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Empowering Women Farmers Groups and Bamboo MSMEs via Legal, Management, and Productivity Support

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ABSTRACT

Empowering rural communities through local potential requires an integrated upstream-to-downstream approach to strengthen economic competitiveness. This Fostered Village Community Service Program (PkM) aims to optimize the bamboo plantation and craft potential of Ababi Village, Abang District, Karangasem Regency, Bali. The program works with two main partners: the Tunas Asih Women Farmers Group (KWT), which supplies raw materials (upstream), and the Sedana Artha Bamboo Craft MSME, which processes the products (downstream). The partners' main challenges include low productivity, conventional production methods, limited preservation technology, the absence of business legality in the form of a Business Identification Number (NIB) under the Online Single Submission Risk-Based Approach (OSS-RBA), and manual financial recording. The program applied Participatory Rural Appraisal (PRA) through the following stages: socialization, technical and managerial skills training, application of science and technology, intensive mentoring, and program evaluation. The results show higher bamboo processing productivity, mastery of modern craft design diversification, the adoption of simple digital financial recording, and the issuance of OSS-RBA NIBs for both partners. This synergy has strengthened local institutions and fostered the economic independence of bamboo artisans in Ababi Village.

Keywords: *Women Farmers Group (KWT), Business Legality, OSS-RBA NIB, Bamboo Artisans, MSMEs*

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INTRODUCTION

Sustainable rural development depends on making the best use of community-based local potential that responds to market challenges (Habib, 2021). Ababi Village, in Abang District, Karangasem Regency, Bali, has plantation and bamboo forest areas of more than 120 hectares, which makes it one of the most important sources of ecological raw materials in East Bali (Staf Pemerintahan Desa

Ababi, 2026a). The village's local economic value chain is supported by intergenerational collaboration between two community groups. The first is the Tunas Asih Women Farmers Group (*Kelompok Wanita Tani*/KWT), which has 25 members and works in the upstream sector as the manager and supplier of bamboo raw materials. The second is the Sedana Artha Bamboo Craft MSME, which has 12 artisans and works in the downstream sector, turning bamboo into creative handicraft products (Landuh, 2026; Sukaning, 2026). Because of this supply chain linkage, the sustainability of the downstream MSME depends heavily on the quality of bamboo supplied by the upstream KWT.

However, initial observations and contextual data show that the integration of this value chain has stalled because of three priority problems. First, in terms of production technology, the artisans still rely entirely (100%) on conventional manual tools and on the traditional method of soaking bamboo in river water for preservation. This practice takes 3 to 4 weeks, cannot consistently prevent infestations of powder-post beetles (*Dinoderus minutus*), and causes a raw material failure rate of up to 35% (Helmiana et al., 2025). Second, in terms of business legality, none of the partner business actors (100%) holds a Business Identification Number (*Nomor Induk Berusaha*/NIB) under the Online Single Submission Risk-Based Approach (OSS-RBA) system, owing to low digital literacy and the perception that the bureaucracy is complicated (Fadilah et al., 2025; Farida & Radian, 2024). This lack of legal status limits access to bank financing and government grants, as well as formal partnerships with the hospitality sector and exporters. Third, in terms of business management, financial records remain mixed with household funds and do not follow standard bookkeeping, so business profitability cannot be measured accurately (Priandi et al., 2022). Earlier interventions by the local government tended to be partial, such as occasional exhibition support without assistance on legality or technological modernization, and therefore did not address the root causes of limited production capacity and weak business governance.

To close these gaps, the community service team from Universitas Pendidikan Ganesha implemented an Integrated Fostered Village Community Service (*PkM Desa Binaan*) approach. This approach was chosen because it combines the transfer of appropriate technology (bamboo splitting/slicing machines and preservation tanks using a boiling/pressure method), direct legality mentoring until the OSS-RBA NIBs are issued, and training in financial record-keeping with simple digital applications. This holistic solution is designed to break the cycle of low efficiency and lack of legal standing that has long constrained the competitiveness of rural MSMEs.

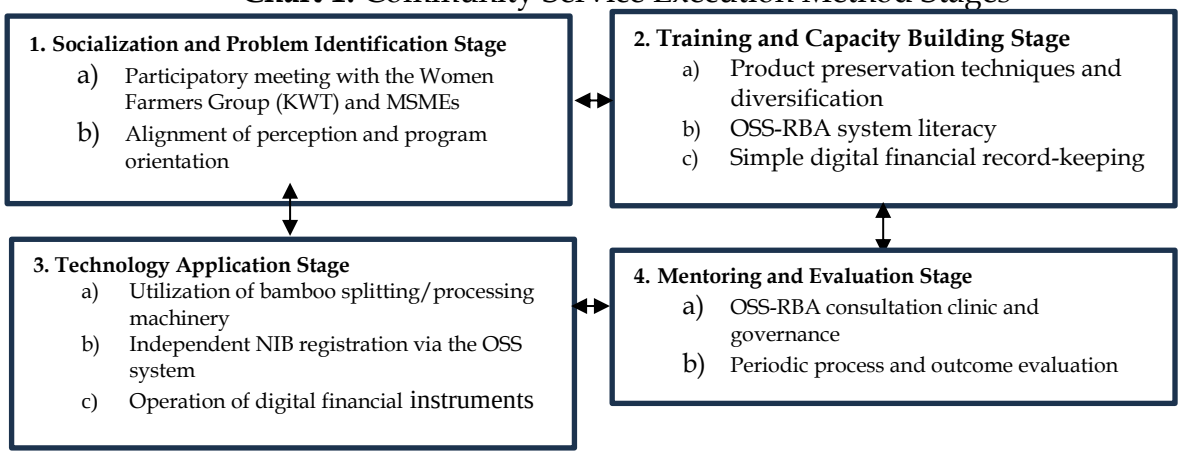
The main objectives of this PkM program are to (1) raise bamboo production efficiency and capacity by up to 50% through the diversification of appropriate technology, (2) fully facilitate (100%) business legality (OSS-RBA NIB) for the partner KWT and MSME, (3) modernize the partners' financial governance through separate, digital app-based record-keeping, and (4) widen market reach into the formal tourism industry. The program directly supports Ababi Village's "MABASI" vision (*Mandiri, Aman, Bersih, Amanah, Bersinergi, dan Indah* / Independent, Safe, Clean, Trustworthy, Synergistic, and Beautiful), the *Asta Cita*

agenda of developing the nation from rural areas and the periphery, and Village Sustainable Development Goals (SDGs) Goal 8 (Decent Work and Economic Growth) and Goal 12 (Responsible Consumption and Production) (Evinita et al., 2025; Pemerintah Desa Ababi, 2022).

METHOD

The Fostered Village Community Service Program (PkM) was carried out in Ababi Village, Abang District, Karangasem Regency, Bali, over eight months (May–December). The program used a Participatory Rural Appraisal (PRA) approach, in which community partners acted as active agents of change (co-creators) from planning through evaluation (Tamphu et al., 2024).

Chart 1. Community Service Execution Method Stages



Source: Community Service Method, DIPA 2026.

Implementation of Partner Sokasi Product Diversification



Figure 1. Implementation of Production Aspect Activities
Documentation of Partner Sokasi Production Results, July 2026.

Target Audience and Participant Characteristics

The program targets 37 participants from two main partner groups. a) The Tunas Asih Women Farmers Group (KWT, upstream sector) has 25 members, all women aged 35–58 years, most of whom have primary to junior high school education, and focuses on harvesting bamboo and supplying raw materials. b) The Sedana Artha Bamboo Craft MSME (downstream sector) has 12 artisans (7 men and 5 women) aged 22–50 years with junior to senior high school education, and focuses on processing creative bamboo weaving products.

Preparation Phase and Activity Instruments

The preparation phase took place in Month 1 and covered two activities. a) Permitting and coordination: coordinating with the Ababi Village Government to align the program with the Fostered Village roadmap. b) Module and instrument development: drafting the training modules (Bamboo Preservation, OSS-RBA, and Digital Cash Book), skills observation sheets, pre-test and post-test questionnaires (1–5 Likert scale), and product quality assessment instruments.

Implementation Stages and Intervention Delivery Methods

The interventions were delivered in stages using a combination of participatory methods: experiential learning, demonstration plots (demplots), and direct one-on-one mentoring.

Table 1. Stages of the Desa Binaan PkM Implementation in Ababi Village

Phase	Period	Activities and Description
Phase I: Socialization and Orientation	(Month 2)	Focus Group Discussions (FGDs) with the KWT leaders, the MSME owner, and community leaders to agree on the activity schedule, the division of roles, and the indicators of program success.
Phase II: Technical and Management Training	(Months 3-4)	1. **Preservation and Production Techniques:** interactive workshops and hands-on practice in eco-friendly bamboo preservation (borax–boric acid solution / liquid borax soaking method) and precision slicing techniques. 2. **Legality and Finance:** training in creating a business Gmail account, registering for an NIB through the OSS-RBA application, and simulating transaction record-keeping with digital bookkeeping apps (e.g., BukuKas/Kasvort).
Phase III: Application of Appropriate Technology / Science and Technology	(Months 5-6)	3. Handover and installation of 2 Automatic Bamboo Splitting/Slicing Machines and 1

Phase	Period	Activities and Description
		Medium-Pressure Preservation Soaking Tank to the partners. 4. Facilitation of the issuance of risk-based OSS-RBA NIBs for the KWT (KBLI 02202 - Bamboo Harvesting) and the MSME (KBLI 16299 - Bamboo Handicrafts).
Phase IV: Mentoring and Market Access	(Months 7-8)	Weekly on-site mentoring through a Business Consultation Clinic to ensure safe machine operation and daily digital bookkeeping, and to develop a digital product catalog for Business-to-Business (B2B) marketing aimed at hotels and restaurants in Bali.

4. Evaluation Procedures and Indicators

Evaluations were conducted systematically at three levels (process, outcome, and impact) using both qualitative and quantitative instruments. a) Knowledge and attitude evaluation: measured by the difference between pre-test and post-test scores on understanding OSS-RBA legality, bamboo sanitation and preservation, and cash management. b) Skills and behavior evaluation: assessed with performance observation rubrics during the operation of the bamboo slicing machines and compliance with daily digital cash book entries. c) Business performance evaluation (outcome and impact): measured with the following quantitative indicators:

Table 2. Evaluation of Community Service Program (PKM) Results

Evaluation Dimension	Key Performance Indicators (KPI)	Progress Target	Measurement Method
Productivity	1. Bamboo slicing capacity per hour 2. Raw material damage/failure rate	1. Increase ≥ 50% 2. Decrease from 35% to < 10%	Production sampling (time and motion study)
Legality	Ownership of OSS-RBA-based Business Identification Number (NIB)	Both partners (KWT and MSME) obtain official NIBs	Verification of legal documents

Evaluation Dimension	Key Performance Indicators (KPI)	Progress Target	Measurement Method
Management	Separation of personal and business finances	Both partners actively record transactions on the digital app	Periodic audits of financial journals
Marketing	Market reach and new partnerships	At least 2 new partnerships with the tourism industry	Verification of MoUs/sales contract documents

Source: Processed Evaluation Results of the Ababi Village Fostered Village PKM Team, 2026.

The evaluation data were analyzed with a paired sample t-test to determine the significance of the changes before and after the intervention.

Table 3. Compliance Matrix

Notes	Compliance Point
Participant Characteristics and Count	Details of KWT Tunas Asih (25 women, elementary to junior high school education) and MSME Sedana Artha (12 artisans, junior to senior high school education)
Preparation and Instruments	Preparation of modules, pre/post-test questionnaires, observation sheets, and assessment rubrics
Intervention Delivery	Structure and delivery are explained through FGDs, workshops, demonstration plots (demplots), and one-on-one mentoring
Evaluation Method and Indicators	Utilizes capacity increase percentage indicators, (50%), defect rate reduction (< 10%), as well as an evaluation matrix based on pre/post-tests and t-tests.

Source: Results of the Program Implementation by the Assisted Village Community Service (PkM) Team of Ababi Village, 2026.

RESULTS AND DISCUSSION

RESULTS

Program Implementation Achievements and Partner Transformation

Over the eight months of implementation, the Fostered Village Community Service (PkM) program in Ababi Village significantly transformed the operational capacity, legality, and management skills of KWT Tunas Asih (upstream sector) and MSME Sedana Artha (downstream sector). The changes before and after the intervention were measured through quantitative and qualitative evaluations, as presented in Table 4.

Table 4. Evaluation Matrix of Partner Development Before and After the Community Service (PkM) Program

No	Evaluation Indicator	Initial Condition (Pre-Intervention)	Final Condition (Post-Intervention)	Significance of Progress / Achievement
1	Bamboo Production Capacity	Manual (knives/machetes); 2-4 strips/hour; raw material defect rate 35%	Automatic slicing machine; 12-15 strips/hour; raw material defect rate < 8%	Capacity increased > 150%; slicing time saved 65%
2	Raw Material Durability	River water soaking (3-4 weeks); vulnerable to powder-post beetles	Soaking method using liquid borax preservative solution in tanks	Bamboo durability increased from 6 months to > 3 years
3	Product Diversification	Household functional products (*sokasi*, baskets)	Home decor, decorative lampshades, ethnic bamboo bags	Product added value increased 40% – 60% per unit
4	Business Legality	0% Have official/informal permits	100% Partners have official NIB based on OSS-RBA (KBLI 02202 and 16299)	Officially registered in the state system; ready to partner with formal industries
5	Financial Management	Manual recording; business and household cash merged	Daily recording based on digital applications (Kasvort/BukuKas)	Separate bookkeeping100%; COGS precisely calculated
6	Satisfaction and Understanding Level	Average pre-test: 42,5/100	Average post-test: 88,0/100	Increase in participants' knowledge and skills by 107%

Source: Processed Data from the Ababi Village PkM Evaluation (2026).

DISCUSSION

Production Modernization and Creative Diversification

The application of Appropriate Technology (ATG), in the form of automatic bamboo slicing machines and preservative soaking tanks, removes the physical barriers faced by artisans who previously depended on manual equipment. Before the intervention, heavy physical labor limited the artisans' production capacity. The machines cut processing time by up to 65% and produced strips of uniform thickness. The shift from traditional functional products to home decor and decorative lampshades also raised the partners' profit margins. This supports the finding of Helmiana et al. (2025) that simple mechanization combined with design

diversification based on tourism market demand can sustainably increase the income of micro bamboo craft businesses.

Legal Certainty and Formal Market Access

The successful facilitation of OSS-RBA-based Business Identification Numbers (NIB) for KWT Tunas Asih and MSME Sedana Artha removes the institutional barriers that have long kept them out of the formal economy. With an NIB, the partners gain legal certainty and also qualify to apply for Micro Small Business Loans (Kredit Usaha Rakyat / KUR) and to sign supply contracts with hotels and restaurants in the Karangasem and Ubud tourism areas. These results are consistent with Fadilah et al. (2025) and Farida and Radian (2024), who stress that holding an NIB is the key to connecting rural MSMEs with large-scale industrial supply chains.

Institutional Strengthening and Local Supply Chains (Socio-Economic Linkages)

This intervention strategically connects KWT Tunas Asih in the upstream sector with MSME Sedana Artha in the downstream sector. Before the program, the KWT sold raw bamboo to outside collectors at low prices, while the MSME struggled to obtain high-quality bamboo. Under an internal village partnership scheme, the KWT now supplies preserved bamboo directly to the MSME at mutually agreed prices. This model gives the KWT a certain market and guarantees the MSME a reliable supply of raw materials (Pusvita et al., 2025).

Impact Separation: Short-Term versus Long-Term

Immediate Outcomes (Short-Term Achievements): a) Issuance of 2 official OSS-RBA NIB legality documents. b) Improved technical skills for 37 participants (post-test scores rose by 107%). c) Provision of 2 bamboo slicing machines and 1 ready-to-use preservation tank. d) Development of a digital product catalog and a daily cash bookkeeping application.

Longer-Term Impacts (Projections): a) **Rural Economic Independence:** a self-sustaining bamboo creative industry ecosystem that is resilient to external supply fluctuations. b) **Women's Empowerment:** KWT Tunas Asih moving from merely gathering bamboo to managing a value-added raw material business, which increases the contribution of rural women to household income. c) **Environmental Sustainability:** less reliance on hazardous chemicals thanks to eco-friendly preservation technology that uses borate salt solutions.

Participant Engagement, Challenges, Limitations, and Sustainability

Participant attendance across the eight months of activities reached 92%. KWT members were encouraged to take part through gender-responsive mentoring, such as co-designing training schedules outside household chore hours. MSME artisans, meanwhile, were highly enthusiastic because they saw the machines save labor from the very first trial.

Field Challenges and Program Limitations: a) **Digital Technology Adaptation:** several older KWT members (aged over 50 years) were reluctant and had difficulty using the smartphone-based digital bookkeeping application. b) **Rural Electrical Power Capacity:** operating the bamboo slicing machines required stabilizing the electricity supply at the production site, which initially caused operational bottlenecks. c) **Budgetary and Scope Limitations:** the program could

only work with 2 partner groups and therefore has not yet reached all individual artisans in Ababi Village.

Sustainability Plan: a) **Establishment of Village Digital Cadres:** appointing 3 local village youths as local champions who routinely assist KWT members with digital record-keeping. b) **BUMDes Integration:** encouraging the Ababi Village Government to include this bamboo handicraft business unit in the BUMDes assistance fund allocation for routine machine maintenance. c) **Sustainable Business Consultation Clinic:** establishing a long-term agreement (MoU) between Universitas Pendidikan Ganesha and Ababi Village to make the village a permanent Fostered Village (*Desa Binaan*).

CONCLUSION

The Fostered Village Community Service Program (PkM) in Ababi Village has achieved all of its objectives of easing the production, legality, and management constraints faced by the partners. The evaluation shows that applying Appropriate Technology (ATG) and preservation techniques raised bamboo production capacity by more than 150%, reduced raw material spoilage, and encouraged diversification toward high-value goods. Mentoring on the OSS-RBA system concretely facilitated the issuance of Business Identification Numbers (NIB) for KWT Tunas Asih and MSME Sedana Artha as the foundation of their business legality, while digital accounting training established transparent bookkeeping that is separate from household funds. The main benefit of the program is a strong local supply chain link between the upstream and downstream sectors, which improves operational efficiency and sustainably raises the partners' income. To ensure sustainability and replication, it is recommended to strengthen ongoing mentoring by BUMDes Ababi, form village digital assistant cadres, and extend similar partnership schemes to other bamboo artisan groups.

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