



Pounding Nature into Profit with Sustainable Techniques for Crafting High-value Eco-print Products

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study aims to provide a descriptive overview of the Eco-Print training conducted in Yosowilangun Village as part of the Community Empowerment Programs. The training, emphasizing the Eco-Print Pounding Technique, seeks to empower residents for livelihood creation through the sale of market-valued Eco-Print fabric. The training consists of three phases: First, preliminary meeting, main training event and evaluation meeting. Preliminary meeting is conducted to plan the preparation for the main training event, the Eco-print pounding technique training. While the evaluation meeting was conducted to evaluate the success of the event. Results indicate a comprehensive grasp of eco-printing concepts among participants. Through evaluation, the program also established communication through social networking service (SNS) groups as media for the participant to communicate. Despite concerns about physical exertion during the production

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phase, participants expressed a willingness to create eco-prints independently. Future strategies, discussed in dedicated meetings, prioritize enhancing participants' eco-print knowledge. Ultimately, this training equips Family Welfare Movement members for income generation and potential SME development, aligning with the eco-friendly of Eco-Print production.

Keywords: Eco-print; sustainable development goals; micro small and medium enterprises.

1. INTRODUCTION

Within the domain of sustainable community development, the utilization of eco-printing is still often carried out today [1]. Eco-printing or in short, Eco-print were technique to develop a fabric motif through transfer of color and shape of leaves into a fabric. With the usage of unused botanic product such as dead leaf [2], spoiled fruit and vegetable [3]. Eco-Print could become an Eco-Friendly product [4]. Thus, making the production of Eco-Print in line with the Sustainability Development Goals (SDGs) that has been formulated by the United Nation for a better and cleaner future.

Gresik, situated in East Java, is commonly acknowledged as an industrial city. This recognition is grounded in data spanning from 2016 to 2019, highlighting the industrial sector as a key economic driver in the Gresik regency. However, the substantial industrial footprint raises concerns about potential adverse effects, underscoring the critical need for heightened awareness regarding environmental sustainability [5,6]. In one of the places located in Gresik. Encompassing an area of 1,256.36 square kilometers and home to a population of 13,288, Yosowilangun Village is centrally located within Gresik City, exhibiting the highest population density compared to neighboring villages. This geographical advantage contributes to the village's economic prosperity, aligning with urban development. However, a closer analysis reveals a noteworthy absence—a distinct flagship product that could enhance competitiveness. Despite the community's relative prosperity from its commercial positioning, Yosowilangun Village lacks a recognized local wisdom or specialty that could be strategically utilized for economic advantage.

The conducted Community Service tried to cultivate Eco-Print as featured product of Yosowilangun Village. The final goal of Community Service is not just to empower the community, making the members of the

community able to produce their own income but also to raise awareness of sustainable future through Eco-Print training.

2. LITERATURE REVIEW

A relevant literature review is presented to give insight about both the Community Empowerment and the activities that have been done.

2.1 Community Empowerment to Develop Micro Small to Medium Enterprises

As one of the mandatory programs, the purpose of Community Service Program is to empower the community through various activities held by higher education institute in Indonesia [7]. The aspect of empowerment could vary depending on the activities themselves. For example, the community service that has been held by Made et al. [8] empower the tourism aspect of villages in Gianyar, Bali through development of potential tourism village. On the other aspect, community service that has been conducted by Himmawan and Dinda [9] empower the education aspect of children in Kidul Village. While the community Service that has been conducted by Sari et al. [10] empower the economic aspect through sociopreneurship training.

The target of the community empowerment program can also vary, depending on the topics of the program itself. As example, the community empowerment that has been conducted by [11] tried to empower women, especially housewives to earn their own incomes. Though it may vary, MSMEs and SMEs has been one of the popular targets for community empowerment program, this might occur since empowering MSMEs, and SMEs has been one of the major goals for the government of Indonesia [12]. To support that goal, many conducted community empowerment programs focused on empowering MSMEs or SMEs in many aspects such as human resource management [13] that could lead into sustainability of the MSMEs and the usage of digital marketing and business management to improve MSMEs [14,15].

2.2 Eco-Print

Known as botanical print. The Eco-print training has been an eco-friendly solution for making fabric [4, 16]. Different from other fabrics where most of the pattern and motives were created through complex process of weaving or coloring. The idea of Eco-Print is to print a pattern to a fabric using the color of leaves[17], vegetables or fruits[3]. Eco-Print can be done using new botanical products. However, only when using old unused products such as dead leaves or almost spoiled vegetables can Eco-print be a solution for making environmentally friendly patterned fabrics.

Technique to create Eco-Print also vary. Currently, there are two popular techniques to create Eco-Prints: Steaming process and pounding [2]. Steaming process or also well known as iron blanket print the pattern of botanical products to fabrics through boiling process[3].

As seen in Fig. 1 above, blank fabrics were prepared. Leaves, fruits, and other botanical products are then creatively arranged on the surface of the blank fabrics. The arrangement of the botanical products became the deciding factor for the quality of the pattern. After being arranged, the fabrics were wrapped in plastic and boiled, the duration of the boiling process depends on the type of botanical product used in the process. After the boiling process is done, the only steps left to be done are to peel the plastic wrapper and dry the Eco-Print fabrics.

The other techniques are known as pounding techniques. As the name suggests, the process of pounding technique mainly consists of pounding the botanical product into the fabric [18]. Unlike the previous method, the pounding technique is rather simple but requires a massive amount of force. An example of the pounding process can be seen in Fig. 2.



Fig. 1. Process of Eco-print steaming using dead leaves



Fig. 2. Process of Eco-Print Pounding Using Dead Leaves



Fig. 3. The 12th goals of SDGs

2.3 Sustainable Responsible Production

Formally declared on the first day of the year 2016 but implemented by world leaders since 2015 [19]. Ever since then, 17 SDGs, the abbreviation of Sustainable Development Goals became crucial goals to secure the world's future. The 12th goals of SDGs aware of the limitation of resource on earth, thus a responsible consumption and production were required to remove the possibilities of resource shortage in the future [20].

To achieve these goals, not just consumers but business owners are also held responsible for the waste and environmental impact that caused by the process of their business[5]. Eco-friendly Innovation and design solutions for the business process were required to help achieve the goal.

3. METHODOLOGY

The community development program consists of three main phases that can be seen in Fig. 4.

The first phase of the community development program visited the target location. The offline approach was chosen based on research conducted by Wahyuni [21], which raised questions regarding the effectiveness of community service using online meetings. To mitigate the risk of failing to achieve its goal, offline meetings were employed for the

community service program. The initial phase involved discussions between the team and the target MSMEs, facilitating mutual understanding regarding the program's objectives and requirements. Subsequently, the main event in the form of Eco-Print training was conducted during the second phase. The pounding technique was selected as the primary focus of the training due to its simplicity and minimal requirements compared to alternative methods. Following the completion of the training, an evaluation of the activity was conducted to gain a deeper understanding of the impact of the community development programs. The results of the evaluation phase served as valuable insights for planning future community development initiatives, should they be deemed necessary [22].

3.1 Target of the Research

The program mainly focused on employees of the MSMEs with a total of 15 people. Although during the training, the event gained additional participants from housewives who weren't employed by the MSMEs and member of Family Welfare Movement who were around during the training. These extra participants were allowed to participate in the training but did not participate in the evaluation phase of the programs, this to ensure the accuracy of the result of the evaluation.



Fig. 4. Phases of community development

3.2 Evaluation Method

To evaluate the success of the program, a short questionnaire was employed to measure the level of understanding and willingness of the participants to create their own Eco-print. A meeting also being held at the end of the training to discuss the continuation of the program and next program required by the participant [23,24].

4. RESULTS AND DISCUSSION

The detailed description of conducted community development program are as follows:

4.1 Description of the Program's Target

The community service program was conducted through offline meetings, targeting one of the MSMEs based in Yosowilangun Village, Gresik. "Lila Craft Handmade" is an MSME specializing in crafting various handmade products, including but not limited to handkerchiefs, wallets, and handbags.

For its daily operations, "Lila Craft Handmade" employs housewives residing in its vicinity as artisans. This initiative was undertaken by the MSMEs to empower the housewives in Yosowilangun. Through their employment, each housewife in Yosowilangun will have a sustainable source of income, thereby enhancing

their economic independence. The target participants for the conducted community development program were the housewives employed by "Lila Craft Handmade."

4.2 Documentation of the Program

The documentation of the programs is organized according to the phases outlined in the preceding sections, commencing with Preliminary Visits, and extending through to the Evaluation Phase, as detailed below:

4.2.1 Documentation of preliminary visit

The preliminary visit served two primary objectives: firstly, to scout potential locations suitable for conducting Eco-Print training, and secondly, to convene a meeting with MSMEs and other stakeholders, including the village chief, to deliberate on aspects such as participant selection and training schedules. During this visit, all stakeholders reached a consensus that the training would be conducted at the village meeting hall, with participants comprising MSME employees and a select few village housewives not affiliated with MSMEs. Furthermore, in addition to finalizing participant selection, stakeholders collectively agreed upon the date for the Eco-Print training. The documentation detailing the preliminary visit is provided in Fig. 5.



Fig. 5. Preliminary Visit

4.2.2 Documentation of eco-print training

The eco-print training was conducted in the village meeting hall as planned. The workshop was held offline, with participants including housewives both employed by the MSMEs and those who were not. The training began with welcoming speeches from the head of the community development team, the village chief, and the owner of the MSMEs.

After the speech, a briefing to the participants related to the training is conducted. The team explained the process of Eco-Print using pounding technique and equipment required to produce Eco-Print fabric. Team member also began to distribute the necessary equipment to the participants. After the briefing and distributing process, the participant began to get involved directly in the Eco-Print making process. Each participant can design their fabric motif freely, according to each of their creativity while still being guided by the community development team from the beginning until the end of the training. The documentation of this process can be seen in Fig. 6.

4.2.3 Documentation of activity evaluation

At the end of the training, each of the participants were expected to have their own eco-print fabric made from pounding technique. The example of final product of the training can be seen in Fig. 7.

Apart from presenting the results, a final meeting was held to evaluate the entire training process. This meeting not only assessed whether all participants had understood the Eco-print creation process using the pounding technique but also deliberated on the potential need for further training for MSMEs in the future. Additionally, the benefits received by the participants and MSMEs were discussed. Documentation from the final meeting can be seen in Fig. 8.

4.2.4 Evaluation of the program

At this stage, the main series of community empowerment programs have been completed. The remaining step is the evaluation phase, which aims to assess the program's effectiveness and identify the benefits received by participants and MSMEs, the program's partners. It should be noted that the benefits received by the category of housewife participants who are not employed by MSMEs

are not considered due to their small number, making the impact less significant.

At this juncture, the primary series of community empowerment programs has reached completion. The forthcoming phase involves evaluation, with the aim of assessing the program's efficacy and delineating the benefits accrued by both individual participants and MSMEs, the program's organizational partners. As depicted in the comprehensive meeting outlined in Fig. 8, the majority of participants now possess a thorough understanding of the step-by-step process involved in creating Eco-Print, rendering additional training unnecessary. However, participants expressed a desire to maintain connectivity with the community development team for ongoing support and guidance regarding Eco-Print, even after the conclusion of the community development program. Consequently, Social Media groups were established to facilitate this need. Furthermore, in response to participants' requests, the community development team is considering the implementation of additional training sessions, focusing on diverse topics to address various challenges, particularly those related to marketing. These considerations will inform the planning of future programs.

As mentioned earlier, the benefits acquired from the training were categorized into two groups: those for MSMEs as organizations and those for participants as individuals. It should be noted that the benefits received by the category of housewife participants who are not employed by MSMEs are not taken into account due to their small number, making the impact less significant. The results of the program's impact evaluation are presented in Table 1.

Firstly, the Eco-Print Fabric training significantly enhanced the participants' individual skills, particularly in fabricating Eco-Print textiles. The training demystified the production process, revealing that creating Eco-Print fabrics is less complex than initially perceived. Consequently, participants gained the confidence to produce their own Eco-Print fabrics as an alternative source of income.

For the MSMEs, the training was instrumental in diversifying their product range. This diversification not only broadened their market offerings but also contributed to improving employee welfare by providing additional income streams. Furthermore, the Eco-Print training

fostered an increased awareness among both MSMEs and participants about the importance of sustainable practices and responsible production.

The process of creating Eco-Print fabrics underscored the significance of waste reduction, thereby promoting environmental sustainability.

Table 1. Evaluation of impact

Impact on msme	Impact on participant
Increase the variation of product sold by the msmes	Increase handcrafting skills
Improve employee welfare	Have alternative sources of income
Increase awareness on responsible production	Increase awareness on responsible production



Fig. 6 Pounding Technique Demonstrated by the Housewives



Fig. 7. Result of the Eco-print



Fig. 8. Evaluation of eco-print training

5. CONCLUSION

This paper provides a comprehensive descriptive overview of the conducted community development program, which was systematically implemented in three distinct phases: the preliminary visit, eco-print training using the pounding method, and the subsequent activity evaluation. The primary objectives of the training were multifaceted, aiming not only to enhance the welfare of the participants by equipping them with valuable skills but also to increase their awareness of and commitment to responsible production practices. During the eco-print training, participants were introduced to the pounding method, a technique chosen for its simplicity and minimal environmental impact. This method was demonstrated and practiced extensively to ensure that all participants, including housewives employed by MSMEs and those who were not, could effectively apply it in their future endeavors.

The evaluation phase provided critical insights into the program's effectiveness, with feedback indicating a high level of satisfaction among participants. The success of the program was evident in the participants' improved skills and heightened awareness of eco-friendly production methods. Participants will continue to receive guidance and support through social media

groups, ensuring that they have access to resources and a platform for ongoing learning and collaboration. Additionally, future community development programs are being planned to build on the current achievements and address any emerging needs, ensuring sustained development and empowerment of the participants. In conclusion, the community development program has been a significant step towards empowering local participants and promoting sustainable production practices, with a structured approach that has proven effective in achieving its objectives.

CONSENT

As per international standards or university standards, participants' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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