

DEVELOPMENT OF CREATIVE BAMBOO-WOVEN PRODUCTS AS AN MSME EMPOWERMENT INITIATIVE IN CIKITU VILLAGE

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Abstract

This community service program addressed the declining sustainability and limited economic value of traditional bamboo weaving in Cikitu Village, Pacet Subdistrict, Bandung Regency, by developing alternative creative products based on existing local craftsmanship. The program aimed to develop bamboo-woven keychain prototypes and identify their production opportunities and constraints as an initial pathway for strengthening MSME empowerment. A participatory approach was applied through field observation, interviews, collaborative discussions, direct production practice, mentoring, and descriptive evaluation involving three active bamboo-weaving artisans. The intervention adapted weaving patterns already mastered by the artisans, including the traditional *hihid* form, into smaller functional products without introducing fundamentally new weaving techniques. The program produced more than ten bamboo-woven keychain prototypes, demonstrating the feasibility of transforming existing local skills into alternative product forms. The production process also revealed that product miniaturization did not automatically improve efficiency because smaller dimensions required greater precision, repeated adjustments, and potentially longer processing time. The preliminary price of IDR 5,000 per unit could not yet represent economic feasibility because raw materials, labor, processing time, packaging, and other production costs had not been fully calculated. The findings indicate that participatory product innovation can provide an initial pathway for community empowerment when creative adaptation remains aligned with artisan skills, production feasibility, and realistic economic considerations. Further development requires product refinement, full-cost calculation, appropriate pricing, packaging improvement, and market testing before broader commercialization.

Keywords: Bamboo Weaving; Community Empowerment; Creative Product Development; Msme; Participatory Community Service

A. INTRODUCTION

Indonesia's handicraft industry recorded exports valued at USD 165.27 million in the first quarter of 2026, representing a 4.08% increase compared with the same period in the previous year (Ministry of Industry of the Republic of Indonesia, 2026b). Indonesia's creative economy generated approximately IDR 1,757.87 trillion in gross domestic product in 2025, grew by 6.86%, and employed around 27.4 million workers or 18.7% of the national workforce (Ministry of Creative Economy/Creative Economy Agency, 2026). More than 64 million micro, small, and medium enterprises (MSMEs) also account for approximately 99% of business units, contribute more than 60% of national GDP, and absorb nearly 97% of Indonesia's workforce (Coordinating Ministry for Economic Affairs of the Republic of Indonesia, 2025). These economic characteristics demonstrate the potential of locally based creative products to connect the preservation of traditional skills with value creation for community enterprises. National policies for bamboo-based small and medium industries similarly emphasize artisan capacity building, regeneration, product design development, preservation techniques, and packaging as key elements for strengthening the competitiveness of products derived from local resources (Ministry of Industry of the Republic of Indonesia, 2026a).

The *Profile of Micro and Small Industries 2024* identifies limited access to capital, weaknesses in human resource and managerial capacity, and legal constraints as persistent challenges confronting micro and small industries in Indonesia (Statistics Indonesia, 2025). Rahayu, Wulandari, Rahmawati, and Istiyanti (2024) found that the bamboo handicraft products examined in their study achieved revenue–cost ratios above one, while product diversification contributed to income stability and generated different levels of added value across product categories. Kidane et al. (2024) demonstrated that raw-material quality and the number of working days influence bamboo product prices, while inadequate equipment and processing capacity constrain artisans' ability to produce competitive final products. Existing evidence therefore positions bamboo craft diversification as a process that must simultaneously account for artisan skills, product characteristics, production difficulty, processing time, and potential economic value. Community service interventions consequently need to move beyond the creation of new products by developing solutions that correspond to the actual production capacities and resources of local artisans.

Initial identification conducted during the Community Service Program (*Kuliah Kerja Nyata* [KKN]) in Cikitu Village revealed that bamboo weaving continues to be practiced by several community members, although weaving has increasingly become a supplementary occupation and active artisans are predominantly older adults. The production process requires substantial time and precision, whereas the selling value of several existing products does not adequately compensate for the effort involved, creating both economic and artisan-regeneration challenges. The KKN team collaborated with three artisans to adapt existing weaving patterns, including the traditional *hihid* form, into bamboo-woven keychains and produced more than ten prototypes. The product-development process revealed that smaller dimensions required greater precision, while the preliminary price of IDR 5,000 had not incorporated the full range

of production costs and the prototypes had not yet been commercially marketed. The central problem faced by the partners therefore concerns the need to develop alternative products that preserve locally embedded weaving skills while remaining realistic in terms of production complexity, processing time, and economically reasonable pricing.

Recent community service initiatives in bamboo-based crafts have generally employed training, mentoring, design innovation, and appropriate technology to strengthen artisan capacities and expand product diversification. Riyanto, Murtadha, Fadhilah, and Mulyani (2024) implemented socialization, training, and mentoring activities among bamboo-weaving artisans in Purworejo and generated more creative product variations in response to limited product diversity and relatively low selling value. Sumiati, Agustina, Safitri, and Rohmah (2024) developed *Bamboo Craft* through training for bamboo basket artisans and produced modifications in design and color combinations that expanded the potential use of bamboo baskets as souvenirs and product packaging. Bellanov, Nurhayati, and Valentino (2024) applied a *learning-by-doing* approach through the development of a bamboo-splitting tool and reported an approximately 11-minute reduction in processing time compared with manual methods, while simultaneously addressing constraints during raw-material preparation. The synthesis of these initiatives suggests that design innovation and production-process improvement can generate meaningful benefits for artisan partners, although the implications of product miniaturization for precision, production difficulty, processing time, and price feasibility during the prototype stage remain insufficiently examined.

The community service initiative in Cikitu Village shares several characteristics with previous programs through its utilization of bamboo as a local resource, the involvement of artisans as active partners, and the use of product innovation as a mechanism for strengthening community capacities. A further similarity lies in the mentoring approach, which allows artisans to retain and apply their existing knowledge and skills throughout the product-development process. The principal distinction of the Cikitu initiative lies in its decision not to introduce new weaving techniques, production machinery, or marketing training as the core intervention because the artisans already possessed the fundamental technical skills required for weaving. The evaluation instead concentrates on adapting traditional weaving patterns into miniature products and examining the resulting implications for shape, neatness, precision, production difficulty, processing time, and preliminary price formation before commercialization. These characteristics create a more specific field of community engagement concerned with determining whether jointly developed product innovations are genuinely compatible with the partners' production capacities and can realistically be continued after the KKN program has ended.

Existing studies demonstrate that training, product diversification, and technological interventions can improve product variety and artisan efficiency, while the practical feasibility of newly developed products before commercialization remains comparatively underexplored. The primary gap addressed by this initiative is a *practical-knowledge gap* concerning limited implementation-oriented understanding of the relationship between product innovation, locally embedded skills, and the actual production capabilities of community partners. This gap is

particularly relevant because changes in product form or size can alter precision requirements, workloads, processing time, and cost structures even when the underlying production technique remains unchanged. Community service literature that emphasizes the successful creation of product variations has not sufficiently explained how artisans can assess an innovation before reproducing it at scale and directing it toward market commercialization. The Cikitu Village initiative addresses this gap through participatory prototype development combined with the identification of production constraints as a basis for subsequent product refinement.

The urgency of this initiative arises from limited artisan regeneration, the increasing position of weaving as a supplementary occupation, the relatively low economic value of several existing products, and the need for diversification that does not impose disproportionate production burdens on local artisans. Limited evidence regarding the practical feasibility of newly developed products may cause community empowerment programs to stop at prototype creation without establishing whether community partners can reproduce the products independently. Practical risks also emerge when aesthetically attractive designs require greater precision and longer processing time without corresponding calculations of production costs and appropriate prices. Artisans, local MSMEs, village authorities, higher education institutions, and KKN teams all have an interest in the sustainability of the intervention because its long-term value depends on the community's ability to continue the innovation after formal mentoring activities have concluded. The Cikitu Village context therefore requires evaluation from the earliest stage of product development so that subsequent improvements in design, cost calculation, packaging, and marketing can be based on products that are technically and economically realistic for the partners.

The distinctive feature of this initiative lies in adapting weaving patterns already mastered by the artisans, particularly the *hihid* form, into miniature products that are jointly developed and evaluated without replacing the community's traditional production techniques. The conceptual contribution strengthens an understanding of community empowerment as a process that enables local actors not only to create innovations but also to evaluate their feasibility using resources, knowledge, and skills that already exist within the community. Empirical evidence from three participating artisans and the production of more than ten prototypes indicates that miniaturization does not automatically improve production efficiency because smaller products may instead demand greater precision and technical skill. The practical contribution provides an evaluative foundation for simplifying product design, measuring processing time, calculating production costs, determining appropriate prices, improving packaging, and conducting market testing in subsequent stages. The added value of the initiative lies in positioning prototypes as participatory learning instruments through which product innovations can be assessed against the partners' actual capacities before claims of economic empowerment or commercialization success are made.

This community service initiative aims to develop an alternative creative product in the form of bamboo-woven keychains by utilizing the skills and weaving patterns already mastered by artisans in Cikitu Village, Pacet Subdistrict, Bandung Regency. The initiative also seeks to identify opportunities and constraints associated with product development by evaluating the

production process, level of difficulty, precision requirements, processing time, and preliminary pricing considerations as a basis for further product refinement.

B. LITERATURE REVIEW

Community Empowerment

Community empowerment refers to a process through which local communities strengthen their capacity to identify, manage, and develop available resources in order to improve their social and economic conditions. Empowerment is not limited to providing external assistance, but emphasizes the ability of community members to participate in decision-making, utilize existing competencies, and gradually develop greater independence in managing productive activities. Perkins and Zimmerman (1995) explain that empowerment involves processes that enable individuals and communities to gain greater control over issues affecting their lives while strengthening their capacity to mobilize available resources. In the context of MSMEs, empowerment becomes particularly relevant when local skills and resources can be transformed into productive activities that generate additional value and create opportunities for sustainable economic development. This perspective corresponds with the conditions in Cikitu Village, where bamboo-weaving artisans already possess traditional craftsmanship that can be strengthened through product development rather than replaced by externally introduced skills.

Product Innovation

Product innovation represents the development or modification of a product through changes in its design, function, form, characteristics, or use in order to create additional value for producers and potential consumers. Innovation within traditional craft-based enterprises does not necessarily require the introduction of entirely new production techniques because existing skills can also be transformed through product diversification, redesign, and functional adaptation. Riyanto et al. (2024) demonstrate that mentoring and product innovation activities among bamboo-weaving artisans can stimulate creativity and expand the range of products that can be developed from established weaving skills. Product innovation must nevertheless consider production feasibility because an aesthetically attractive design may not be sustainable when it requires excessive precision, processing time, labor, or production costs. The development of bamboo-woven keychains in Cikitu Village reflects this concept by adapting existing weaving patterns, including the traditional *hihid* form, into smaller products while retaining the fundamental techniques already mastered by local artisans.

Participatory Community Development

Participatory community development places community members as active actors in identifying problems, designing solutions, implementing activities, and evaluating the results of interventions that directly affect their livelihoods. Participation allows local knowledge and practical experience to become integral components of decision-making, particularly in craft-

based activities where artisans possess tacit knowledge of materials, techniques, production constraints, and product characteristics. Chambers (1994) emphasizes that participatory approaches require development processes to recognize local people as knowledgeable actors rather than passive recipients of externally designed programs. Such an approach is particularly appropriate for community service activities because the effectiveness of an intervention depends on the extent to which proposed solutions correspond to the needs, capacities, and actual working conditions of community partners. The KKN activity in Cikitu Village adopts this orientation by involving artisans directly in adapting weaving patterns, producing keychain prototypes, identifying production difficulties, and evaluating the feasibility of further product development.

C. RESEARCH METHODOLOGY

This community service program employed a participatory approach that actively involved bamboo-weaving artisans in Cikitu Village throughout the stages of problem identification, product development, implementation, mentoring, and evaluation, consistent with participatory assistance practices in bamboo-based MSME development (Riyanto et al., 2024). Initial data were collected through field observation and interviews to identify existing business conditions, bamboo utilization, product characteristics, artisan skills, production processes, and constraints affecting product development, following similar diagnostic procedures used in bamboo-weaving community empowerment programs (Ngazizah & Widjajani, 2024). The intervention focused on developing bamboo-woven keychains by adapting weaving patterns already mastered by the artisans, including the traditional *hihid* form, while maintaining the existing production techniques and emphasizing product diversification through direct practice (Arhandi et al., 2024). Practical implementation involved three artisans through socialization, collaborative production, product-form adjustment, finishing, and continuous mentoring, reflecting the use of hands-on approaches in bamboo craft development activities (Kurniawan et al., 2025). Descriptive evaluation assessed product design, weaving neatness, shape accuracy, attachment strength, aesthetics, production difficulty, processing time, preliminary pricing, and constraints that should be addressed before the prototypes proceed to further development and commercialization (Ngazizah & Widjajani, 2024).

D. RESULT AND DISCUSSION

Product Development and Prototype Outcomes

Field observations in Cikitu Village identified three active bamboo-weaving artisans who continued to apply established manual techniques in household-based production. The artisans already mastered several traditional patterns, including *hihid*, so the activity did not require the introduction of a new weaving technique. Collaborative discussions transformed existing patterns into keychain designs by adjusting size, shape, and function while preserving the basic weaving structure. The production process covered bamboo preparation, weaving, shaping, hook attachment, finishing, and joint inspection, resulting in more than ten prototypes. These field outputs confirm that local craftsmanship can support product diversification, while the

prototype stage also provides a basis for assessing whether the adapted design corresponds to the artisans' actual production capacity.

Existing technical mastery shifted the orientation of the intervention from basic skills transfer toward the collaborative application of established craftsmanship to a new product format. The adaptation strategy reduced the learning burden because artisans could rely on familiar patterns and techniques while exploring a different product function. Product miniaturization simultaneously shifted the production challenge from basic weaving competence toward precision, dimensional control, edge neatness, and consistency of form. This configuration indicates that meaningful product innovation depends not only on the ability to generate a new design but also on compatibility between design requirements and established production practices. The interaction between preserved local skills and modified product attributes consequently provides an analytical basis for positioning the Cikitu experience within previous bamboo-craft interventions.

Previous community service initiatives demonstrate that bamboo-craft diversification can generate greater product variety when mentoring activities build on the skills and production knowledge already possessed by artisans (Riyanto et al., 2024). Product adaptation that combines existing bamboo-weaving practices with new functions has also enabled artisans to create products with higher perceived value while retaining elements of local craftsmanship (Ngazizah & Widjajani, 2024). Bamboo-weaving training in Sumpur Kudus further indicates that direct practice can strengthen the capacity to transform locally available bamboo into craft products with functional and aesthetic value (Kurniawan et al., 2025). Community-based bamboo craft activities in a tourism-village setting similarly show that practical engagement can connect local-resource utilization with the production of distinctive craft items that possess potential economic value (Halim et al., 2025). Production-oriented interventions also demonstrate that technical characteristics of the crafting process directly influence artisan workload, processing consistency, and production efficiency (Bellanov et al., 2024).

Evidence from Cikitu extends these findings by showing that innovation can emerge through functional reinterpretation without requiring artisans to replace their established craftsmanship. The *hihid*-based keychain converts a familiar woven form into a portable souvenir format, creating a different use context while retaining recognizable elements of local craft identity. Artisan knowledge remains central to this process because decisions concerning pattern density, material handling, form correction, and finishing depend on direct production experience. The resulting prototypes function not merely as tangible outputs of the KKN activity but also as practical testing objects that reveal the point at which design intentions encounter production realities. Prototype quality and reproducibility consequently become critical considerations before the product can move toward wider production.

Prototype inspection identified several aspects that required further adjustment, particularly shape consistency, weaving density, edge neatness, and the attachment of keychain components. Smaller product dimensions increased the need for precision and occasionally required repeated corrections before the intended form could be achieved. The production of

more than ten units demonstrates the technical possibility of converting existing weaving patterns into keychains, although the number of prototypes alone cannot establish production efficiency or replicability. The resulting output is therefore more appropriately interpreted as an initial product-development achievement that provides empirical evidence for assessing technical feasibility rather than as evidence of commercial success. These characteristics shift attention from whether bamboo-woven keychains can be produced toward whether production difficulty, processing time, consistency, and preliminary pricing are sufficiently feasible to support continued adoption by the artisans.

Production Feasibility, Constraints, and Development Opportunities

Field observations revealed that reducing the dimensions of bamboo-woven keychains increased the precision required to control pattern density, product shape, and edge neatness. More than ten prototypes were successfully produced, although several units required repeated adjustments before achieving an acceptable final form. Artisan experience indicated that smaller products did not automatically shorten processing time because narrow weaving spaces made manual manipulation more demanding. A preliminary price of IDR 5,000 per unit was proposed by the artisans, although the calculation had not incorporated raw materials, keychain components, labor, processing time, packaging, and other supporting costs. The combination of technical producibility, repeated correction, uncertain processing efficiency, and incomplete cost information created a need to distinguish successful prototype creation from feasible routine production.

Product miniaturization created a clear trade-off between material compactness and production complexity. Smaller dimensions potentially reduce material consumption and produce a portable souvenir format, yet greater precision can increase labor intensity and processing time. A low preliminary selling price becomes problematic when additional precision is not translated into compensation for the artisan's labor and technical skill. The absence of commercial sales also prevents reliable assessment of consumer acceptance, revenue potential, and actual profitability at the current stage. Technical feasibility therefore represents only one component of product viability, while production efficiency and economic feasibility determine whether the product can realistically become a repeatable livelihood activity.

Research on bamboo handicrafts in Muntuk Village found that different product types generated different levels of added value and economic feasibility, demonstrating that diversification alone does not guarantee equivalent financial returns across craft products (Rahayu et al., 2024). Bamboo value-chain evidence also shows that material quality and the number of working days contribute to price formation, reinforcing the relevance of labor time in evaluating the economic viability of bamboo products (Kidane et al., 2024). A bamboo-processing intervention in Trenggalek reduced processing time by approximately 11 minutes through an appropriate splitting tool, indicating that production efficiency can change substantially when technical constraints are addressed directly (Bellanov et al., 2024). A recent community service program in Ngadiharjo Village similarly reported that bamboo-splitting and

shaving technologies improved processing efficiency while producing more precise and consistent dimensions than manual methods (Suryanadi et al., 2026). Product-innovation assistance among bamboo-weaving artisans in Purworejo generated more varied products with higher potential selling value, although the reported intervention concentrated on creativity and diversification rather than the production consequences of reducing product dimensions (Riyanto et al., 2024).

The Cikitu evidence reveals a distinctive miniaturization-feasibility trade-off in which a smaller product format increases functional and souvenir potential without necessarily improving production efficiency. Existing weaving competence enables artisans to produce the keychain form, yet competence alone does not eliminate the additional precision required by reduced dimensions. The relationship between size, precision, processing time, and preliminary price consequently becomes more decisive than the mere existence of a new product variant. The IDR 5,000 preliminary price also exposes a potential mismatch between perceived product simplicity and the hidden labor intensity embedded in miniature handwoven production. Product viability in this context depends on achieving a workable balance among design attractiveness, artisan effort, reproducibility, processing efficiency, and economic compensation.

Prototype assessment consequently carries significance beyond determining whether a bamboo keychain can be physically produced. Artisan judgments concerning difficulty, repeated adjustments, processing effort, and acceptable pricing represent practical knowledge that directly shapes the sustainability of the intervention. Community empowerment becomes fragile when product innovation creates additional production burdens without providing a realistic pathway toward proportional economic value. Collaborative evaluation allows product ideas to be confronted with the actual capacities, experiences, and limitations of the artisans before wider production or market introduction occurs. The interaction between local craftsmanship, participatory decision-making, product innovation, and production feasibility consequently defines the conditions under which bamboo-based diversification can function as a meaningful pathway for community empowerment.

Participatory Product Innovation as a Pathway for Community Empowerment

Field implementation in Cikitu Village showed that artisans participated directly in determining product forms, adjusting weaving dimensions, producing keychain prototypes, correcting technical imperfections, and evaluating the resulting products. The KKN team primarily facilitated product ideas and design adjustments, while the artisans retained control over material preparation, weaving techniques, pattern formation, and finishing. Existing craftsmanship therefore remained the primary production asset throughout the intervention rather than being replaced by externally introduced techniques. Artisan feedback concerning precision, weaving density, processing difficulty, and preliminary pricing directly influenced decisions regarding the feasibility of the proposed product. This pattern of interaction demonstrates that the intervention functioned as a collaborative production process in which local knowledge shaped both the product and the assessment of its practical viability.



Figure 1. Participatory Process of Bamboo-Woven Product Development with Local Artisans in Cikitu Village

Source: KKN Team Documentation, 2026.

Artisan participation changed the role of community members from recipients of assistance into active decision-makers within the product-development process. Local production knowledge provided information that could not be adequately captured through design considerations alone because technical feasibility depended on practical experience with bamboo characteristics and weaving patterns. Collaborative experimentation also exposed limitations in the initial assumption that smaller products would be easier and faster to produce. Direct involvement allowed the artisans to assess innovation according to actual production demands rather than according to external perceptions of product attractiveness. Community empowerment in this setting therefore emerged through the capacity to participate in innovation decisions, evaluate technical consequences, and determine whether a product was sufficiently compatible with existing skills and working conditions.

Community-based bamboo-weaving assistance in Purworejo demonstrates that socialization, training, and mentoring can stimulate product variation and strengthen artisans' capacity to generate higher-value craft products (Riyanto et al., 2024). Empowerment activities among bamboo artisans in Kebumen similarly show that combining local weaving competence with new product applications can broaden opportunities for product innovation while retaining locally embedded craftsmanship (Ngazizah & Widjajani, 2024). Economic analysis of rural bamboo handicrafts indicates that product diversification can generate added value, although differences among product types create unequal levels of economic feasibility and returns to artisans (Rahayu et al., 2024). Bamboo value-chain research further demonstrates that processing knowledge, market requirements, material characteristics, and production constraints interact in determining the capacity of local actors to capture economic value from bamboo resources (Kidane et al., 2024). Evidence from these studies strengthens the argument that sustainable bamboo-based empowerment requires the integration of innovation, artisan knowledge, production capacity, and economic considerations rather than reliance on product diversification alone (Rahayu et al., 2024).

Evidence from Cikitu reveals that participatory product innovation generates a dual empowerment mechanism consisting of productive adaptation and evaluative capacity.

Productive adaptation occurs when artisans transform established weaving knowledge into a different functional form without abandoning the technical competence already embedded in their craft practices. Evaluative capacity emerges when artisans use production experience to judge whether changes in size, precision, workload, and price remain acceptable for continued production. The combination of these two mechanisms indicates that empowerment is not represented solely by the ability to produce a new item, but also by the ability to critically assess whether the innovation deserves to be sustained. The resulting finding positions artisan judgment as a central resource that mediates the relationship between creative product ideas and their practical feasibility within community-based enterprises.



Figure 2. Bamboo-Woven Keychain Prototypes Developed from Existing Local Weaving Patterns

Source: KKN Team Documentation, 2026.

Sustainable continuation of the bamboo-woven keychain initiative depends on preserving this balance between creative adaptation and the production realities experienced by the artisans. Product refinement needs to retain recognizable local weaving characteristics while reducing technical complications that may increase processing time and labor intensity beyond reasonable levels. Economic considerations also require a more complete calculation of material inputs, components, labor, processing time, packaging, and expected margins before a final selling price can be established. Market testing can become meaningful only after the product achieves sufficient consistency, reproducibility, and pricing feasibility from the producer's perspective. Alignment among local skills, production efficiency, economic compensation, and market potential ultimately determines whether prototype-based innovation can develop into a sustainable form of community empowerment.

E. CONCLUSION

The community service program in Cikitu Village successfully produced more than ten bamboo-woven keychain prototypes with three local artisans by adapting existing weaving patterns, including the traditional *hihid* form, while revealing that product miniaturization increased precision requirements, processing difficulty, and production time, and that the preliminary price of IDR 5,000 had not yet reflected the full production cost. These findings indicate that the program achieved its objectives of developing an alternative creative product

and identifying its principal production constraints, while demonstrating that community empowerment through product innovation depends on the compatibility between local skills, technical feasibility, and economically reasonable value creation. The main contribution lies in positioning participatory prototype development not merely as a process of creating new craft products but as a practical mechanism for evaluating whether an innovation can be realistically reproduced and sustained by community partners. Local artisans, village authorities, MSME facilitators, and community-service teams should refine product dimensions, measure processing time, calculate complete production costs, establish appropriate selling prices, improve packaging, and conduct market testing, while local development support should encourage artisan regeneration and the sustainable use of bamboo-based local potential. Future studies should address the current limitations of involving only three artisans and the absence of market, sales, and income data by examining consumer responses, production efficiency, full-cost pricing, larger artisan participation, and longer-term economic and empowerment outcomes after commercialization.

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