

EMPOWERING HOUSEWIVES' ECONOMY THROUGH MORINGA LEAF BISCUIT PRODUCTION IN THE COMMUNITY OF GAMPOENG TANJOENG MULIENG

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ABSTRACT This community service program was motivated by the abundant potential of the Moringa plant (*Moringa oleifera*) in Gampoeng Tanjoeng Mulieng, whose utilization remains limited to simple household consumption. On the other hand, housewives in the area require innovative creative economic activities to improve family welfare. This program aimed to empower the economic capacity of housewives through training in the production of moringa leaf biscuits, which possess high nutritional value and market potential. The method applied was participatory empowerment, consisting of educational sessions on the nutritional benefits of moringa, demonstrations on moringa powder production techniques, biscuit processing training, and packaging strategies. The participants consisted of 20 housewives. Evaluation was conducted by comparing the pre-test and post-test results regarding knowledge and entrepreneurial interest. The results of the program indicated a significant increase in participants' knowledge, where only 25% of participants were categorized as having good knowledge before the activity, increasing to 95% after the training. In addition, respondents' entrepreneurial interest reached 100% at the end of the program. This moringa leaf biscuit innovation successfully transformed the community's perspective toward local plants and opened opportunities for new business units within the village. The outputs achieved included training modules, scientific articles, and mass media publications as efforts to ensure program sustainability.

KEYWORDS: *Moringa Leaf Biscuits, Economic Empowerment, Housewives, Gampoeng Tanjoeng Mulieng.*

1. INTRODUCTION

Gampoeng Tanjoeng Mulieng is one of the villages in Syamtalira Aron District that possesses fertile agricultural land and home gardens. Based on observations conducted by the service team, moringa plants (*Moringa oleifera*) grow abundantly in almost every household yard. However, the utilization of this plant remains highly conventional; the community only consumes it as clear vegetable soup or even leaves it as a fence plant that is periodically trimmed without economic value.

On the other hand, post-pandemic conditions and current economic dynamics require housewives to become more creative in supporting family income. Most housewives in Gampoeng Tanjoeng Mulieng do not have permanent jobs and rely solely on the income of their husbands, who work as farm laborers or small traders. Therefore, an innovative product is needed using raw materials that are inexpensive, easily accessible, yet possess high market value among increasingly health-conscious consumers.

Community empowerment in rural areas is an important approach in development oriented toward improving human resource capacity and utilizing local potential. In this context, housewives play a strategic role, not only as household managers but also as economic agents capable of supporting family economic resilience if provided with adequate opportunities, training, and business access. However, in reality, many rural housewives have not yet been reached by sustainable productive economic empowerment programs.

One area facing similar challenges is Gampoeng Tanjong Mulieng, Syamtalira Aron District, North Aceh Regency. Most people in this village depend on the agricultural sector and informal employment. Housewives in this village have sufficient free time and potential involvement in household economic activities but have not yet been exposed to entrepreneurship and skills training programs. In fact, the village possesses natural resources that have not been optimally utilized, one of which is the moringa plant (*Moringa oleifera*), which grows abundantly in residents' yards.

Moringa is widely known as a plant with high nutritional content. Its leaves contain vitamins A and C, calcium, protein, iron, and antioxidants that are highly beneficial for health. The Food and Agriculture Organization (FAO) recognizes moringa as a highly nutritious plant with great potential to address malnutrition problems (Food and Agriculture Organization [FAO], 2004). Research has shown that moringa leaves are rich in protein, iron, and calcium, making them an important source of nutrients for vulnerable populations (Makkar & Becker, 1997). Furthermore, moringa leaves can be processed into flour, powder, or extracts to improve the nutritional value of food products (Mishra et al., 2012). Nevertheless, in many regions, including Gampoeng Tanjong Mulieng, moringa leaves are only utilized as daily vegetable consumption and have not yet been developed into processed products with high economic value.

One strategy to improve rural community welfare is empowering the economy based on local potential. This concept is known as One Village One Product (OVOP), a rural economic development strategy that creates a flagship product unique to each region (Kurokawa et al., 2010). In Indonesia, the OVOP concept has been implemented since 2007 through the Regulation of the Minister of Industry Number 78/M-IND/PER/9/2007 to strengthen the competitiveness of small and medium industries (Ministry of Industry of the Republic of Indonesia, 2007).

One snack favored by many people is biscuits. This food is popular among children, teenagers, and adults in both rural and urban areas. Biscuits have a crispy texture, a relatively long shelf life, and practical consumption characteristics. Therefore, healthier and more nutritious biscuits enriched with moringa leaves need to be developed so that this snack is not only delicious but also provides greater health benefits (Manley, 2011).

Food innovation based on local resources is one of the effective strategies to increase rural community income and improve community welfare (Setyawan et al., 2025). As an effort to enhance the economic value and broaden the utilization of moringa leaves, innovation in the form of moringa leaf cookies was developed as a village flagship product based on the OVOP concept. This product not only has high market value but also has the potential to support community nutrition improvement through MSME-based economic empowerment (Silva et al., 2017).

However, limitations in technical processing knowledge, entrepreneurial skills, and access to production equipment remain major obstacles to realizing businesses based on local potential. Community empowerment programs accompanied by practical training and mentoring are essential to strengthen local economic independence (Setyawan et al., 2025).

Considering these conditions, a directed and sustainable community service program is necessary to empower housewives through moringa leaf biscuit production training and household-based entrepreneurship development. This program aims not only to improve the technical and managerial skills of housewives but also to encourage the establishment of independent business groups capable of producing economically valuable, nutritious, and competitive products.

By optimizing local potential and strengthening the capacity of rural women, this activity is expected to make a real contribution to increasing family income, creating small-scale employment opportunities, and supporting inclusive and sustainable rural economic development. In addition, this program also supports the agenda of strengthening household food security and nutrition through local food innovation based on moringa leaves.

2. METHOD

Data were collected using structured questionnaires to measure changes in participants' knowledge and entrepreneurial interest. The use of questionnaires is considered an effective technique to improve the quality and consistency of data collection in community-based activities (Pujiharti & Isnaini, 2025).

Data were processed descriptively using frequency distributions and percentages to compare conditions before and after the intervention. The descriptive approach is widely used to present community service outcomes and evaluate program effectiveness (Rahmawati & Bayangkara, 2024).

2.1 Problem-Solving Framework

The method used in this community service program was an Integrated Community Empowerment approach through a participatory training model. The problem-solving framework was carried out through the following stages: Assessment, Education, Demonstration, and Evaluation. This activity involved 20 respondents, all of whom were housewives in Gampoeng Tanjoeng Mulieng.

2.2 Target and Location

- a) Target: 20 Housewives in Gampoeng Tanjoeng Mulieng.
- b) Location: The activities were centered at the Village Hall/Meeting Building of Gampoeng Tanjoeng Mulieng, Syamtalira Aron District, North Aceh Regency.
- c) Time: December 17th, 18th, and 19th, 2025.



Figure 1. Participant of Activities

2.3 Implementation Procedures

This community service activity was carried out through several main stages:

1. Preparation Stage

- a) Coordinating with the Geuchik (Village Head) and local community leaders.

- b) Preparing the main raw materials (fresh moringa leaves) and additional biscuit ingredients (flour, eggs, butter, etc.).
- c) First, the moringa leaves were picked from the tree, washed thoroughly under running water, drained in a container, and dried in a wide and absorbent place. The drying process should not be under excessive heat. The dried leaves were then ground into fine powder and sieved into moringa flour ready for use.
- d) Ingredients for making supplementary biscuits included: wheat flour 150 g, powdered sugar 70 g, milk powder 40 g, moringa leaf powder 25 g, cocoa powder 20 g, margarine 75 g, 2 chicken eggs, chocolate chips as needed, and vanilla as needed.
- e) Equipment prepared included a stove, gas cylinder, oven, and mixer.
- f) Preparing evaluation instruments in the form of pre-test and post-test questionnaires.
- g) Distributing questionnaires as a pre-test before the educational session began. After the pre-test was completed, the educational session was conducted.

2. Implementation Stage (Intervention)

a) Education (Interactive Lecture)

Providing material regarding the nutritional content of moringa leaves and the market opportunities of processed moringa products to improve family income.

b) Demonstration (Hands-on Practice)

Training participants starting from the process of washing moringa leaves, drying them into powder, and preparing biscuit dough. The biscuit dough preparation process involved mixing eggs, powdered sugar, and margarine until smooth, then gradually adding moringa flour and wheat flour while slowly mixing in milk powder, cocoa powder, and vanilla according to taste. The dough was then shaped as desired and baked in the oven until fully cooked before being served or packaged for marketing purposes.



Figure 2. Implementation

3. *Mentoring*: Providing guidance regarding hygiene standards in food production processes.
4. Evaluation Stage: Participants completed questionnaires after the training to measure changes in knowledge and entrepreneurial interest.

2.4 Instruments and Data Collection Techniques

Data were collected using structured questionnaires covering:

1. Knowledge Variable: Consisting of 5 questions regarding the benefits of moringa and biscuit processing techniques.
2. Interest Variable: Measuring respondents' tendency to continue production independently.
3. Data Analysis: Data were processed descriptively using frequency distribution and percentages to compare conditions before (pre) and after (post) the activity.

2.5 Expected Outputs

The expected outputs of this method were:

1. Increased knowledge among target partners (housewives).
2. Availability of moringa leaf biscuit products produced by participants.
3. Training modules and drafts of scientific publications in community service journals.



Figure 1. Biscuits After the Baking Process

3. RESULT AND DISCUSSION

3.1 Result

Based on the data analysis, respondents' knowledge levels increased significantly as follows:

Table 1. Comparison of Respondents' Knowledge Levels

No	Knowledge Category	Score Range	Pre-Test (f)	Percentage (%)	Post-Test (f)	Percentage (%)
1	Good	4–5	5	25%	19	95%
2	Fair	2–3	10	50%	1	5%
3	Poor	0–1	5	25%	0	0%
Total			20	100%	20	100%

This table shows changes in the level of understanding among housewives regarding moringa leaf biscuit production before and after the program.

Based on Table 1, there was a significant increase in respondents' knowledge in Gampoeng Tanjoeng Mulieng. Before the intervention, most respondents (50%) were in the "Fair" category. However, after the moringa leaf biscuit production training, the majority of respondents (95%) improved to the "Good" category. Based on the data analysis, respondents' attitudes and interests showed a significant increase as follows:

Table 2. Comparison of Respondents' Entrepreneurial Interest

No	Interest Category	Description	Pre-Test (f)	Percentage (%)	Post-Test (f)	Percentage (%)
1	High	Agree with All Statements (Score 3)	9	45%	20	100%
2	Low	At Least One "Disagree" Response (Score 0–2)	11	55%	0	0%
Total			20	100%	20	100%

Based on Table 2, shows changes in housewives' interest in entrepreneurship. Respondents' entrepreneurial interest increased from 45% to 100%. This indicates that the economic empowerment program through moringa leaf biscuit production successfully increased awareness and interest among housewives in generating additional family income.

3.2 Discussion

Before the intervention, respondents tended to perceive moringa merely as an ordinary household plant. Educational activities succeeded in changing this perception, encouraging participants to recognize moringa as a nutrient-dense food resource with economic potential. Previous

studies have reported that *Moringa oleifera* possesses substantial nutritional and therapeutic benefits, making it suitable for community nutrition interventions (Leone et al., 2015; Vergara-Jimenez et al., 2017).

a. Analysis of Increased Partner Knowledge

This success was driven by the interactive demonstration method. Housewives became highly enthusiastic when they saw that ingredients readily available around their homes (moringa leaves) could be transformed into modern, delicious, and nutritious snacks. Based on the evaluation results, there was a significant increase in the “Good” knowledge category, from 25% during the pre-test to 95% during the post-test. This phenomenon indicates that the knowledge transfer process conducted through interactive lectures and direct demonstrations was highly effective for the community of Gampoeng Tanjoeng Mulieng.

Theoretically, knowledge is an important domain in shaping individual behavior. Before the activity, respondents considered moringa (*Moringa oleifera*) merely as an ordinary fence plant or a plant associated with mystical beliefs. Through this educational program, a paradigm shift occurred in which the community began to view moringa as a “superfood” rich in protein, calcium, and iron. This understanding became the primary foundation for encouraging the community to process moringa independently at home for family nutrition fulfillment as well as commercial purposes.

b. Moringa Leaf Biscuit Innovation as a Creative Economic Solution

The selection of biscuits as the product innovation was strategic because biscuits have low moisture content and longer shelf life, reducing the risk of spoilage during storage and marketing (Manley, 2011). Moreover, the incorporation of moringa powder into biscuit formulations has been recognized as an effective strategy to enhance the nutritional value of commonly consumed snacks (Mishra et al., 2012). Biscuits were chosen because they possess several advantages compared to other wet-processed foods:

1. **Shelf Life:** Biscuits have low moisture content, making them more durable without chemical preservatives. This is highly beneficial for housewives who wish to start small businesses because the risk of products spoiling quickly is reduced.
2. **Consumer Acceptance:** The crispy and savory texture of biscuits successfully eliminates the characteristic “leafy” aroma that children sometimes dislike. This makes the product a smart solution for supplementary feeding programs based on local food resources.

The increase in entrepreneurial interest among participants reflects the effectiveness of participatory empowerment approaches. Such approaches enable communities to identify local

resources and transform them into economically valuable products, thereby strengthening local economic resilience (Setyawan et al., 2025).

c. Empowerment Strategy and Program Sustainability

The success of this program cannot be separated from the participatory approach used. Respondents were not merely passive listeners but were directly involved in the leaf-processing process, dough mixing, and baking stages. This active involvement fostered a sense of ownership toward the “Tanjung Mulieng Moringa Biscuits” product.

The sharp increase in interest from 45% to 100% demonstrates strong motivation among the mothers to become economically independent. This is in line with the objective of community empowerment, namely enabling partners to recognize local resource potential and transform it into products with economic value.

To ensure sustainability, it is recommended that the housewives immediately establish a small business unit or village MSME group. Collaboration with village authorities regarding capital support through Village-Owned Enterprises (BUMDes) and assistance in obtaining P-IRT permits from the Health Office will become key factors in enabling moringa biscuits to be marketed legally and professionally in souvenir shops or supermarkets.

d. Challenges and Solutions During Implementation

During the implementation process, the main challenge identified was the limited production facilities, such as standard baking ovens in respondents’ homes. As a solution, the service team provided simulations on the use of simple kitchen equipment while still maintaining hygiene and food sanitation standards. In the future, the provision of collective production equipment in the village could become a permanent solution to support mass production.

5. CONCLUSION

Based on the results of the community service activity entitled “Economic Empowerment of Housewives through Moringa Leaf Biscuit Production” in Gampoeng Tanjung Mulieng, the following conclusions can be drawn:

1. Improved Knowledge:

There was a very significant increase in the knowledge of the target participants. Before the activity, only 25% of respondents had a “Good” level of knowledge; however, after receiving education and training, this figure increased sharply to 95% (19 respondents). This indicates that

the materials regarding the nutritional benefits of moringa and its processing techniques were delivered very effectively.

2. Entrepreneurial Interest:

This activity successfully fostered strong economic motivation, where 100% of respondents expressed high interest in producing moringa leaf biscuits independently or in groups after the training.

3. Technical Skills:

Housewives in Gampoeng Tanjoeng Mulieng successfully mastered practical skills in processing moringa leaves into powder and transforming them into biscuit products that are suitable for consumption, hygienic, and marketable.

4. Achievement of Outputs:

This activity produced draft scientific articles, training modules, and video documentation as part of the mandatory outputs of the research/community service program.

Recommendations

To ensure program sustainability and further develop the village's economic potential, the proposing team suggests the following:

1. For the Village Government:

It is expected that the Gampoeng Tanjoeng Mulieng government will facilitate the establishment of small business units (MSMEs) through village fund support or Village-Owned Enterprises (BUMDes) for the procurement of proper production equipment, such as large-capacity ovens and vacuum packaging machines.

2. For the Target Participants (Housewives):

It is recommended that the mothers consistently apply the skills they have acquired, at least to fulfill family nutritional needs as an effort to prevent stunting, while also beginning simple marketing activities within the surrounding community.

3. For Future Community Service Teams:

Further assistance is needed regarding product legality aspects (P-IRT permits and Halal Certification) as well as Digital Marketing strategies through social media to expand the market reach of moringa leaf biscuits more widely and professionally.

4. Institutional Support:

Synergy with the Cooperative and MSME Office of North Aceh Regency is expected in order to provide business management guidance for this group of housewives.

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