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Community Engagement Research: Harnessing Natural Materials for Ecoprint Totebags

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Abstract

The aim of this research-based community service is to provide creative space for youth and children in the Simpang Tiga village by applying the Community-Based Participatory Research approach. (CBPR). The activity focuses on the development of skills in the manufacture of canvas totebags using ecoprint techniques based on natural pigments from leaves around resident settlements. The dedication team delivered the material through a lecture approach as well as a question-and-answer session followed by a demonstration and practical production of the ecoprint totebag. The responses from the participants indicated a high level of enthusiasm, with the majority revealing that these activities add value to the use of their time. The expectation of the participants is that there will be continued activities on a periodic basis to produce products that are more diverse and beneficial to the community.

Keywords: Ecoprint; Creativity; Teenager; Natural Materials;

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Introduction

In a modern era filled with attention to environmental issues, the challenge of creating innovative solutions that combine environmental sustainability with the daily needs of societies is becoming increasingly pressing. One of the topics that drew attention was the wise use of natural resources in the production of consumer goods, in particular in the manufacture of canvas totebags using ecoprint techniques from natural pigments derived from leaves around citizens' settlements. Available data suggests that the fashion and manufacturing industries are often a major contributor to environmental pollution.[1] For example, in conventional textile dyeing processes, chemicals are used that are toxic and difficult to degrade,[2] resulting in water and soil pollution that has a negative impact on ecosystems.[3] This is where the importance of environmentally friendly alternatives such as ecoprint from natural pigments. Studies show that this technique uses leaves and other natural materials[4] to print motifs onto fabrics, reducing dependence on harmful chemicals.[5]

Not only does it provide solutions to environmental problems, the manufacture of canvas totebags with ecoprint techniques also has a significant social impact. This initiative empowers local communities by leveraging the natural resources available around them. Through training and collaboration, communities can produce economically high-value products of what was previously regarded as just ordinary crops around their surroundings. On a broader scale, raising these topics provides the stage for raising awareness of the importance of integrating environmental sustainability with economic activity. By creating opportunities for local entrepreneurs, expanding insights into the importance of environmentally friendly practices in industry, and supporting communities in the development of sustainable skills, making canvas totebags using natural pigment from leaves around citizen settlements is a real step towards environmental sustainability and better social well-being.

Simpang Tiga Subdistrict is one of the districts situated within the Bukit Raya District in the city of Pekanbaru. This subdistrict encompasses 5 community units (Rukun Warga/RW) and 21 neighborhood units (Rukun Tangga/RT), covering an area of 5.35 cubic meters. Geographically, it is bordered by Tangkerang Selatan and Tangkerang Labuai Subdistricts of Bukit Raya District to the north. To the south, it shares boundaries with Tanah Merah Village, Siak Hulu District, and Kampar Regency. Meanwhile, to the west, Simpang Tiga Subdistrict is adjacent to Jendral Sudirman Street and Kaharuddin Nasution Street in Maharatu Subdistrict. On its eastern side, the subdistrict is delineated by the Sail River in Siak Hulu District, Kampar Regency. Delegates from 8 RTs are representing the adolescents and children from RW 1 in Simpang Tiga Subdistrict as partners in this community service project.

This dedication activity focuses on artistic activities through ecoprint with the aim of pouring the creativity of teenagers and children into fun and creativity-based activities. Furthermore, this activity is also an extension of the resources that exist in the complex because of having a green house from the exploitation of empty land to productive crops such as medicinal and vegetable crops. The dedication team provided ecoprint manufacturing training that applied to a 25 x 35 cm canvas totebag. In addition to resource utilization in the Simpang Tiga, the eco-print products could later become green house products that can be routinely produced by local communities.

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[1] Sana Khan and Abdul Malik, "Environmental and Health Effects of Textile Industry Wastewater," *Environmental Deterioration and Human Health: Natural and Anthropogenic Determinants*, 2014, 55–71.

[2] Kunal Singha et al., "Harmful Environmental Effects for Textile Chemical Dyeing Practice," in *Green Chemistry for Sustainable Textiles: Modern Design and Approaches* (Elsevier, 2021), 153–64, https://doi.org/10.1016/B978-0-323-85204-3.00005-1.

[3] Tarekul Islam et al., "Impact of Textile Dyes on Health and Ecosystem: A Review of Structure, Causes, and Potential Solutions," *Environmental Science and Pollution Research* 30, no. 4 (2023): 9207–42.

[4] S Aishwariya and Riddhi Adhiya, "Eco-Couture: Redefining Fashion with Renewable Textiles and Sustainable Printing," n.d.

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Ecoprint is a word that combines eco and print. The practice of decorating totebags with ecoprints is meant as a process of transferring colors and shapes by directly touching plants that contain color pigments to fibers or totebag.[6] The goal of this eco-printing technique is to exploit the potential of the environment to produce products with a relatively high sales value.[7] We used pigments from cranberry leaves, papayas, currants and other natural dyes.

The processing of this ecoprinting tends to be simple, very easy, and environmentally friendly, because in its production no machines are used.[8] There are two kinds of ecoprints, the stamping method and the steam method. The process continues until all the color pigments and leaf patterns are printed onto the fabric fiber. And the second method is the steam method, which requires natural coloring from the environment.[9] Besides, the fabric made with this technique produces artwork depending on the leaves and flowers used on the surface of the fabric. It becomes a very unique technique, simple and easy if done by children and adolescents but of course works well.

This research responds to important issues in the development of sustainable creative practices with a focus on ecoprint on canvas totebag. The state of the art of this research involves integrating environmentally friendly concepts into ecoprint techniques with community empowerment through a Community-Based Participatory Research approach (CBPR).[10] The application of this method brings innovations in the use of natural materials from the environment as a source of pigments on textiles, minimizing the usage of harmful chemicals commonly found in the textile industry. In a social context, this research contributes to empowering communities, especially adolescents and children, to learn and apply environmentally friendly creative practices. Integration between environmental aspects, technology, and community participation is a strong foundation in the development of this devotional activity.

This research employs the "Community-Based Participatory Research (CBPR)" method.[11] CBPR stands as a collaborative research approach involving cooperation between researchers and the community under study.[12] The project encompasses several crucial phases aimed at engaging the community and developing eco-friendly practices:

Firstly, the project initiates by identifying local natural resources through a participatory survey and discussions within the community. This phase involves understanding the available types of leaves in the vicinity suitable for natural pigments. The collaboration with the local community enables the collective gathering of valuable data regarding these leaves. Following this identification, the project moves into the development phase of the Ecoprint technique. Here, researchers and community members actively collaborate through experimentation and joint efforts. The goal is to refine the process of extracting natural pigments from selected leaves. This phase incorporates demonstrations and open discussions to ensure a comprehensive understanding of the process among participants.

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[6] Afrahamiryano Afrahamiryano et al., "Edukasi Dan Pemanfaatan Bahan Alam Untuk Pembuatan Ecoprint," *Community Development Journal : Jurnal Pengabdian Masyarakat* 3, no. 2 (2022): 1209–13, https://doi.org/10.31004/cdj.v3i2.5714.

[7] Endah Saptutyningsih and Dyah Titis Kusuma Wardani, "Pemanfaatan Bahan Alami Untuk Pengembangan Produk Ecoprint Di Dukuh Iv Cerme, Panjatan, Kabupaten Kulonprogo," *Warta LPM* 21, no. 2 (2019): 18–26, https://doi.org/10.23917/warta.v21i2.6761.

[8] Subiyati Subiyati, Ainur Rosyida, and Totok Wartiono, "Pelatihan Eco-Print Kain Kapas/Cotton Pada Siswa SMK Tekstil Pedan," *Abdi Masya* 1, no. 2 (2021): 41–46, https://doi.org/10.52561/abma.v1i2.124.

[9] Diah Wulandari Rousdy et al., "Peningkatan Keterampilan Kelompok Masyarakat Perempuan Desa Sengkubang Kabupaten Mempawah Melalui Pembuatan Kerajinan Resin Dan Totebag Ecoprinting," *Jurnal Pengabdian Kepada Masyarakat* 27, no. 3 (2021): 258–62.

[10] Slamet Riyadi et al., "Building a Qurani Society: A Collaborative Community Base Research," *Al-Arkhabiil: Jurnal Pengabdian Masyarakat* 2, no. 3 (2022): 39–49, https://doi.org/10.51590/jpm_assunnah.v2i3.272.

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The subsequent step involves training and community engagement. Tailored participatory training sessions are designed for community members to learn and apply ecoprint techniques in crafting canvas tote bags. This approach aims to cater to the specific needs and level of involvement within the community, encouraging active participation in the production process. As the project progresses, the team proceeds to evaluate the social and environmental impact of these initiatives. Through interviews, surveys, and observations, the project collects data to gauge its effects on community knowledge, local economic development, and the ecological footprint created.

Lastly, the project cycle includes a reflective and adaptive phase. Open discussion forums are set up for the community and researchers to exchange views, assess project outcomes, and collaboratively plan improvements and future developments. This iterative process ensures continual improvement and sustainable growth in the community's engagement with eco-friendly practices. By employing the CBPR approach, this research not only delves into the creation of canvas tote bags using ecoprint from natural pigments but also positions the community as a partner in every research stage, bridging scientific knowledge with their needs and aspirations.

This community service took place at Posyandu Anggrek in Simpang Tiga Subdistrict, involving a total of 15 participants. The activity began with a lecture-style presentation and a question-and-answer session to convey the material. Subsequently, a demonstration and practical application of ecoprint on tote bags were conducted. The materials provided included plain canvas tote bags, small wooden hammers, plastic sheets as a base, papaya leaves, cassava leaves, turmeric, and other similar items, along with alum water.

Result and Discussion

In this segment of discussion, we will investigate the implications and impact of totebag canvas production activities using ecoprint techniques with natural pigments extracted from leaves around resident settlements. This discussion not only focuses on the practical aspects of the use of natural materials for textile dyeing, but also explores the broader implications for environmental, social, and economic aspects.

From an environmental point of view, the use of natural pigments from surrounding leaves in the dyeing process provides an alternative that reduces dependence on toxic chemicals commonly used in the conventional textile industry. The move reflects real efforts in minimizing negative environmental impacts and reducing carbon footprints. However, it is important to consider the sustainability of these natural resources so as not to disrupt local ecosystems.

From a social perspective, these activities provide an opportunity for local communities, especially the younger generation, to engage in creative activities that empower. By giving practical skills and knowledge about the use of natural materials in textile art, it also gives them an increased understanding of environmentally friendly practices that can be applied in everyday life.[13] The interaction and collaboration between participants and dedication teams also stimulates the formation of communities that care about environmental sustainability.

In economic terms, this practice opens up opportunities in the development of creative enterprises based on environmental principles.[14] With the application of ecoprint techniques in a variety of textile products, such as fashion products or household furniture, opportunities open to developing sustainable local markets. However, it is necessary to consider marketing, distribution, and production sustainability strategies in order for this venture to be sustainable.

[13] Derek Hodson, "Time for Action: Science Education for an Alternative Future," *International Journal of Science Education* 25, no. 6 (2003): 645–70, https://doi.org/10.1080/09500690305021.

[14] Tomas Kačerauskas, Dalia Streimikiene, and Rasa Bartkute, "Environmental Sustainability of Creative Economy: Evidence from a Lithuanian Case Study," *Sustainability (Switzerland)* 13, no. 17 (2021): 9730, https://doi.org/10.3390/su13179730.

The importance of understanding the practical implications of this discussion is to associate theory with practical applications in the field.[15] The data obtained from the participation of participants in the canvas totebag production activities using ecoprint techniques is an important basis in assessing the effectiveness, responses, and real impact of these activities. Through this field data, it will illustrate concrete to what extent the acceptance, understanding, and impact generated in the local community, provides a strong basis for in-depth evaluation of the success and relevance of these actions in a practical context.

The next step will delve deeper into the implications of ecoprint activities on canvas tote bags across three primary dimensions: environmental, social, and economic.

The ecoprint activity was attended by 15 children from Simpang Tiga Subdistrict. The attendance percentage is as follows:

In the participant cohort of the ecoprint activity focused on canvas tote bag creation, a diversity of gender representation was evident. Out of the 15 attendees, the gender distribution revealed a balanced yet slightly higher female participation. The session welcomed 5 male participants, constituting 33.3% of the group, while female representation stood at 10 individuals, comprising 66.7% of the attendees. This balanced gender engagement signifies an inclusive involvement of both boys and girls, emphasizing the accessibility and appeal of the ecoprint activity within the community.

The participation distribution in the ecoprint activity for canvas tote bag creation indicates a diverse representation across genders, emphasizing an inclusive engagement of both male and female attendees. This diverse participation underscores the accessibility and resonance of ecoprint initiatives within the community, showcasing a promising avenue for fostering creativity and environmentally conscious endeavors across various demographics.

Table 1. The age distribution among participants

Age	Quantity	Percentage
3 y.o	1 individuals	6,7
5 y.o	3 individuals	20,0
8 y.o	4 individuals	26,7
10 y.o	2 individuals	13,3
12 y.o	5 individuals	33,3

Source: Team Compilation

The age distribution among participants in the canvas tote bag ecoprint activity portrays a diverse representation across different age brackets. Among the attendees, the highest number of individuals, accounting for 33.3% of the group, were 12 years old, followed closely by 8-year-olds, comprising 26.7% of the participants. Additionally, 5-year-olds represented 20.0% of the group, while 10-year-olds constituted 13.3% of the attendees. Notably, a single participant, at 3 years old, made up 6.7% of the total participants. This varied age range reflects an inclusive engagement of children from various age groups, illustrating the accessibility and appeal of the ecoprint activity across different stages of childhood development.

Based on the table above, the participants in this activity are predominantly 12-year-olds, constituting 33.3% of the attendees. However, in terms of familiarity with the concept of ecoprinting, the majority of the participants seem to be unfamiliar with the term.

[15] Woon Chia Liu, John Chee Keng Wang, and Richard M. Ryan, "Understanding Motivation in Education: Theoretical and Practical Considerations," *Building Autonomous Learners*, 2016, 1–7, https://doi.org/10.1007/978-981-287-630-0_1.

Table 2. Participant Composition Based on Knowledge of Ecoprint

Knowledge of Ecoprint	Quantity	Percentage
belum tahu	14 orang	93,3
sudah tahu tapi tidak pernah melakukan	1 orang	6,7
sudah mengetahui teknik ecoprint	-	-

Source: Team Compilation

Based on the table above, the composition of participants involved in this activity indicates that 93.3% are unfamiliar with and unaware of the ecoprint technique.

The production of ecoprint products heavily relies on the availability of natural materials used as the primary raw materials for ecoprinting. The principal raw materials for ecoprint production are various types of leaves found in the surrounding area. Therefore, prior to conducting this activity, the community engagement team had already provided the leaves used by utilizing natural resources available in the Simpang Tiga Village environment. The raw materials and all ecoprint production equipment were prepared by the community engagement team. Before engaging in ecoprinting practices, the team demonstrated to participants the process of decorating canvas tote bags using ecoprint techniques. Subsequently, each participant was provided with tools and materials previously arranged in plastic trays. These tools and materials included various types of pre-selected leaves, a wooden mallet, plastic sheets, and plain canvas tote bags. Accompanied by the community engagement team, the participants began the step-by-step process of ecoprint production.

The creation of ecoprint products requires the availability of natural materials, especially various types of surrounding leaves. To ensure the availability of these materials, the community engagement team prepared by collecting and organizing the necessary leaves from the surrounding environment of Simpang Tiga Village. Alongside the preparation of raw materials, all the equipment necessary for ecoprint production was also readied by the community engagement team. This initial step showcases the commitment to ensuring all practical aspects related to this activity were prepared in advance.

Before commencing the ecoprint production practices, the community engagement team conducted a demonstration for the participants on the technique of decorating canvas tote bags using ecoprint. A comprehensive understanding of the process steps, starting from leaf selection to printing motifs on canvas, was conveyed in detail to the participants. After the demonstration, each participant was provided with tools and materials previously arranged in plastic trays. These packages included various pre-selected leaves, a wooden mallet, plastic sheets for printing, and plain canvas tote bags as the objects to be decorated.

Guided by the community engagement team, the participants began applying the knowledge gained during the demonstration. The step-by-step ecoprint production practices were carried out, starting from selecting appropriate leaves, placing them neatly on the canvas, to the process of extracting natural pigments from the leaves using a wooden mallet. This process wasn't just a practical learning experience but also served as a collaborative moment where participants exchanged experiences and demonstrated their creativity in creating unique motifs on the canvas tote bags.

During the ecoprint production process, the community engagement team provided direct guidance to the participants, offering technical guidance and directions when needed. This enabled all participants, especially those facing difficulties in specific stages, to actively engage and comprehend each step thoroughly. While participants continued with the printing process, the community engagement team also emphasized the importance of responsibly using natural materials and preserving the surrounding environment.

Once all participants completed the printing stages, the canvas tote bags showcasing their artwork were left to dry and absorb the natural pigment colors for a brief period. While awaiting the final results of their created canvas tote bags, the community engagement team utilized this time for further discussions regarding ecological practices, environmental conservation efforts, and the potential utilization of other local natural resources for environmentally friendly creative activities.

Upon the completion of the drying process, the canvas tote bags adorned with ecoprint motifs from natural pigments were revealed. Each canvas tote bag became a reflection of the uniqueness and creativity of each participant. This moment also marked the beginning of collective reflection on the importance of community engagement in the context of environmental preservation and the potential development of sustainable creative economic endeavors at the local level. With a spirit of collaboration established, all participants and the community engagement team felt inspired and motivated to continue applying environmentally friendly practices in their daily lives.
The initial step for participants was to place a plastic sheet between the layers of the tote bag to prevent the transferred pigment colors from the leaves being pounded onto other parts of the tote bag. Subsequently, participants arranged the leaves used on the tote bag, then pounded the leaves with a wooden mallet to extract color pigments. Afterward, the tote bag was submerged in water containing alum. This immersion aimed to fix the color pigments from the leaves. Subsequently, the tote bag was left to dry in sunlight for approximately 3 hours. In the initial stage, participants were instructed to place a plastic sheet between the layers of the tote bag to prevent the transfer of pigment colors from the leaves being pounded onto other parts of the tote bag. After this stage, participants began arranging the pre-selected leaves on the tote bag, arranging the composition according to their individual creativity. The next step involved using a wooden mallet to pound the leaves, a process that would extract natural color pigments from the leaves and create motifs on the canvas tote bag.
Once the pounding process was completed, the tote bag adorned with leaves was submerged in water containing alum. This immersion aimed to fix the color pigments extracted from the leaves. In the context of ecoprint product production, alum serves as a fixative to ensure color stability on the canvas tote bag. This process helps prevent color fading and maintains the beautifully printed motifs.
After being soaked in alum solution, the tote bags are then left to dry under sunlight for approximately three hours. This drying process aims to allow sufficient time for the tote bags to naturally dry. Sunlight aids in the drying process of the tote bags and plays a role in enhancing colors while maintaining the stability of the applied natural pigments. Throughout this process, participants also directly witness the transformation of their tote bags from the wet to dry stage, completing their practical experience in the canvas tote bag creation process using ecoprint techniques.

Figure 1. Facilitation of ecoprint activities on tote bags
Source: Field Documentation (2023)

This image is documentation of the practical facilitation of creating ecoprints on tote bags conducted in 2023. It captures the moment when participants, guided by the service team, actively engage in decorating canvas tote bags using ecoprint techniques with natural pigments extracted from surrounding leaves. It reflects the direct interaction between participants and the practice aimed at empowering skills and creativity in an environmentally friendly context.

Figure 2. Output of Ecoprinting on Tote Bags
Source: Field Documentation (2023)

This figure is a documentation of the final outcome of the ecoprinting process on tote bags conducted in 2023. It displays canvas tote bags adorned with ecoprint motifs derived from natural pigments extracted from surrounding foliage. The image showcases the diverse array of motifs and creativity produced by participants, highlighting the uniqueness of each creation crafted through the practical process of ecoprinting. It underscores the participants' accomplishments in applying eco-friendly techniques in textile art, demonstrating their enhanced skills resulting from this activity.

The ecoprint activity in Simpang Tiga Sub-district is not just a sight of creativity but also provides valuable skills to the involved teenagers and children. The fabric dyeing process on canvas tote bags using natural materials from the surrounding environment not only offers a chance for creativity but also demonstrates how easily accessible natural materials can be applied in textile art. Through this practice, they learn not only about techniques and processes but also about the importance of responsibly utilizing natural resources.

Besides canvas tote bags, the ecoprint technique applied in this activity can also be utilized on various other mediums. From different fabrics used as bases for printing motifs to applications in other textile artworks such as scarves, shirts, or even household decor fabrics. The versatility of this technique provides ample creative space for participants to expand their creativity in diverse forms of textile work.

More than just an activity, this initiative aims to trigger interest and motivation among children and teenagers in Simpang Tiga Sub-district to continuously explore their creativity. Their ability to create, express, and develop their own ideas is expected to serve as a foundation for broader skill enhancement and self-discovery. This serves as a promising starting point to stimulate their interest in creative arts and the innovative use of natural resources.

This activity opens up opportunities for developing various community service initiatives. The next steps may involve applying the ecoprint technique to fashion products or other fabric materials that can bring tangible benefits to the community. This initiative won't just stimulate further creativity but can also become a potential avenue for a creative economic enterprise that supports the well-being of the local community. By continually developing such community service activities, the potential to bridge environmental sustainability with local economic empowerment becomes significantly promising.

Conclusion

The ecoprint activity among adolescents and children in the Simpang Tiga Sub-district fosters valuable skills and creativity. The natural dyeing of canvas tote bags using materials readily available in their surroundings is easily accessible. Its application extends beyond canvas tote bags to various other mediums. This initiative is envisioned to serve as a catalyst for children in the Simpang Tiga Sub-district to develop and nurture their creativity. Recommendations for future community service activities involve creating a more diverse range of ecoprint products, such as in fashion items or practical fabric-based products.

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