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Enhancing women's economic independence through ecological products, ecoenzymes, digital gardens, and sustainable product management based on local wisdom

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ABSTRACT

This Community Service Program aims to strengthen the economic independence of environmentally conscious women through ecological crafts, eco-enzyme products, digital gardens, and sustainable product management based on local wisdom. The program was carried out with the Environmental Care Women's Groups in Patalan and Srihardono Hamlets, Bantul, whose members mostly housewives initially had limited skills in ecoprinting, digital gardening, and online marketing. Activities included training and mentoring on ecoprint production using local natural materials, household-scale digital garden development, eco-enzyme liquid soap processing, and digital marketing strategies. A participatory approach ensured active involvement in planning, practice, and evaluation. The results showed significant skill improvement: 80% of participants produced marketable ecoprint products, and 75% successfully promoted their products through social media and simple online stores. Participants also created various ecological products and began managing organic digital gardens. The program increased women's technical capacities and strengthened their awareness of sustainability and local wisdom. Overall, it effectively supported women's economic independence while fostering environmental conservation.

KEYWORDS
Women Empowerment,
Economic Independence,
Ecological Crafts,
Digital Gardens,
Marketing.

1. Introduction

Community service is an important strategy for improving social and economic welfare [1], particularly for women [2]. Women play a strategic role in driving the family economy while maintaining environmental sustainability [3]. However, in practice, many women, especially in rural areas, still face limited access to training, technology, and markets [4]. As a result, their potential for entrepreneurship, managing local resources, and participating in sustainable development remains untapped [5]. This situation drives the need for integrated empowerment programs focused on skills development, economic independence, and concern for environmental sustainability.

One important issue currently faced is the high level of public consumption of environmentally unfriendly industrial products [6]. This has implications for increasing waste and pollution, while eroding local wisdom in resource utilization [7]. Therefore, there is an urgent need to develop alternative products that are ecological, sustainable, and competitive in the modern market [8]. One form of this innovation is ecoprinting, a technique for printing natural motifs on fabric or other media using leaves, flowers, and other natural materials [9]. Ecoprinting not only produces aesthetically and economically valuable products, but also teaches the principles of environmental conservation, as the entire process is relatively environmentally friendly [10]. In addition to ecological crafts, women's empowerment efforts can also be strengthened through the concept of digital gardens. This concept combines agricultural practices with information technology, where available land is managed productively and the produce is marketed through digital platforms [11]. Digital gardens not only improve family food security but also provide new business opportunities based on sustainable agriculture [12]. Through digital gardens, women can act as

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managers and technologically savvy entrepreneurs, thus gaining access to a wider market beyond the local area [13]. Another equally important aspect is sustainable product management. Products produced through ecoprinting or digital gardens will not have added value if not managed with sound marketing and management strategies [14]. Therefore, women participating in this PKM activity need to be equipped with knowledge about branding, environmentally friendly packaging, social media utilization, and digital marketing strategies. With proper product management, their work will not only be able to reach local consumers but also have the potential to penetrate regional and national markets [15]. These ecological components are interrelated. Ecoprint activities utilize local leaves and flowers, while their organic waste can be processed into ecoenzyme as an environmentally friendly household product. Ecoenzyme also functions as a natural fertilizer that supports digital garden cultivation, creating a circular ecological cycle between craft production, organic processing, and sustainable agriculture. Digital gardens, in turn, ensure a continuous supply of natural materials and strengthen food security, while product management and digital marketing help transform these ecological outputs into sustainable economic value for women.

This program was implemented in Srihardono, Bantul, Yogyakarta, an area with great potential in terms of natural resources and social communities. Most of the program participants were housewives who were members of environmental women's groups from the Patalan and Srihardono sub-districts. They were passionate about improving their family's economy while preserving the environment, but still needed assistance in the form of skills training, market access, and strengthening business management capacity [5]. The socio-economic conditions in Patalan and Srihardono reflect the challenges faced by many villages in Indonesia. On the one hand, villages have abundant natural resources and the potential for local wisdom that can be processed into high-value products. However, on the other hand, limited access to technology, information, and marketing is often a major obstacle. Therefore, through this PKM activity, it is hoped that synergy will emerge between the utilization of local potential and mastery of modern technology, resulting in the creation of unique, sustainable, and competitive products. Group Photo of Community Service as show in Fig. 1.

Fig. 1. Group Photo of Community Service

The urgency of this program also aligns with the Sustainable Development Goals (SDGs), specifically Goal 5 (Gender Equality), Goal 8 (Decent Work and Economic Growth), and Goal 12 (Responsible Consumption and Production). By empowering women through eco-friendly crafts, digital gardens, and sustainable product management, this program not only promotes economic independence but also contributes to achieving global goals of environmental protection and promoting inclusive development.

Based on the explanation above, the main objectives of this activity are: (1) to improve women's skills in producing eco-printed crafts that are both economically valuable and environmentally friendly; (2) to develop digital gardens as a means of economic empowerment based on sustainable agriculture; (3) to equip participants with product management and digital marketing skills to enable them to compete in a wider market; and (4) to foster participants' awareness and commitment to the importance of environmental protection through sustainable business development. It is hoped that the results of this

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Community Service Program (PKM) activity will not only increase knowledge and skills but also lead to the formation of independent business groups capable of producing highly competitive products.

2. Method

The implementation method of this Community Service Program uses a participatory approach by involving environmentally conscious women in Srihardono, Bantul, as the main subjects of the activity [16]. This approach was chosen to ensure that participants play an active role in each stage, so that the results obtained not only increase knowledge, but also build independence and sustainability [17]. The activity is carried out in several stages. First, local needs and potential are identified through interviews and group discussions with participants. This stage aims to understand socio-economic conditions, initial skills, and the potential of natural resources that can be optimized, such as leaves, flowers, and natural materials for ecoprinting, as well as yard land for digital gardens. Next, practical skills training is carried out, which includes: (1) making ecoprint crafts using environmentally friendly techniques; (2) managing digital gardens, starting from planning, planting, and maintenance; and (3) sustainable product management, including environmentally friendly packaging, branding strategies, and digital marketing through social media and e-commerce. Participants will be assisted intensively in independent practice. Each participant is directed to produce ecoprint products and manage digital gardens in their respective environments. The results are then tested and marketed locally and online. Next, evaluation and reflection are conducted, including assessing skills, product quality, and understanding of marketing strategies. Evaluation is conducted through observation, questionnaires, and group discussions. This method is expected to encourage sustainable skills development, economic independence, and environmental awareness based on local wisdom.

3. Results and Discussion

The ecoprint craft training program held in Bantul as show in Fig. 2 demonstrated significant achievements in improving the skills of women participating in the program. In the initial stages, the majority of participants lacked a sufficient understanding of basic ecoprint techniques, including material selection, the mordanting process, and color fixation techniques. Through a hands-on approach, participants were introduced to the use of local resources such as teak leaves, castor oil palm leaves, and ketapang leaves, as well as various wildflowers abundant in the surrounding environment [17]. The use of these natural materials not only reduces production costs but also reflects practices based on local wisdom that support ecosystem sustainability and are environmentally friendly.


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Fig. 2. Ecoprinting Training

As the training progressed, participants' skills in producing ecoprint artworks showed marked improvement. Products included fabrics, scarves, and tablecloths, with a variety of motifs and increasingly improved quality [9]. Evaluation of the activity showed that approximately 80% of participants were able to produce ecoprint products of marketable quality. This achievement confirms an increase in technical skills and creativity in exploring motifs, color composition, and design innovation. These results align with findings [18], which emphasize that eco-based crafts not only increase the creative economic capacity of communities but also foster stronger ecological awareness.

In addition to craft skills, the PKM program also focuses on digital garden management as a sustainable empowerment strategy. Participants are encouraged to utilize their yards and unused land around their homes as a means of producing organic food crops [19]. Selected commodities, such as kale, spinach, chilies, and family medicinal plants, are considered for their ease of care, high consumption value, and market potential. The digital garden concept emphasizes not only cultivation but also integrates digital technology into the marketing process, thus supporting the transformation of traditional agricultural practices into business models that are more adaptive to developments in information technology [20]. Eco Enzyme Product (liquid soap) as show in Fig. 3.

Fig. 3. Eco Enzyme Product (liquid soap)

Furthermore, sustainable product management training is a crucial element in strengthening the added value of participants' products. Participants are equipped with basic skills related to branding strategies, the use of environmentally friendly packaging, and digital marketing. One of the main focuses of this activity is the development of product identity to create an attractiveness that differentiates it from similar products in the market [21]. In practice, participants are trained to create simple labels, utilize recycled paper packaging, and use social media as a digital storefront to promote their products. Evaluation results show that approximately 75% of participants have successfully marketed their products through personal social media accounts and simple online stores. Although there are still limitations in technical aspects such as the quality of product photography and promotional consistency, basic digital marketing skills have been developed. This finding is consistent with the literature stating that digital marketing is a crucial strategy in increasing the competitiveness of community-based small businesses [15]. Digital marketing training as show in Fig. 4.

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Fig. 4. Digital Marketing Training

The impact of this PKM activity is not only reflected in improved technical skills, but also in the social and economic dimensions of the participants. From a social perspective, this program has proven to be able to increase the self-confidence of women in Patalan and Srihardono. They began to see themselves as important actors in supporting the family economy, while gaining greater social recognition from the surrounding community. Furthermore, intensive interaction during the training activities strengthened solidarity and collaboration among members, resulting in the formation of a more solid social network. From an economic perspective, although the additional income earned by participants was still relatively small in the initial stages, this achievement indicates the opening of opportunities for economic independence based on local skills that have the potential to develop sustainably. One of the main supporting factors was the high enthusiasm of participants, which accelerated skill acquisition because they consistently attended sessions, practiced independently at home, and actively engaged during mentoring. Another key factor was the abundance of local natural materials (such as teak leaves, ketapang leaves, and wildflowers) which ensured continuous production without requiring additional costs. Strong social cohesion among group members also contributed to smooth [7] collaboration and mutual support throughout the training process. One key aspect of the success of this activity is the integration of local wisdom as the main basis for business development. The use of local leaves and flowers as ecoprint materials represents the use of environmentally friendly renewable resources, while digital gardening practices based on organic farming principles contribute to family food security while maintaining soil fertility . Furthermore, this activity also demonstrates that women's empowerment cannot be reduced only to increasing economic capacity, but also involves ecological and social dimensions [22]. Through a series of training and mentoring, women have proven capable of becoming agents of change who drive ecological awareness at the community level as show in Fig. 5.

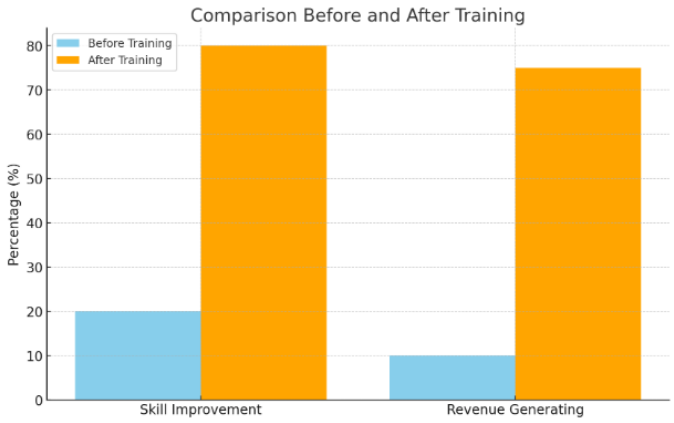

Fig. 5. Level of Understanding

Overall, the results of this PKM activity demonstrate that a local wisdom-based empowerment approach combined with digital innovation can produce a holistic impact for participants, both in terms of technical skills, economic strengthening, and social transformation. Increasing women's capacity in ecoprint crafts, digital garden management, and sustainable product management is proof that simple yet

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targeted interventions can spark the birth of creative entrepreneurs who are competitive and oriented towards environmental sustainability. Therefore, the continuity of mentoring programs and support from various parties, including universities, the government, and local communities, is key to expanding the impact and ensuring the sustainability of this initiative in the future.

4. Conclusion

The Community Service Program in Bantul has strengthened the economic capacity, ecological awareness, and digital readiness of environmentally conscious women. The integration of ecological craftmaking, digital gardening, and sustainable product management has proven effective in expanding participants' income opportunities and enhancing their confidence as active contributors to their families and communities. These outcomes indicate that the empowerment model used in this program can serve as a sustainable framework for women's community-based entrepreneurship rooted in local wisdom. To ensure long-term impact, several recommendations should be considered. First, extended mentoring for an additional 3–6 months is needed to support participants in stabilizing production quality and maintaining marketing consistency. Second, collaboration with village government is essential to strengthen market access and integrate women's ecological products into local economic programs. Third, further capacity building is recommended, particularly in branding, product photography, digital promotion, and basic MSME management, to enhance the competitiveness of participants' products in wider markets.

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