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Optimalization of Local Medicinal Plants through TOGA Gardens and Jamu Botanicals in Pari City Village

[1]Andri Zainal, [1]Nur Alifah Fitriyana Siallagan*, [1]Zahara Ain Nur Syahru, [1]Uci Gresia Tarigan, [1]M. Dinar Nazwi, [1]Hikma Mauliddinsyah Dino
[1]Universitas Negeri Medan, Indonesia
*Corresponding author
E-mail: nuralifah.4231141006@mhs.unimed.ac.id

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Abstract

Purpose: This service activity aims to optimize the use of local medicinal plants through the development of a TOGA (Family Medicinal Plants) garden and the production of Jamu Botanicals in Kota Pari Village, while supporting community participation and empowerment in utilizing local herbal resources.

Methods: The activities used a participatory approach involving the local community, particularly farmers and PKK women. Activities included initial observation and licensing, identification of community needs through interviews, development and labeling of the TOGA garden, production of liquid and powdered Jamu Botanicals, and organoleptic testing involving 30 panelists using a 1–4 scale based on color, aroma, taste, and texture parameters.

Practical Applications: The results showed that the TOGA garden became cleaner, more organized, and more diverse, providing a local resource for the community to recognize and utilize medicinal plants. The processing of local medicinal plants into liquid and powdered Jamu Botanicals also provided a more practical alternative for storage and preparation. Community involvement, particularly among PKK women, provided opportunities to participate in the processing of local medicinal plants into usable herbal products. The organoleptic test resulted in an overall average score of 2.56, with scores of 3.00 for color, 2.93 for aroma, 2.00 for taste, and 2.30 for texture.

Conclusion: The integration of TOGA garden development and Jamu Botanicals production can support the utilization of local medicinal plant resources while strengthening community participation and practical skills in herbal processing. This approach provides a community-based model for utilizing local resources and supporting community empowerment in Kota Pari Village.

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Introduction

Indonesia is a country that has a diversity of plants that can be used as food, beverages, and traditional medicinal materials. One form of utilization of medicinal plants that are close to people's lives is Family Medicinal Plants (TOGA). TOGA is a plant that is cultivated in the home environment or communally and can be used as a traditional medicinal ingredient. The existence of TOGA not only provides a source of herbal ingredients that can be used by the community, but can also be a means to increase public knowledge about the types and uses of medicinal plants (Sari & Andjasmara, 2022). The development of TOGA can also be directed as a form of community empowerment through planting, maintenance, introduction, and utilization of medicinal plants available in the surrounding environment (Mu'arifuddin et al., 2024).

The use of medicinal plants in the community has basically become part of traditional knowledge that has been passed down from generation to generation. Various types of plants can be used in different forms, either used directly or processed first into herbal products. Hidayah et al. (2022) show that the community has knowledge about various types of plants that are used as traditional medicines by various processing methods. This condition shows that the existence of medicinal plants in the community has the potential to be developed not only as plants, but also as raw materials for herbal products that are easier to use.

The development of TOGA into herbal products is a form of diversification of the use of medicinal plants. The processing of herbal plants into herbal products can provide higher use value while improving people's skills in processing materials available in their environment. TOGA socialization activities and the manufacture of herbal powder carried out by Arifah et al. (2024) show that the processing of medicinal plants into herbal medicine can be used as a means of education and improving the ability of the community to use herbal plants independently. In addition, the development of TOGA gardens can also be directed as a means of education and the use of medicinal plants as well as a basis for the development of herbal products in the community (Susanti et al., 2021).

One form of diversification that can be done is to process herbal medicine into powder form. Compared to herbal products that are consumed directly, the powder form can provide convenience in storage, packaging, and presentation. The development of instant powdered herbal medicine has also been carried out as an effort to produce products with a more practical shape and have a better shelf life than fresh herbs (Az-Zahra et al., 2024). In addition, the formulation of powdered drinks made from rhizome plants such as ginger, temulawak, turmeric, and lemongrass shows that herbal ingredients can be developed into powdered products with sensory characteristics that can be evaluated based on color, aroma, taste, and texture (Husnani, 2021).

Kota Pari Village has the potential for herbal plants that can be developed through TOGA gardens. Based on the results of the identification carried out in the Real Work Lecture (KKN) activity, the community, especially farmers, conveyed complaints of sciatica after carrying out agricultural activities. On the other hand, the community still gets herbal medicine from sellers who are outside the residential environment so that access to herbal medicine is not yet fully practical. This condition is one of the bases for developing herbal products that can be made and used more easily by the community. The development of local plant-based products is also in line with the principle of community empowerment, namely utilizing the potential available in the environment to answer the needs of the local community.

Based on these conditions, the Jamu Botanicals program was developed as one of the activities that integrates the development of TOGA gardens with the use of herbal plants into herbal products. The TOGA Garden in Kota Pari Village was developed through cleaning and land planning activities and planting several types of plants, namely red ginger, white turmeric, temulawak, yellow turmeric, galangal, betel nut, and lemongrass. The existence of the garden is expected to be a means of introducing herbal plants as well as a source of materials that can be used in the development of herbal products in the community.

The available herbal plants are then used as raw materials for making Anti-Sore Herbal Medicine which is developed in two product forms, namely liquid herbal medicine and powdered herbal medicine. The two products use the same herbal ingredients, namely yellow turmeric, white turmeric, red ginger, kencur, ginger, and cloves, with the addition of brown sugar to liquid herbal products. The difference between the two products lies in the processing process. Liquid herbal medicine is processed through the process of washing, cutting, boiling, filtering, and adding brown sugar so that it produces a product that can be consumed immediately. Meanwhile, the manufacture of powdered herbal medicine is carried out through the stages of washing, slicing, drying, refining, mixing, and packaging so that products are obtained in powder form that are more practical in storage and presentation. The development of these two product forms is an effort to diversify the processing of herbal plants into more diverse and practical herbal products according to the needs of the community.

In addition to product development, product characteristics also need to be considered to determine the sensory characteristics of the herbal medicine produced. Organoleptic testing is one method that can be used to describe the characteristics of a product based on sensory attributes such as color, aroma, taste, and texture. Sihombing's research (2021) shows that differences in the formulation of herbal ingredients can produce differences in organoleptic characteristics in herbal drinks. Therefore, organoleptic testing on Herbal Botanicals is carried out to obtain an overview of the sensory characteristics of the product based on the panelists' assessment.

Based on this description, the Jamu Botanicals activity in Kota Pari Village aims to optimize the use of medicinal plants through the development of TOGA gardens, process herbal plants into Herbal Botanicals Antipegal products in liquid and powder form, and know the organoleptic characteristics of the products produced. This activity is expected not only to support the utilization of the potential of local herbal plants, but also to increase the knowledge and skills of the community in recognizing, utilizing, and processing medicinal plants into more practical herbal products. The development of TOGA gardens and herbal medicine processing skills is expected to encourage the community to utilize medicinal plants available in the surrounding environment more independently and sustainably

Method

This activity was carried out in Kota Pari Village as part of the Real Work Lecture (KKN) program, with the target community consisting of local residents, particularly farmers and PKK women. The activity used a participatory approach in which community members were directly involved in identifying local needs, developing the Family Medicinal Plants (TOGA) garden, discussing the utilization of medicinal plants, and practicing the production of Jamu Botanicals. The implementation consisted of four main stages: (1) identification of community needs, (2) development of the TOGA garden, (3) production of Jamu Botanicals, and (4) organoleptic testing of the products.

The first stage was identification of community conditions and needs through direct interviews with residents, particularly farmers. The interviews focused on health complaints experienced after agricultural activities and the accessibility of herbal products in the residential area. The information obtained from the interviews was used as a basis for determining the utilization of locally available medicinal plants and the form of herbal products to be developed.

The second stage was the development of the TOGA garden. This stage involved the community in cleaning and arranging the existing garden area, planting medicinal plants, and labeling each plant. The plants included red ginger, white turmeric, temulawak, yellow turmeric, galangal, betel, and lemongrass. The tools and materials used included hoes, shovels, medicinal plant seedlings, and plant name labels.

The third stage was the production of Jamu Botanicals Antipegal in liquid and powdered forms. The production activities were conducted together with four PKK women from Kota Pari

Village through discussion and hands-on practice. The liquid product was prepared through washing, cutting, boiling, filtering, mixing the ingredients, and adding brown sugar. The powdered product was prepared through washing, slicing, drying in the sun for approximately three days, grinding, sieving, measuring, mixing according to the predetermined formulation, and packaging. The community participants were directly involved in the preparation and processing of the medicinal plant materials.

The fourth stage was organoleptic testing of the Jamu Botanicals products. The test involved 30 panelists who assessed the products based on color, aroma, taste, and texture. The panelists used a descriptive 1–4 scale, in which each score represented a specific sensory characteristic rather than a level of preference or liking. Thus, the assessment was not a hedonic acceptance test. The criteria were defined for each parameter, ranging from light yellow to dark brown for color, from not typical to very typical of spices for aroma, from sweet to very bitter with a spicy flavor for taste, and from very diluted to thick for texture. The assessment results were recapitulated and analyzed descriptively by calculating the average score for each parameter and the overall average score.

Interview and observation data were analyzed descriptively to identify community needs and describe the implementation of the activities. Data from the organoleptic assessment were also analyzed descriptively and presented as average scores for each sensory parameter and the overall average score. Because the organoleptic assessment used a descriptive scale, the resulting scores were interpreted as descriptions of sensory characteristics and not as indicators of product preference or acceptance.

Result

The development of the TOGA garden in Kota Pari Village began with cleaning and arranging the existing garden area. Before the activity, several medicinal plants, including lemongrass and temulawak, were already growing in the garden, but the area required further arrangement and maintenance. The activity continued with the planting of additional medicinal plants, including red ginger, white turmeric, temulawak, yellow turmeric, galangal, betel, and lemongrass. Each plant was labeled to help community members identify the medicinal plants available in the garden.

Photo 1. Licensing and observation of the initial condition of TOGA land



Source: Private Documentation, 2026.

The activity resulted in a cleaner, more organized, and more diverse TOGA garden. The garden was subsequently used as a local source of medicinal plants for the Jamu Botanicals activity. The development of the garden also provided the community with a more organized space for recognizing and utilizing medicinal plants available in Kota Pari Village.

Photo 2. TOGA Garden Arrangement Results



Source: Private Documentation, 2026.

The identification of community needs showed that residents could obtain herbal drinks from sellers outside the residential area; however, the distance to the sellers was one of the obstacles to obtaining herbal products conveniently. At the same time, Kota Pari Village had medicinal plants that could be developed through the TOGA garden. These conditions became the basis for introducing the utilization of locally available medicinal plants through the Jamu Botanicals program.

The mentoring activity involved four PKK women from Kota Pari Village. The participants took part in discussions and direct practice during the Jamu Botanicals production process. The mentoring process introduced the participants to the utilization of medicinal plants from the TOGA garden as raw materials for herbal products and provided direct experience in processing the plants into a more practical herbal product.

During the activity, the participants responded positively and actively participated in the preparation and processing stages. The participants were also involved in discussions concerning the utilization of TOGA plants and the potential development of Jamu Botanicals in the community. At the end of the activity, the participants expressed their intention to continue developing TOGA plants and producing Jamu Botanicals after the program. This follow-up intention indicates an initial opportunity for the continued utilization of local medicinal plants at the community level.

Photo 3. Community Mentoring Activities and Utilization of TOGA in Kota Pari Village



Source: Private Documentation, 2026.

Jamu Botanicals Antipegal was produced using medicinal plants obtained from the TOGA garden. The production process was conducted together with the participating PKK women, who were directly involved in preparing and processing the medicinal plant materials into an herbal product. The product was developed in powdered form to provide a practical alternative for storage, preparation, and use.

The production activity provided participants with direct experience in processing locally available medicinal plants into a ready-to-use herbal product. The finished Jamu Botanicals Antipegal was packaged in a ziplock bag and provided with a product label containing information about the product and its use.

Photo 4. Jamu Botanicals Cair



Photo 5. Discussion of Herbal Botanicals Powder



Source: Private Documentation, 2026.

The organoleptic test involved 30 panelists who evaluated Jamu Botanicals based on color, aroma, taste, and texture using a 1–4 scale. The assessment criteria are presented in Table 1, while the average scores obtained from the panelists are presented in Table 2.

Table 1. Organoleptic Test Assessment Criteria

Score	Color	Aroma	Taste	Texture
1	Light yellow	Not typical of spices	Sweet	Very diluted
2	Yellow	Less typical spices	Sweet with spice flavor	Ink
3	Brownish yellow	Typical spices	Slightly bitter with a spicy flavor	Somewhat thick
4	Dark chocolate	Very typical spices	Very bitter with a spicy flavor	Thick

Source: Author's Work, 2026.

Table 2. Recapitulation of Organoleptic Test Results

No.	Parameter	Average Score	Category
1	Color	3,00	Brownish yellow
2	Aroma	2,93	Typical spices
3	Taste	2,00	Sweet with spice flavor
4	Texture	2,30	Ink
	Overall average	2,56	—

Source: Author's Work, 2026.

Based on Table 2, the average scores were 3.00 for color, 2.93 for aroma, 2.00 for taste, and 2.30 for texture, with an overall average score of 2.56. Color received the highest average score, while taste received the lowest score. These results indicate that taste and texture were the main aspects that could be further improved in the development of Jamu Botanicals.

Discussion

The TOGA garden in Kota Pari Village was not built from scratch. Several medicinal plants were already growing there, but the area lacked arrangement and maintenance. The activities therefore combined cleaning and land arrangement with the planting of additional medicinal species and the labeling of each plant. This is consistent with Kartini et al. (2024), who emphasized that medicinal plant gardens require attention to layout, plant management, and the suitability of species to the site. Santoso et al. (2024) similarly explained that TOGA can be developed on a household or communal scale and that planting medicinal plants can be a starting point for communities to cultivate, maintain, and use the plants around them. The

plant labels in this program also serve a purpose described by Wartana et al. (2023), who developed a pilot TOGA garden to educate the public about the types and benefits of medicinal plants: they help residents recognize the plants, so the garden functions as more than a plot of land. However, the garden is still at an early stage. Kartini et al. (2024) note that cultivation depends on continued planting and care, so its long-term value will depend on regular maintenance after the program ends, which this activity could not yet observe.

Interviews showed that farmers experienced muscle aches and stiffness (pegal linu) after working in the fields, while the nearest herbal sellers were far from the residential area. Together with the plants available in the garden, this shaped the decision to develop Jamu Botanicals Antipegal in liquid and powder forms. The powder form was emphasized because it is easier to store and prepare. Dianasari et al. (2024) similarly describe instant herbal powder as having a practical presentation and a longer shelf life than ready-to-drink herbal medicine. This practicality, however, comes with a quality concern. Prabandari and Darwati (2022) identified pathogenic mold contamination in powdered herbal medicine circulating in Surakarta, and Husnani and H (2021) explain that rhizomes have high moisture content and are easily damaged. In this program, the rhizomes were sun-dried for about three days and packed in ziplock bags, but no moisture, microbial, or shelf-life testing was carried out. The practical advantage of the powder form should therefore be regarded as a potential benefit that still needs to be verified.

Photo 6. Discussion with PKK mothers regarding Jamu production collaboration



Source: Private Documentation, 2026.

Four PKK women took part in discussions and hands-on production. They responded positively, were actively involved in preparation and processing, and expressed the intention to continue developing TOGA plants and producing Jamu Botanicals. Arifah et al. (2024) reported that TOGA socialization and herbal powder production improved PKK women's understanding of TOGA and herbal medicine making, and Sari et al. (2024) linked herbal powder training to processing skills and to packaging for marketing. Saragih et al. (2025) likewise applied a participatory, empowerment-based approach with PKK women as the main subjects in training on TOGA-based powdered jamu, aiming to strengthen knowledge, skills, and economic independence. Their program also aimed to produce clean, hygienic, and marketable products, which highlights quality and market aspects that remain to be developed in the present activity. Our observations point in the same direction: practicing with plants from one's own environment appears to be an effective entry point for building practical skills. These findings should be interpreted with caution. The evidence is limited to observed participation and stated intention. The program did not measure changes in knowledge or daily behavior, no formal group or institution was established, and no local leader emerged during the activity period. What can be said is that the program created initial awareness and readiness, and whether this becomes lasting social change depends on follow-up.

The 1–4 scale used in this activity is descriptive: each score corresponds to a described characteristic (for example, color from light yellow to dark brown), not to a level of liking. The average scores therefore describe what the product is like: brownish-yellow color (3.00), recognizably spicy aroma (2.93), sweet with a spice flavor (2.00), and dilute texture

(2.30). The overall average of 2.56 summarizes these characteristics and should not be read as a quality or acceptance score. In particular, the lower taste score indicates a sweeter and less bitter product, not a worse one. The sweetness can be attributed to the brown sugar in the liquid product, and the spice character to turmeric, kencur, and ginger. Sihombing (2021) reported that differences in the formulation of ginger and temulawak drinks changed their organoleptic characteristics, which suggests that formulation is the main way to adjust this product. Because the panelists were not asked about preference, this activity cannot show whether the community would accept the product as it is.

This activity has several limitations. Only four community members took part in the mentoring process. The needs assessment relied on interviews without a quantitative baseline. The organoleptic test provided no preference data. Product quality and shelf life were not tested. For comparison, Husnani and Zulfitri (2022) evaluated an instant powder of ginger, temulawak, turmeric, and lemongrass over one month using dissolving time, pH, water content, and organoleptic tests (color, aroma, and taste), which are the kinds of quality checks not yet applied to Jamu Botanicals. Some lessons emerge nonetheless. Starting from what the community already had (an existing garden) and a need residents voiced (access to herbal drinks) gave the activities a clear link to daily life. Connecting the garden to the product also let participants see the path from plant to finished herbal product. At the same time, the technical steps of production took up most of the activity, while building a group to carry the work forward received little attention. Future programs replicating this model could plan group formation from the start, for example by assigning garden roles and agreeing on a production schedule. They could also use measurable indicators such as pre- and post-activity knowledge and continued production after handover, add a preference (hedonic) test with a defined panel, and include basic product quality checks.

Conclusion

The Jamu Botanicals community service activity in Kota Pari Village demonstrated that the utilization of local medicinal plants can be integrated with community participation through the development of a TOGA garden and the processing of herbal plants into liquid and powdered products. The activity resulted in a cleaner, more organized, and more diverse TOGA garden, while the available medicinal plants were utilized as raw materials for Jamu Botanicals. The involvement of local communities, particularly farmers and PKK women, in the identification of needs, garden development, and herbal processing indicates that the program was not limited to product development but also provided opportunities for community participation and practical skills in utilizing local medicinal resources.

From a community empowerment perspective, the participatory approach applied in this activity shows that local resource utilization can be strengthened when the community is involved in identifying needs and developing solutions based on available resources. The integration of TOGA cultivation and herbal product processing creates a connection between local resource management, community participation, and the development of practical skills. Thus, community service activities based on local potential should not only focus on producing physical outputs, but also on building community involvement and the capacity to utilize available resources independently. This reflection is consistent with the role of the TOGA garden as a source of herbal materials and a means of introducing medicinal plants to the community.

For future sustainability, the community is recommended to maintain the TOGA garden through regular planting and plant maintenance so that the available medicinal resources can continue to be utilized. The production of Jamu Botanicals can also be continued on a small community scale by improving formulation, particularly the taste and texture characteristics identified through the organoleptic assessment, which obtained overall scores of 2.00 for taste and 2.30 for texture. Further activities may focus on improving packaging and product labeling, developing more consistent production procedures, and exploring appropriate marketing

opportunities if production is continued. Future community service programs are also recommended to evaluate changes in community knowledge, skills, participation, and potential economic benefits using measurable indicators so that the longer-term impact of the program can be assessed.

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