent-based simulation of economic sustainability in waste-to-material recovery,” 2011.

[22] A. A. Adesoji, J. A. Ade-Omowaye, A. Afolalu, and O. Sunday, “Waste to Wealth: Engineering Solutions for SDG 12,” 2024.

[23] V. Roleders, T. Oriekhova, and G. Zaharieva, “Circular Economy as a Model of Achieving Sustainable Development,” 2022.

[24] M. Aluchna and B. Rok, “Closing the Loop: Circular Economy Through Sustainable Innovation Lens,” 2019.

[25] J. Chai, “Closing the Loop: Industrial Ecology, Circular Economy and Material Flow Analysis,” Springer eBooks, 2023, pp. 113–125. doi: 10.1007/978-3-031-22245-0_11.

[26] A. Coskun, J. Metta, Y. Bakirlioğlu, D. Çay, and K. Bachus, “Make it a circular city: Experiences and challenges from European cities striving for sustainability through promoting circular making,” *Resour Conserv Recycl*, vol. 185, p. 106495, 2022, doi: 10.1016/j.resconrec.2022.106495.

[27] N. K. Denzin, Y. S. Linclon, and Dariyatno, “The Sage Handbook of Qualitative Research 2,”2011,[Online].Available: https://catalog.unpkediri.ac.id/index.php/ijophya/article/view/index.php?p=show_detail&id=272&keywords=