

Impact Oriented Research Dissemination: Community Training on Herbal Soap Production Using Local Medicinal Plants in Karya Mukti Village, Bandung Regency

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Abstract. Community empowerment through the utilization of local medicinal plants provides a strategic approach to improving public health while enhancing rural economic resilience. This community service initiative aimed to transfer appropriate and sustainable technology for the production of herbal soap formulated with natural ingredients lemongrass (*Cymbopogon citratus*), cinnamon (*Cinnamomum verum*), and red ginger (*Zingiber officinale* var. *rubrum*) each recognized for its antibacterial and skin-protective properties. The program was implemented in Karya Mukti Village, Cililin District, Bandung Regency, involving active participation from local farmer groups and women's associations. The activities included community outreach, educational workshops, hands-on training in herbal soap formulation, and product quality evaluation. Program evaluation revealed a 65% improvement in participants' knowledge and practical skills in producing three herbal soap variants with favorable physical characteristics, a pleasant natural aroma, and a skin-compatible pH of 5–6. Participants also demonstrated high enthusiasm and motivation to sustain production as a potential home-based enterprise.

Keywords: *community empowerment, cinnamon, herbal soap, ginger, lemongrass, medicinal plants.*

A. Introduction

Indonesia possesses an abundant wealth of biodiversity, particularly in the form of medicinal plants that hold significant potential to be utilized for improving public health and economic welfare. However, this potential is often underutilized by local communities due to limitations in knowledge, technology, and access to innovations that align with their specific needs (1). In fact, the proper utilization of local natural resources can serve as an effective strategy to foster economic self-sufficiency in rural areas while simultaneously enhancing public health through the development of natural-based products (2).

Karya Mukti Village, located in Cililin District, West Bandung Regency, is an agrarian area where the majority of residents earn their livelihood as farmers(3). The village covers an area of approximately 11.78 km², with a population of 3,850 people and a population density of 327 people per km². According to data from the Department of Communication, Information, and Statistics of Cililin District, most of the population works in the agricultural and livestock sectors, while trade and industrial facilities remain very limited. In addition to cultivating vegetables such as chili, tomato, and water spinach, the people of Karya Mukti Village also grow various plants such as lemongrass (*Cymbopogon citratus*), red ginger (*Zingiber officinale* var. *rubrum*), and cinnamon (*Cinnamomum verum*), which have potential as herbal medicine ingredients. (4) (5). Furthermore, plants such as betel leaf (*Piper betle*), turmeric (*Curcuma longa*), Java turmeric (*Curcuma xanthorrhiza*), and galangal (*Alpinia galanga*) are also commonly found but have not yet been optimally developed into high-

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value health products. The map and condition of Karya Mukti Village are presented in Figure 1.

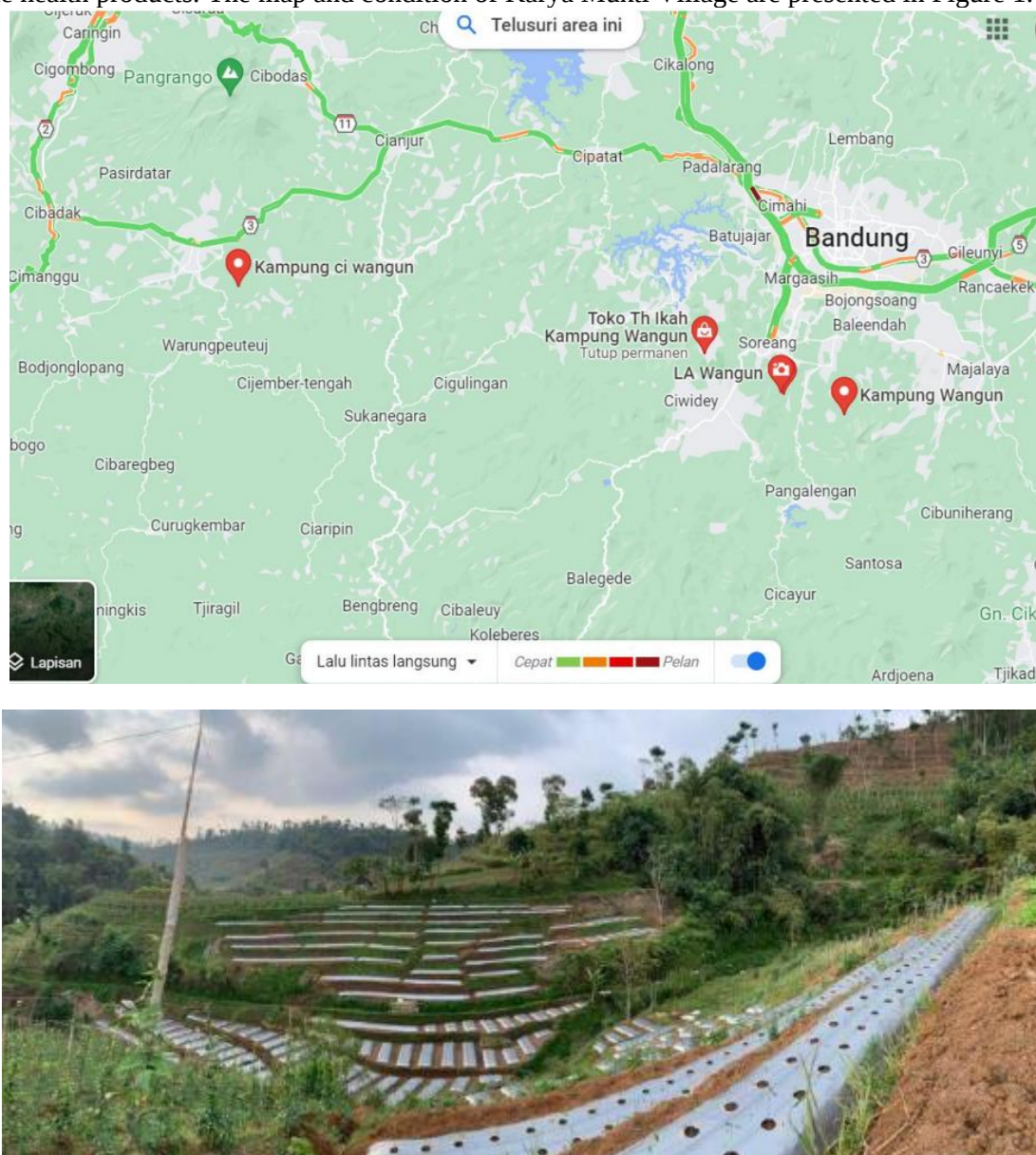


Figure 1. Location and Condition of Wangun Village, Karyamukti Village, Cililin District, Bandung Regency

Building upon the abundant potential of medicinal plants, simple yet practical innovations are needed to ensure that agricultural yields do not merely end at household consumption but can also be processed into value-added functional products. One form of innovation that can be easily implemented at the community level is the processing of herbal plants into health and hygiene products such as herbal soap.

(2). Herbal-based soaps offer several advantages over commercially available soaps made with synthetic chemicals. The bioactive compounds found in herbal plants—such as essential oils, flavonoids, phenolics, and tannins—possess antibacterial, anti-inflammatory, and antioxidant properties that are beneficial for skin health. Moreover, herbal soaps tend to be more environmentally friendly, non-irritating, and safe for various skin types, including sensitive skin.(6) Therefore,

The problems faced by the community in Wangun Village are as follows. Referring to the aforementioned studies and situational analysis, the focus of the proposed community service program in Wangun Village, Karyamukti Village—particularly for the Hurip Barokah Farmer Group—has

been determined based on the following priority issues: (1) Lack of knowledge regarding the benefits of agricultural products/natural materials for soap or herbal medicine production. (2) Lack of knowledge, skills, and experience in producing healthy or herbal soap. (3) Lack of knowledge, skills, and experience in packaging healthy or herbal soap products for long-term storage or marketing.

The objective of this program is to enhance the knowledge and skills of the community in developing health-oriented soap made from herbal ingredients such as lemongrass (*Cymbopogon citratus*), cinnamon (*Cinnamomum verum*), and red ginger (*Zingiber officinale* var. *rubrum*).

B. Method

The implementation method planned by the community service team, based on the situational analysis, involves several approaches and activities designed to address the main issues faced by the residents of Wangun Village, Karyamukti Village, particularly the Hurip Barokah Farmer Group. The steps include:

Preparatory Meeting

Conducting a coordination meeting with the management of Wangun Village and Karyamukti Village officials to discuss the stages and timeline of the community service program (PKM).

Community Socialization

Holding a socialization session with the residents of Wangun Village, especially the *Hurip Barokah* Farmer Group, to explain the objectives and technical implementation of the PKM activities.

Workshop and Training on Herbal Soap Production

Organizing a workshop and hands-on training on how to produce healthy or herbal soap. The training materials include:

1. **Introduction to Herbal Soap:** Explanation of different types of herbal soaps and their benefits.
2. **Introduction to Medicinal Plants:** Identification of medicinal plants suitable for soap-making.
3. **Techniques for Extracting Active Compounds:** Simple methods for extracting bioactive compounds from medicinal plants.
4. **Herbal Soap Formulation:** Composition and methods for mixing ingredients in soap production.
5. **Soap-Making Practice:** Demonstration and hands-on practice by participants.
6. **Soap Storage and Packaging:** Techniques for proper storage to prolong shelf life and strategies for attractive packaging.
7. **Product Marketing Strategies:** Methods for marketing herbal soap through local and digital markets.

The evaluation process includes assessing the soap-making, packaging, and marketing techniques, as well as the sustainability of herbal soap production within the Wangun Village community. The evaluation aims to measure the effectiveness and impact of the training and will be conducted through the following stages:

Pre-Training Evaluation (Pre-Test)

1. Assessing participants' initial knowledge about medicinal plants and soap-making processes.
2. Identifying participants' needs and expectations regarding the training.

Ongoing Evaluation

1. Direct observation of participants' engagement during the soap-making practice.
2. Monitoring the alignment between the provided materials and participants' understanding.

Post-Training Evaluation (Post-Test & Feedback)

1. Written tests or interviews to measure participants' improvement in understanding.
2. Evaluation of the soap-making results in terms of quality and application of taught techniques.
3. Collection of feedback from participants regarding the strengths and weaknesses of the training.

Long-Term Impact Evaluation

1. Monitoring the continuity of soap-making activities by participants after the training.
2. Analyzing the training's impact on the community's economy and program sustainability.

3. Identifying opportunities for further development, such as product diversification or market expansion.

C. Result and Discussion

The Community Service Program (PKM) was carried out through three main stages: socialization, interactive material delivery, and hands-on training in the production of herbal-based health soap. The implementation of the program proceeded smoothly and received positive responses from participants, most of whom were members of the *Hurip Barokah* Farmer Group in Wangun Village, Karyamukti Village, Cililin District, West Bandung Regency.

After receiving theoretical explanations and demonstrations on the soap-making process using bioactive compounds from medicinal plants, participants successfully produced three variants of herbal soap: lemongrass (*Cymbopogon citratus*), red ginger (*Zingiber officinale* var. *rubrum*), and cinnamon (*Cinnamomum verum*). Participants actively engaged in the practical session, showing great enthusiasm throughout the activity, particularly during the soap-making process. The soap-making training activity is shown in Figure 2.





Figure 2. Practical Session during the Soap-Making Training Program

Based on the results of the pre-test and post-test evaluations, participants' understanding of processing herbal ingredients into health products increased by **65%**. This finding indicates that a hands-on training approach is effective in enhancing community knowledge and skills, as direct experience allows participants to experiment, interact, and apply the concepts in practice thereby improving retention and the ability to implement them in real settings. (7)

The graph illustrating the improvement in participants' knowledge before and after the training is presented in Figure 3. Figure 3 shows that the training significantly enhanced participants' knowledge and skills, with the average pre-test score increasing from 28.14 to an average post-test score of 83.45. A paired *t*-test conducted at a 95% confidence level yielded a *p*-value < 0.0001, indicating a statistically significant difference.

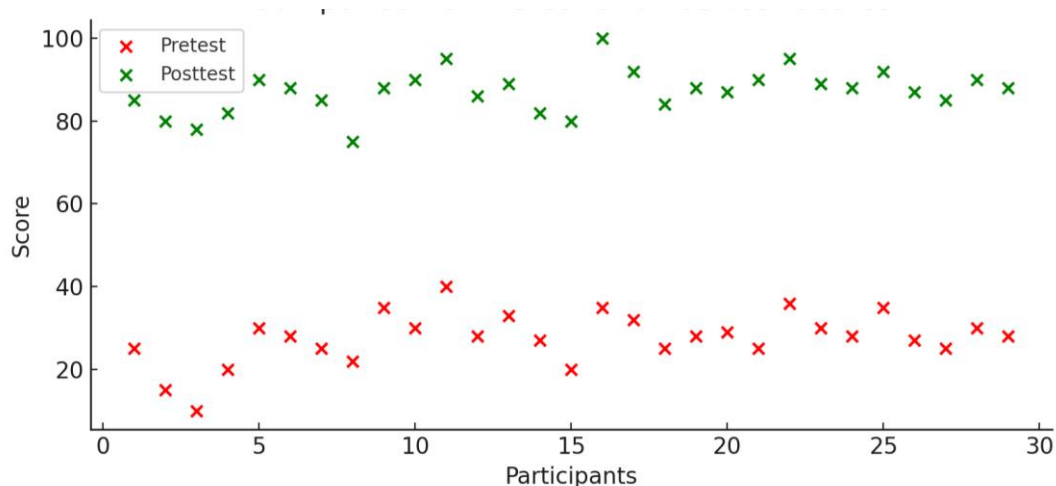


Figure 3. Comparison of Participants' Scores Before and After the Workshop

The three soap variants produced exhibited solid consistency, distinctive natural aromas from their active ingredients, and a pH range of 5–6, which is considered safe for human skin.(8) (9) The characteristic warm and spicy scent of the ginger-based soap originates from volatile compounds (essential oils) found in ginger rhizomes.(10) The main components responsible for this aroma include zingiberene, gingerol, shogaol, β -sesquiphellandrene, and zingerone, which together produce the warm, spicy, and sharp scent typical of ginger.(11)

Meanwhile, the soap made with lemongrass oil has a strong and refreshing aroma derived from monoterpenoid aldehyde compounds, particularly citral, geraniol, and citronellal, along with myrcene and limonene, which contribute to a light and fresh fragrance. Lemongrass also exhibits antibacterial properties.(12) Citral serves as the primary compound responsible for lemongrass's dominant aroma and possesses high volatile stability, resulting in a strong and long-lasting fragrance when used in soap or cosmetic products.(13)

Interviews and post-activity questionnaires revealed that 90% of participants expressed interest in independently producing herbal soaps at home, either for personal use or for family activities. Additionally, more than 50% of participants showed a desire to develop herbal soap-making into a family-based business, suggesting that this activity has the potential to create new economic opportunities based on locally sourced natural materials.

The development of herbal-based health soaps in this community service program (PKM) utilized simple technological innovations that are easy for local residents to adopt. Several aspects of science and technology (IPTEK) applied in this program include(14):

1. **Active Compound Extraction Technology** – Simple methods to extract bioactive components from medicinal plants.
2. **Soap Formulation Techniques** – Basic formulation methods to achieve optimal texture and stability.
3. **Appropriate Technology Utilization** – Soap production was carried out using simple yet effective equipment, enabling the community to continue production without requiring significant financial investment.
4. **Introduction to Digital Marketing** – Participants were introduced to the use of social media and digital platforms as promotional tools for marketing herbal soap products to a broader market, though this stage remains in its introductory phase.

Through the application of these science and technology principles, the PKM program is expected to provide long-term benefits, particularly by enhancing the economic self-reliance of rural communities and strengthening the downstream utilization of medicinal plant research into practical, ready-to-use products.

D. Conclusion

This community service program successfully transferred practical knowledge and skills in

producing herbal soap using locally sourced medicinal plants in Karyamukti Village. The activity not only opened new economic opportunities but also enhanced the utilization of natural ingredients to promote community health and hygiene.

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