



Sustainable Kecombrang-Based Health Drink as a Social Intervention to Prevent Early Marriage among Rural Young Women

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Abstract

This community engagement program aimed to develop a Kecombrang-based (*Etligeria elatior*) wellness drink as a dual-layer intervention to support local food sustainability and prevent early marriage among young women in Cibokor Village. The program integrated participatory surveys, wellness drink production training, reproductive health education, and business mentoring. Results showed a significant increase in participants' knowledge, rising from 30–40% to 85–90%. Beyond skill acquisition, economic simulations indicated that the initiative could generate a projected monthly net profit of IDR 180,000 per participant, providing a tangible alternative to the economic drivers of early marriage. Qualitatively, the program fostered the emergence of youth leadership and shifted perspectives regarding ideal marriage age and reproductive health. This model aligns with SDGs 1, 3, 5, and 12 by combining economic empowerment with health literacy. The framework offers a replicable solution for rural socio-economic development. The findings suggest that institutionalizing such initiatives through Village Funds can strengthen adolescent resilience and provide a sustainable, socially acceptable strategy for reducing early marriage rates in rural communities.

Keywords:

Local Food, Kecombrang, Wellness Drink, Young Women Empowerment

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Abstrak

Program keterlibatan masyarakat ini bertujuan untuk mengembangkan minuman kesehatan berbasis Kecombrang (*Etilingera elatior*) sebagai intervensi dua lapis untuk mendukung keberlanjutan pangan lokal dan mencegah pernikahan dini di kalangan perempuan muda di Desa Cibokor. Program ini mengintegrasikan survei partisipatif, pelatihan produksi minuman kesehatan, pendidikan kesehatan reproduksi, dan bimbingan bisnis. Hasil menunjukkan peningkatan signifikan dalam pengetahuan peserta, dari 30–40% menjadi 85–90%. Selain pengembangan keterampilan, simulasi ekonomi menunjukkan bahwa inisiatif ini dapat menghasilkan laba bersih proyeksi sebesar Rp. 180.000 per peserta per bulan, memberikan alternatif konkret terhadap faktor ekonomi yang mendorong pernikahan dini. Secara kualitatif, program ini memfasilitasi munculnya kepemimpinan pemuda dan mengubah persepsi mengenai usia ideal pernikahan dan kesehatan reproduksi. Model ini selaras dengan Tujuan Pembangunan Berkelanjutan (SDGs) 1, 3, 5, dan 12 dengan menggabungkan pemberdayaan ekonomi dan literasi kesehatan. Kerangka kerja ini menawarkan solusi yang dapat direplikasi untuk pengembangan sosial ekonomi pedesaan. Temuan menunjukkan bahwa menginstitutionalisasi inisiatif semacam ini melalui Dana Desa dapat memperkuat ketahanan remaja dan menyediakan strategi berkelanjutan yang secara sosial dapat diterima untuk mengurangi tingkat pernikahan dini di komunitas pedesaan.

Kata Kunci:

Pangan Lokal, Kecombrang, Minuman Kesehatan, Pemberdayaan Wanita Muda

Cara mensitasi:

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INTRODUCTION

Health drinks, or wellness drinks, have gained increasing attention due to growing public awareness of healthy lifestyles, particularly following the COVID-19 pandemic, which heightened concerns about immunity and daily nutritional intake (Sutakwa & Wiratawa, 2022; Viari & Tondo, 2024). Wellness drinks are generally defined as beverages made from natural ingredients that contain antioxidants, vitamins, and bioactive compounds to support physical and mental well-being. In parallel, demand for wellness drinks based on local ingredients has expanded as part of the sustainable consumption and local food movements (Ali et al., 2021). Local food resources represent regional assets that can be innovatively transformed into value-added food products (Bridha et al., 2024), contributing not only to food sustainability but also to community-based economic development and culinary-related activities (Putri & Yulianto, 2022).

However, in rural community contexts, the relevance of wellness drink production extends beyond health trends and market opportunities and must be understood as part of a broader social intervention strategy. In Cibokor Village, Cianjur Regency, Kecombrang (*Etlingera elatior*) grows abundantly yet remains underutilized, primarily limited to its use as a traditional cooking spice. At the same time, the village faces persistent social challenges related to early marriage among young women, which are closely linked to economic vulnerability and limited future livelihood options. Although the overall incidence of early marriage in Cianjur Regency has declined in recent years—from 573 cases in 2020 to 130 cases in 2023, and 42 cases recorded in 2024 (Nursidin, 2025)—early marriage remains a significant concern due to its association with limited educational attainment, reduced economic independence, and increased reproductive health risks for young women (Mughal & Awan, 2020; Pratiwi, 2020; Gunawan & Bahri, 2023).

Table 1. Characteristics of Target Community (N=30)

Characteristics		N	%
Education	Senior High School	30	100
	University	0	0
Employment	Unemployed	30	100
	Employed	0	0
Income (Per month)	< IDR 2 million	30	100
	> IDR 2 million	0	0
Body Nutrition	Malnutrition	7	23.3
	Normal	18	60
	Overweight	5	16.7
Reproductive Health	With Issues	11	36.7
	No Issues	19	63.7
Entrepreneur Training	Yes	24	80
	No	6	20
Entrepreneur Experience	No Experience	11	83.3
	Experienced	5	16.7

Baseline observations revealed that all 30 program participants were senior high school students and none were formally employed, indicating economic dependence on their families and limited access to independent income sources. While most participants had a normal nutritional status (60%), a considerable proportion experienced undernutrition (23.3%) or overweight conditions (16.7%), and 36.7% reported reproductive health issues. Importantly, preliminary discussions during the baseline assessment indicated that economic insecurity and parental expectations were perceived by participants as dominant factors influencing early

marriage considerations, suggesting that marriage is often viewed as an economic coping strategy rather than a personal choice. Regarding entrepreneurial skills, only 20% of participants had ever attended entrepreneurship training, and merely 16.7% had prior experience in small-scale business activities, highlighting a substantial gap in economic skills and livelihood opportunities.

From a social intervention perspective, early marriage in rural areas is driven not only by cultural norms but also by structural economic constraints and limited alternatives for young women. Women are often regarded merely as participants, whereas in fact, they are problem solvers across various sectors (Abou-Shouk et al., 2021; Elshaer et al., 2021; Bonis-Profumo et al., 2021; Quisumbing et al., 2023). Empowering young women through skills development in entrepreneurship is one solution to reduce the incidence of early marriage (Luthfia et al., 2022; Ririn et al., 2024; Rusyada et al., 2023). Entrepreneurship training provides young women with opportunities to earn their own income, reducing their reliance on marriage as an economic solution for their families while simultaneously strengthening self-confidence and social bargaining power.

Based on this logic, the production of Kecombrang-based wellness drinks was intentionally designed not merely as a food innovation activity but as a structured social intervention mechanism. The intervention followed a logical framework in which local food resources (input) were transformed through training and mentoring activities (process) into tangible products and entrepreneurial skills (output), leading to improved income-generating capacity and health literacy (outcome), which ultimately contribute to delayed marriage decisions and enhanced agency among young women (impact).

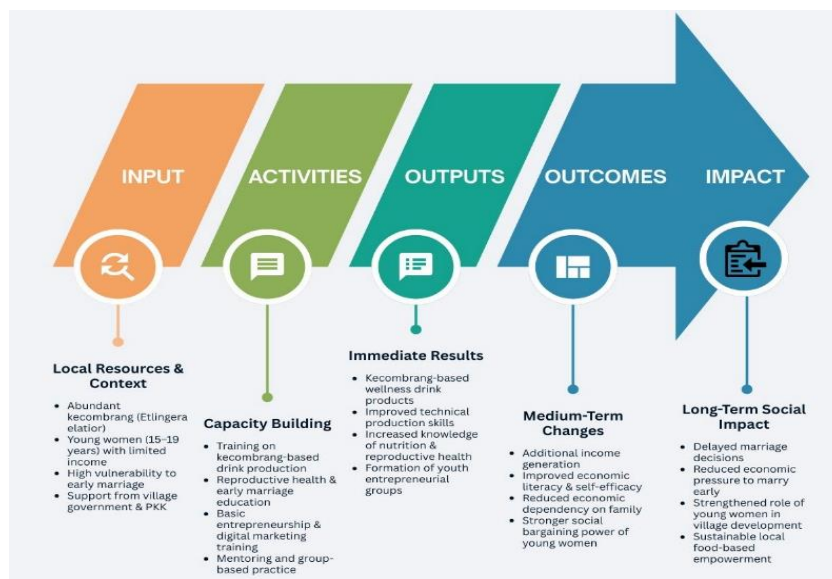


Figure 1. Logical Framework

Through this training, it is expected that young women will improve their skills in using torch ginger to produce wellness drink products with economic and health value, thereby promoting local food sustainability and supporting the economic empowerment of young women in Cibokor Village in a sustainable manner. In addition, training in producing wellness drinks from torch ginger can serve as a medium for nutrition and health education for young women, enabling them to gain proper knowledge of the body's nutritional needs, particularly during adolescence, as preparation for a healthy reproductive phase. Improved nutrition literacy will help prevent anemia and malnutrition, which often occur among young women in rural areas (Febria et al., 2023; Taufikurrahman et al., 2023).

The availability of raw materials, the simplicity of processing techniques, and the growing market demand for local health drinks strengthen the sustainability of this intervention. This training activity also serves as an initial step in building a village-based entrepreneurship network, where young women can establish joint business groups to produce and market torch ginger wellness drinks. Such initiatives are expected to foster economic independence, reduce economic pressure to marry early, and strengthen family economic resilience in Cibokor Village. With the implementation of this program, it is expected that an ecosystem will be developed to support entrepreneurial skills, improve health, and promote the sustainable use of local food in Cibokor Village, ultimately contributing to reduced early marriage rates through the empowerment and increased roles of young women in village development.

METHODS

This community service activity employed a participatory method based on community empowerment and was carried out in Cibokor Village, Cianjur Regency, from July to September 2025. The target participants were 30 young women aged 15–19 years who are at risk of early marriage, with the involvement of the village government, PKK (Family Welfare Movement) cadres, and parents as supporting stakeholders.

1. Preparation and Coordination

The team coordinated with local partners, namely village officials and PKK cadres, to identify the problems faced in Cibokor Village. Afterwards, they mapped out prospective training participants and the activities to be conducted. Entrepreneurship training and counseling on early marriage and reproductive health were selected as the main themes of this program. Torch ginger was chosen as the focus material since it grows abundantly in Cibokor Village, making it the main ingredient in the wellness drink innovation introduced to the young women.

2. Baseline Knowledge Assessment (Pre-test)

To assess the program's effectiveness, this study employed a structured questionnaire to measure participants' knowledge of the benefits of Kecombrang, the definition and advantages of wellness drinks, reproductive health, and basic entrepreneurial skills. The questionnaire consisted of 20 multiple-choice and true-false questions. Prior to implementation, the instrument underwent content validation by three experts (a nutritionist, a reproductive health specialist, and an entrepreneurship expert) and reliability testing, yielding a Cronbach's Alpha score of 0.82, indicating good internal consistency. Additionally, a Likert-scale questionnaire was used to measure entrepreneurial interest, and an observation checklist was employed to evaluate participants' practical skills during the production process.

3. Socialization and Education

Socialization sessions were provided to young women regarding reproductive health, the risks of early marriage, and the potential of local food as an economic opportunity. The materials were delivered interactively using engaging media. Reproductive health and early marriage risks were presented through a modified Snakes and Ladders game, with each square containing a question for participants to answer.

4. Training on Wellness Drink Production, Marketing, and Basic Entrepreneurship

Participants were educated on hygiene and sanitation practices for product preparation, from handwashing to bottle sterilization for drink packaging. They then prepared the torch ginger drink using torch ginger juice, lemon juice, honey, and tea, mixed according to the recipe and packaged properly. In addition, participants were trained in packaging design using Canva and digital marketing through social media platforms.

5. Evaluation

The program's success was evaluated by comparing participants' knowledge, skills, and entrepreneurial interest before and after the training. Data were analyzed descriptively using gain score analysis to illustrate the improvement in knowledge and skills, the impact of the activity on young women's utilization of local food, and its potential to reduce early marriage rates through increased economic independence.

RESULTS AND DISCUSSION

Kecombrang-Based Wellness Drink Product

A total of 30 participants completed all training modules. The main output of this activity is a training model for producing torch ginger-based wellness drinks as a new skill for young women to support economic independence and reduce early marriage rates. This model includes materials on reproductive health, nutrition literacy, skills in processing torch ginger into wellness drinks, and basic entrepreneurship. Abundant raw materials, simple processing methods, and growing market potential for health drinks support the model.

The wellness drink developed during the program was made with locally available ingredients, including Kecombrang extract, lemon juice, honey, and tea. Participants were trained in basic food hygiene and sanitation practices, including handwashing procedures, equipment sterilization, and clean packaging techniques. These practices were consistently applied during the production process to minimize contamination risks and ensure product safety at the household production level.



Figure 1. Wellness Drink Training Results

Although laboratory-based analyses—such as sugar content measurement, microbiological contamination testing, and shelf-life assessment—were not conducted during this community engagement program, several practical control measures were implemented as part of the training. First, sugar intake was managed using natural sweeteners (honey), with standardized proportions introduced during the training sessions to avoid excessive sugar content. Second, participants were educated on the importance of immediate consumption and cold storage, and simple observational shelf-life testing indicated that the product maintained acceptable sensory quality (taste, aroma, and appearance) for up to 2–3 days under refrigerated conditions.

The absence of laboratory testing represents a limitation of this program and was identified as an area for future development. However, within the context of community-based empowerment, the primary objective of the product development stage was skill acquisition, hygiene awareness, and safe household-level production rather than industrial-scale commercialization. Therefore, the term “wellness drink” in this study refers to a functional, locally produced beverage developed through controlled hygienic practices and nutrition education, rather than a clinically tested health product.

Empowerment and Training Process

The training modules used in this program were specifically developed by the research team based on a needs assessment conducted in the study area and adapted from relevant national guidelines on adolescent reproductive health, basic food processing hygiene, and community-based entrepreneurship. The modules covered Kecombrang processing techniques, food safety

and sanitation, reproductive health education, and basic entrepreneurial skills. To ensure content accuracy and relevance, the modules were reviewed by the same panel of experts who validated the questionnaire and revised it accordingly before implementation.

These findings highlight that the program successfully improved participants' understanding of food safety principles and responsible production practices. Future program expansion is planned to include laboratory testing in collaboration with food science laboratories to analyze nutritional composition, microbial safety, and extended shelf life, thereby strengthening the scientific basis for broader market distribution.



Figure 2. Training Process

The product was developed by combining the nutritional value of torch ginger with other ingredients, such as honey, lemon, and tea. A series of training activities was conducted, including an introduction to the nutritional benefits of torch ginger, techniques for processing and packaging health drinks, and basic social media marketing strategies.

The mentoring process consisted of three main stages: preparation, training, and assistance. In the preparation stage, a participatory survey was conducted to assess community perceptions of early marriage and to map local potential. The training stage consisted of processing torch ginger into health drinks, providing nutrition and reproductive health education, and introducing simple product branding techniques. In the assistance stage, participants were guided in developing flavor variations, determining selling prices, and creating digital marketing accounts.

Improvement in Knowledge and Attitudes

Before the training began, a pre-test was conducted to assess participants' initial knowledge regarding (1) the benefits of torch ginger as a food ingredient; (2) the definition and benefits of wellness drinks, and (3) reproductive health and the issue of early marriage. The pre-test results showed that, on average, participants only understood 30–40% of the topics to be delivered. After the training and mentoring sessions, a post-test was conducted, demonstrating a significant improvement: participants' understanding increased to 85–90%. This indicates the effectiveness of the training methods used and the success in delivering information relevant to adolescents' lives.

In addition to short-term knowledge measurement through pre-test and post-test, this study also planned a follow-up evaluation three months after the training. This evaluation aims to assess knowledge retention and identify actual behavioral changes among participants, both in reproductive health practices and entrepreneurial skills related to Kecombrang-based wellness drinks. Thus, the findings not only demonstrate immediate gains in knowledge but also provide insights into the program's long-term impact and sustainability.

Table 2. Pre-Test and Post-Test Result

Aspect	Pre-Test (%)	Post-Test (%)
Knowledge of Kecombrang benefits	35	88
Understanding of the wellness drink concept	32	86
Reproductive health knowledge	40	90
Basic entrepreneurial skills	38	87

Long-term attitudinal changes among participants were assessed qualitatively. The findings indicate that all participants developed a clear understanding of the ideal age for marriage, recognizing it as a decision based on physical, psychological, and socio-economic readiness rather than solely on social expectations. Participants also demonstrated improved awareness of reproductive health practices, particularly regarding proper menstrual hygiene, such as the recommended frequency for changing sanitary pads.

Furthermore, participants showed increased awareness of the health benefits of locally available food resources. They were able to identify local food ingredients that can be utilized to support overall health, including the health of the reproductive system. This enhanced understanding reflects a shift in participants' perspectives toward more health-conscious and informed decision-making. Overall, these qualitative findings suggest that the program contributed to sustained improvements in knowledge and attitudes, which may, in the long term, promote healthier life choices and reduce vulnerability to early marriage.

Following the completion of the program, positive social changes emerged, including: (1) The formation of small youth groups interested in developing wellness drink products as business opportunities; (2) Increased awareness of early marriage issues, with participants actively engaging in discussions and disseminating information to their peers; and (3) The emergence of local youth leaders who took the initiative to organize follow-up training activities at the adolescent health post (*posyandu remaja*). These changes demonstrate the potential of the training model to generate long-term impacts in community-based social transformation.



Figure 3. Training Process for Cibokor Village Youth and Training Products

Economic Impact and Program Sustainability

Program sustainability does not rely solely on initial training and mentoring but also on long-term support mechanisms. Following the training phase, participants are supported through peer learning groups and periodic mentoring facilitated by schools, youth organizations, and the implementation team. This approach ensures that knowledge and skills continue to be transferred even after the main program has ended.

Sustainability is further reinforced by involving the local community in the planning, implementation, and evaluation of the program. This strategy fosters community ownership, encouraging participants and stakeholders to maintain the activities independently. Moreover, integration with local institutions—such as schools, village governments, cooperatives, and small enterprises—ensures that the program becomes embedded within existing social and economic structures. As a result, the program’s sustainability is strengthened, and its impact is more likely to extend and endure over the long term.

The program’s outcomes were reflected not only in improved knowledge and skills but also in participants’ economic performance. Preliminary data indicate that, on average, participants produced and sold 50–70 bottles of wellness drinks per week during the first three months following training. This activity generated profit margins of 25–30%, which directly contributed to additional income. Some participants reported a 10–15% increase in earnings compared to their pre-program income.

Based on a simple economic analysis, the household-scale Kecombrang beverage enterprise reaches its Break Even Point (BEP) at approximately 130–140 bottles per week, assuming a selling price of IDR 5,000 per bottle and a net profit of around IDR 1,500 per bottle. At the initial production capacity of 50–70 bottles per week, the enterprise has not yet reached the break-even point, and the income contribution per individual remains limited. However, if the business is managed more seriously by a core group (approximately five participants) and production is increased to around 150 bottles per week, the projected net monthly profit could reach approximately IDR 900,000, or about IDR 180,000 per person. These findings indicate that the Kecombrang beverage enterprise is better positioned as a potential mechanism for strengthening economic capacity and entrepreneurial learning rather than as a primary source of livelihood.

Although these results are preliminary and not yet consistent across all participants, the findings suggest that the program contributed to both individual capacity building and economic independence. Quantitative indicators such as sales volume, profit margins, and income changes provide tangible evidence of the program’s impact and form a foundation for further evaluation. These insights are particularly relevant for developing strategies to expand market reach and ensure the long-term sustainability of participants’ businesses.

Discussion

The Potential of Kecombrang as a Functional Wellness Drink

The development of torch ginger (Kecombrang) into a wellness drink in this program leverages both traditional wisdom and scientific evidence. In various Indonesian regions, such as Gayo, Bali, and Samosir, *Etilingera elatior* has long been utilized as a medicinal ingredient (Novitasari, 2023). This community engagement initiative reinforces these traditional practices by highlighting the plant’s high content of bioactive compounds—including flavonoids, phenolics, and essential oils—which provide significant antioxidant and antimicrobial benefits (Ismail & Ridzuan, 2023). By processing Kecombrang into a functional beverage, the program addresses the need for health-supporting products while utilizing an abundant yet underused local resource (Pengestika et al., 2021).

The Dual-Layer Intervention Model

The uniqueness of this activity lies in its integration of local food processing with reproductive health education, creating a “dual-layer intervention.” Unlike conventional socialization programs that often focus solely on lecturing, this model emphasizes sustainable product creation and market-based skills. This approach fosters “socio-cultural engineering,” in which the process of making and marketing a product becomes a vehicle for shifting young women’s perspectives on local potential and their active role in decision-making about their future.

Economic Empowerment as a Pathway to Delaying Early Marriage

A core argument of this program is that financial independence is a critical factor in reducing the pressure for early marriage in rural areas. By providing young women with the skills to generate income, the program creates an alternative, productive pathway that encourages more

rational life decision-making. This aligns with previous research suggesting that when rural women have access to income-generating activities, they tend to prioritize personal development and financial stability over early domestic responsibilities (Abou-Shouk et al., 2021). In the context of Cibokor Village, the Kecombrang enterprise serves as a practical tool for economic capacity-building, offering a tangible counter-narrative to the economic drivers of child marriage. This program is also relevant when considering the trend in consumption of herbal products and dietary supplements on the island of Java during/after the pandemic, which supports the market potential of the products developed (Sutakwa & Wiratawa, 2022).

Reflections on Implementation Challenges

Despite the positive outcomes, several challenges emerged during the implementation. Cultural barriers remain a significant hurdle, particularly when discussing reproductive health, which is still considered a sensitive topic in some parts of the community. Additionally, resource constraints—such as limited production equipment and funding—posed challenges for immediate large-scale expansion. The participatory approach and step-by-step facilitation were crucial in overcoming the participants' initial lack of confidence in marketing products beyond their immediate community. These challenges highlight the need for sustained mentoring rather than one-off training sessions.

Alignment with Sustainable Development Goals (SDGs)

The multidimensional impact of this program is further evidenced by its alignment with the global Sustainable Development Goals (SDGs). This integration is not merely normative but is demonstrated through tangible changes at the community level. This community engagement program directly contributes to achieving several Sustainable Development Goals (SDGs) through a locally food-based empowerment approach and social interventions. The integration of the SDGs into this program is not merely normative; it is reflected in tangible outcomes at both the individual and community levels.

The program contributes to SDG 1 (No Poverty) by creating new economic assets from local food resources, namely the processing of Kecombrang into value-added beverage products. Training and mentoring activities enabled participants to generate additional income from the production and sale of Kecombrang-based drinks. This enhancement of economic capacity contributes to strengthening household economic resilience and reducing economic vulnerability, which are often key drivers of early marriage in rural areas. The program also supports SDG 3 (Good Health and Well-being), particularly focusing on access to information and education on reproductive health. Sexual and reproductive health education was integrally embedded within the training activities, ensuring that participants not only acquired food production skills but also developed a better understanding of reproductive health, adolescent nutrition, and the risks associated with early marriage. This approach strengthens health literacy among young women as part of community-level promotive and preventive efforts.

In relation to SDG 5 (Gender Equality), the program contributes to eliminate harmful practices, including child marriage, by increasing participants' critical awareness of the social, economic, and health impacts of early marriage, as well as by providing more productive life alternatives. Meanwhile, it increased young women's participation in productive economic activities, strengthened decision-making roles, and led to the emergence of female youth leadership within business groups and follow-up initiatives at the village level. Furthermore, the program contributes to SDG 12 (Responsible Consumption and Production) by promoting the sustainable use of local food resources. Kecombrang, which had previously been underutilized and limited to household consumption, was processed into an economically valuable product with zero-waste potential, as various parts of the plant can be optimally utilized. This approach promotes more responsible production and consumption patterns, reduces dependency on imported raw materials, and strengthens sustainable local food systems. Overall, the integration of the SDGs into this program demonstrates that local food-based empowerment not only generates short-term economic and health benefits but also contributes to broader sustainable development agendas, particularly by enhancing well-being, gender equality, and the resilience of rural communities. These outcomes align with Rusyada et al. (2023), who demonstrated that

entrepreneurship training is an effective tool for empowering women in rural areas. By creating a tangible product, this intervention moves beyond theoretical socialization, as Taufikurrahman et al. (2023) emphasized that reproductive health education must be integrated with practical community-level efforts to mitigate the risks of early marriage successfully.

CONCLUSION

This community empowerment program demonstrates that developing a Kecombrang-based wellness drink is an effective strategy to support local food sustainability while empowering young women in Cibokor Village. Beyond the observed short-term increase in knowledge and skills—reflected in participants' understanding improving from 30–40% to 85–90%—the program highlights the potential of integrated food-based empowerment and reproductive health education as a preventive approach to early marriage. The local food-based empowerment model not only fostered entrepreneurial skills, facilitated the formation of creative youth groups, and encouraged the emergence of young female leadership, but also provided participants with alternative productive pathways that may influence long-term life decisions.

From a policy perspective, these findings suggest that village governments could institutionalize similar initiatives by allocating Village Funds to support youth-led, women-focused local food enterprises as a permanent preventive strategy against early marriage. Integrating economic empowerment programs with reproductive health education at the village level can strengthen adolescent resilience, reduce economic vulnerability, and provide socially acceptable alternatives to early marriage. Therefore, scaling up this model through local policy support has the potential to enhance sustainable local food systems while contributing to broader rural development goals, gender equality, and the long-term reduction of early marriage in rural communities.

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