

# Sustainable Design: Empowering Rural Craft-preneurs Through Pandanus Natural Resources Optimization

## Abstract

Many researchers have conducted Craft and Design research on global issues, environments, and life cycles. However, this study focuses on the creative industry of natural craft products, which is one of the research priorities of Indonesia's economic transformation, particularly the green economy (Pandanus tectorius).

The field identification results show that the problem with this craft product is a lack of public and local government attention to Pandanus tectorius's copious potential. If the natural potential of the surrounding environment is properly managed, it allows for the creation of economic opportunities that can encourage high demand for long-term improvements in the community's economic welfare. Therefore, this article [examines this issue](#) to determine the value, function, and benefits of pandan product applications from an aesthetic and design standpoint, as well as economic, environmental, and socio-cultural perspectives.

It employs the Participation Action Research (PAR) methodology, [engaging](#) design thinking in its implementation. The Creative Preneurship Kriya Pandan (CP-KP) theoretical framework was used to achieve the study's objectives. CP-KP is concerned with the potential aspects of natural resources and human resources of regional craftsmen, as well as the community's creative response to eco-design and environmental design.

The findings revealed that: (1) design development is based on aesthetic and usability requirements; (2) the economic benefits of pandanus products are diverse and valuable; (3) increased sales of pandanus products can reduce plastic (waste); and (4) socio-cultural benefits of people who are proud to be craftsmen and pandanus cultivators because they raise environmental awareness and gain economic benefits.

**Keywords:** Design Thinking, Craft-Preneur, Sustainable Design, Environmental Design, Pandanus Tectorius

## Introduction

This research on natural craft products is directly related to eco-friendly products and global issues concerning the environment and life cycle (Kobayashi, 2006), by referring to the National Research Master Plan (RIRN 2017-2045), which prioritizes the Green Economy (Dossche et al., 2018). In this context, each country is responsible for anticipating the problem of environmental pollution caused by excessive plastic waste. It is time for us to change our consumption habits so that plastic products that accumulate, and [are difficult to decompose](#) can be reduced. Using environmentally friendly products (natural products) is one of the efforts that can be made (Mäkelä, and Aktaş, 2022).

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2. After the introduction, three aspects must be presented with the following sub headings. Theoretical framework, Review of literature and Research methodology.
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4. Review of literature. Any research paper must present a critical review of previous significant research dealing with the issue: in this case, supporting craft and craft-preneurship. There are a lot of such research and most major ones must be discussed, particularly those that have dealt with such issues in Indonesia. 12-15 references are needed. Please download the guidelines from the website and follow suit. Just listing or mentioning them is not enough. It should be a 'critical review'. Use the authors voice. Make statements such as according to Rapoport (1969) or Oliver says (1985)
5. Afterwards, explain the research methodology adopted. It is not about aims. This must explain tools of gathering data. This should not be a lecture on research methods, but what was done step by step. It is not about what can be done or what data can be gathered or their benefits. Say who did what when and where to get data. Be specific. Avoid vague terms such as 'some' and 'various'. This research is experimental and it uses such techniques. However, the descriptions are inadequate.
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8. Conclusions are reasonably good. However, the issue is 'empowering craft-preneurship' this has not been addressed well. More over, the claim for sustainability is just as statements: not adequate evidence.
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This study, which focuses on increasing the capacity and quality of Craft products, is expected to aid in the realization of the resilience of creative culture and the people's economy, particularly in the Pangandaran Regency area. It was conducted based on the findings of the following issues: (1) a lack of community and local government attention to the copious potential, benefits, and functions of Pandanus tectorius; (2) a lack of knowledge about the utilization and processing of natural resource potential as well as creative design; and (3) a lack of knowledge of Appropriate Technology production management in materials processing and techniques, which impacts upon productivity and product quality.

The aim of this research is to help develop designs that meet the aesthetic needs and usability of craft products made from pandanus. Its objectives are to (a) discover opportunities for economic benefits from the application of pandanus products that are diverse and valuable; (b) discover benefits for the environment because the sale of pandanus application products will reduce excessive (waste) plastic; and (c) to facilitate socio-cultural benefits; (d) to make the community proud to be pandanus craftsmen and cultivators because it can increase environmental awareness while also providing economic benefits. To craft, crafts

### Theoretical Framework

#### Literature Review

This critical review aims to synthesize and analyze the key findings of the researchers, who have examined this issue shedding light on the current state of knowledge and identifying gaps in our understanding of this issue.

Ariffin et al., (2023) provide foundational insights into the relationship between traditional craft practices and the natural environment. They emphasize the significance of considering the local context when designing sustainable solutions. Their work underscores the importance of aligning design strategies with the cultural and environmental attributes of the region in Malaysia. They highlight the need for a holistic approach that incorporates indigenous knowledge and local materials concerning innovations such as design, materials, techniques, and uses. Innovation in the creation of true traditional crafts needs to be balanced to maintain the authenticity of traditional crafts.

Building upon the ideas of Ariffin et al., Magalhaes (2020) and Maida et al., (2022) explore the potential of pandanus as a sustainable resource for rural craft-preneurs. They emphasize the economic and ecological advantages of utilizing pandanus fibers in various artisanal products. Maida and Magalhaes demonstrate how the optimization of pandanus resources can lead to increased income for rural communities while simultaneously promoting environmental conservation.

In contrast, Lee et al., (2021) argue that while pandanus-based crafts may offer economic benefits, there are challenges related to resource depletion and over-exploitation. They stress upon the importance of implementing sustainable harvesting practices and managing natural resources responsibly. This perspective adds a crucial dimension to the discussion, highlighting the potential pitfalls of unchecked resource utilization.

Atahau et al., (2022) delve into the social dynamics of rural craft-preneurs in specific local contexts. They analyze the role of social networks and community collaboration in enhancing the sustainability of pandanus-based enterprises. Their findings underscore the need to consider social factors alongside environmental and economic aspects when designing interventions to empower rural craft-preneurs.

However, the literature reveals certain gaps in our understanding of sustainable design for rural craft-preneurs. First, there is limited research that explores the long-term environmental impacts of pandanus resource optimization. While some studies touch on responsible resource management, a comprehensive assessment of the ecological sustainability of pandanus-based crafts is lacking. Additionally, the integration of digital technologies and market access for rural

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craftpreneurs remains an underexplored area. As the world becomes increasingly interconnected, there is a need to investigate how digital platforms and e-commerce can empower rural artisans and expand their market reach while preserving traditional craft practices. Moreover, while some researchers have touched upon the importance of cultural preservation in sustainable design, a deeper exploration of how to balance cultural heritage with innovation is warranted. This is particularly relevant in the context of rural craftpreneurs, where traditional knowledge plays a significant role in craft practices.

In conclusion, literature on sustainable designs that empower rural Craftpreneurs through Pandanus natural resources provide valuable insights into the subject. Researchers like Ariffin et al., Magalhaes, Maida et al., Lee et al., and Atahau et al., have contributed to our understanding of this complex field. However, there are gaps in our knowledge, particularly regarding long-term environmental impacts, digital integration, and the delicate balance between cultural preservation and innovation.

### Research Methods

The design thinking method is used in conjunction with the Participatory Action Research (PAR) design in this craft and design research (Swann, 2002). Participation research focuses on the concept of participation and regards human involvement as individuals who collaborate to make activities a reality through the participation (Namsomboon & Jitcharat, 2021) of artisan partners and pandanus cultivators in the form of experiences, imagination, intuition, ideas, and daily activities. This research model involves research partners with a focus on community involvement in research involvement; in the field, it necessitates the direct active participation of the pandanus craft group in order to collaborate in the creation of more valuable pandanus application products.

The study population consists of pandanus-tectorius plants and pandanus craftsmen in fourteen villages spread across a 44.85 km stretch of Pangandaran's 91 km coastline. The goal of this study is to create an eco-design product using natural materials from Pandanus tectorius. The research analysis instrument employs a number of elements that are relevant and related to other sciences, such as art, design, management, economics, socio-culture, community motivation, and the environment. The Design Thinking model is used to consider relevant conceptions during the practice-led research stage. The method chart (Fig. 01) aids in explaining the interpretation of arts and crafts from the three domains of collaborative practice, epistemology, and ontology (Zhan & Walker, 2019). This method also aids in the consideration of the cognitive concept elements attained by eco-design (Macdonald & She, 2015) and leads to a design attitude toward environmentally friendly application products (Cheah & Phau, 2011; Cerri et al., 2018; Prakash et al., 2019; Nguyen et al., 2017).

Questionnaires were distributed to 100 respondents via online media to gather public opinions on plastic waste originating from household waste. This is done to gauge public interest in environmentally friendly products that can help reduce excessive plastic waste.

Based on the research problems and objectives, the framework for discussing the findings of the Kriya-Pandan (KP) research includes four types of knowledge: (1) experiential learning; (2) practical experience; (3) craft attitude (Sanscartier, 2020); and (4) socially inclusive societies empowering women (Georgeson et al., 2017). These four aspects are thoroughly examined using the following approaches: (a) creative culture theory applied to art, craft, and design; (b) creative emotions and local community collective expressions; and (c) eco-design, eco-friendly products, environmental design, and sustainable design. In the meantime, the practical action stage is carried out by taking several elements into account, such as ideas, concepts, and forms; users, uses, and solutions; the value of novelty/innovation, aesthetics, significance, and meaning; and so on (Fig. 1).

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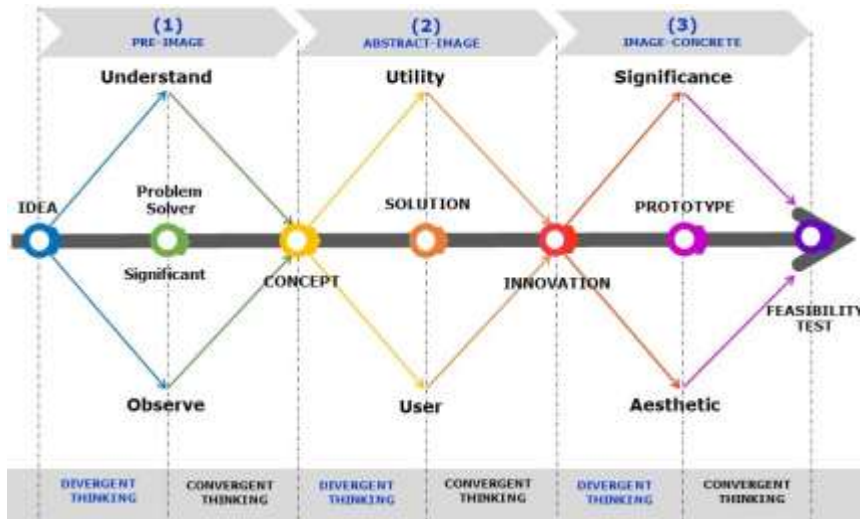


Fig. 1: Chart of Design Thinking Method Illustration Hendriyana, (2021:59-65) Adopted From Swann, 2002, Source: Authors

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## Findings and the Discussion

### Laboratory Test on Pandanus Wovens and Ropes

Traditional craftsmen's products are frequently dismissed because they lack measurable quality standards. According to pandanus craftsmen who met potential buyers of pandan bag products, the strength of the product is measured by stepping on and pulling the bag as hard as possible until the bag is damaged. The results of this laboratory test are critical in instilling confidence in potential buyers who frequently doubt the strength of the pandanus craft product.

The Pandan material's strength was tested in a laboratory at the Textile Center, Ministry of Industry and Trade, West Java Province. This laboratory test consists of a woven material unit strength test, woven strength, color strength, rubbing strength during dry and wet rubbing, and heat resistance strength when boiled.

Table 1: Laboratory Test on Pandan Woven Original Sheet  
 Source: Author

No	Type	Tensile Strength		Stretch		Friction Strength Load 12 Kpa	Tear Strength Trapezium	Color Fastness			Ministry of Industry: BBT Laboratory Test Bandung
		Woven N (kg)/5 cm	A sheet of material	Woven (%)	A sheet of materi al			K	B	S M	
1.	Original	283 (28,8) 380 (38,7)	42,1 (4,29)	4,6 4,3	2,7	30000	40 (4,1)	4	4-5	4	No.916/EV/VI/20 19

2.	Bleached	256 (26,1) 210 (21,4)	27,2 (2,77)	5,0 3,3	2,4	30000	24 (2,4)	4	4-5	4	No.917/EV/VII/2019
3.	Dyed	162 (16,5) 174 (17,7)	46,7 (4,76)	3,51 2,89	3,75	-	22 (2,2) 11 (1,1)	3	4	3	No.1128/EV/VII/2019
4.	Woven +1 -1	287 (29,3) 293 (29,9)	21,3 (2,17) 37,7 (3,84)	3,3 4,6	2,6 4,0	-	30 (3,1) 41 (4,2)	4	4	5	No.2255/EV/VII/2020

The results of the strength of the pandanus woven type differ, which is classified into three types: original pandanus, bleached pandanus, and dyed pandanus. The original type of woven pandanus was declared to be the strongest when compared to those that were dyed and bleached. As shown in Figure 3 (h), woven pandanus is combined with original pandan material and dyed pandanus to provide stable strength and add aesthetic value (patterned).

**Table 2:** Laboratory Test on Pandan Rope  
 Source: Author

No	Type	Tensile Strength/hl (cN)	CV, (%)	Stretch (%)	CV, (%)	Ministry of Industry: BBT Laboratory Test Bandung
1	8 mm pandan rope	19700	17,0	28	12,0	No.1331/EV/IX/2021
2	5 mm pandan rope	11700	12,0	19,0	17,0	No.1332/EV/IX/2021
3	4 mm pandan rope	18200	17,0	33,0	12,0	No.1333/EV/IX/2021
4	3 mm pandan rope	8980	14,0	23,0	20,0	No.1334/EV/IX/2021

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The same test was performed on the type of pandan rope. Weaving techniques are used to achieve a more stable rope strength based on its load and function (as shown in Fig. 8).

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The following are the findings of a feasibility study of Pandan's raw materials and application products in the form of a terrace chair product. The chair strength test was performed manually by occupying it with people of varying weights, as shown in table 3.

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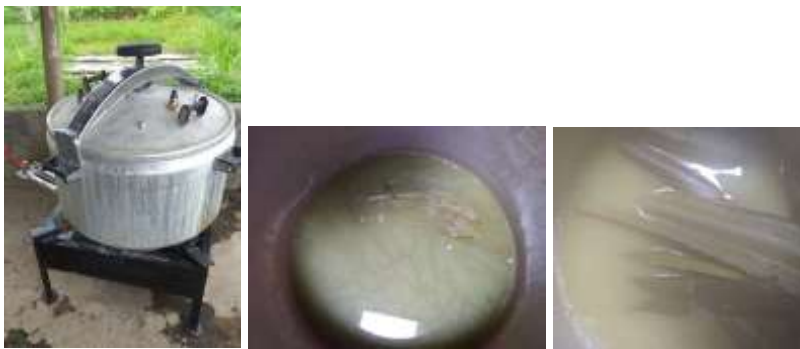
**Table 3:** Load Strength Test for Pandan Rope Terrace Chair  
 Source: Author

No.	Explanation	Description
1	Individuals weighing 74.15 kg sat on the chair for 15 minutes.	The position of the rope showed no damage, and the seat was still strong.
2	Individuals weighing 70.70 kg sat on the chair for 15 minutes.	The position of the rope showed no damage, and the seat was still strong.
3	Individuals weighing 68.35 kg sat on the chair for 15 minutes.	The position of the rope showed no damage, and the seat was still strong.

4	Individuals weighing 62.70 kg sat on the chair for 15 minutes.	The position of the rope was not damaged, it did not stretch or loosen, and the position of the rope and the weaving of the rope were still strong.
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**Table 4:** Testing The Product's Strength on Hot Temperature  
Source: Author

No.	Method	Temperature	Duration	Description
1.	Pandan boiled under pressure in hot water	100°C	45 minutes	Boiling water caused the color of the pandan leaves to turn yellowish green, but the condition of the leaves remained strong and the structure remained unchanged.
2.	Pandan boiled under pressure in hot water	140°C	90 minutes	Boiling water caused the color of pandan leaves to turn yellowish green, but the condition of the leaves remained strong, the structure remained strong, and the leaves were not crushed.



**Fig. 2:** Hot Temperature Strength Test by Boiling Technique  
Source: Authors

The results of the strength test on the rope terrace chairs showed that using pandanus rope in the form of weaving or woven produced a stronger quality against a relatively large load and resistance to heat temperatures up to 140 °C.

### ***Kriya-Urban Preneurship***

Kriya is one of the professional fields that produces products for the needs of specific people's lives, including aesthetic, spiritual, vernacular, functional, socio-cultural, and economic needs (Hendriyana, 2022; Muhadiyatiningih & Fathonah, 2020; Bisyarda, 2016); Firmansyah, 2016; Kudiya & Atik, 2020; Buchori Z., 2010; Arynov et al., 2022). Kriya is derived from Sanskrit, which combines elements of personality and skill, as in Javanese: crafty (perigel), very detailed (ngerawit), complicated, diligent, patient, painstaking, and detailed. This concept of kriya is derived from the background of the palace community's life activities (Hendriyana, 2022:339; Mahardika, 2010; Anshori, 2013), which is well known for its highly valued traditional palace style. Along with the cultural development of urban communities, kriya works, known as Kriya Urban, have also adapted to the needs of urban communities.

Kriya is developing in the academic environment in Indonesia and is divided into four categories. The first category is traditional kriya made in the context of ethnic culture; the second category is religion and rituals; the third category is folk crafts; and the fourth category

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is kriya made by artists and/or designers (Hendriyana, 2022; Buchori, 2010). In the fourth category, university-created kriya are classified according to the materials used: wood kriya, leather kriya, batik and weaving kriya, textile and fashion kriya, metal kriya and jewelry, bamboo and rattan kriya, ceramic kriya, and Tosanaji kriya. The names or terms of kriya pandan have not been included in the list of names of competence and occupational craftsmanship in the academic and vocational environments at universities. Currently, only weaving crafts are listed, and their availability is restricted to the primary and secondary education offices.

Kriya, as defined above, is one of the academic competencies of two-dimensional and/or three-dimensional visual works that demonstrate conceptual intelligence. Furthermore, kriya is oriented toward utility, significance, and aesthetics in achieving goals and targets that focus on user needs, solutions, and innovation (Hendriyana, 2022). Kriya evolves with the times, not only to meet the cultural needs of the palace community but also to have a very broad market potential, both in local and national markets as well as exports.

### The Economic Potential of Pandanus Tectorius

Pandan is one of the materials used in the creation of craft items. Pandanus is one of the names for a family of plants known as the Pandanaceae. This genus contains various pandanus species that live in open areas in the lowlands at an elevation of 20–600 meters above sea level in almost all of Asia, from the eastern tip of Asia to the Pacific islands. Pandanus tectorius (Pandanaceae) populations are primarily found in coastal areas and community plantation lands in Pangandaran Regency. Pangandaran itself has a 91-kilometer-long beach with 21 beach tourism destinations and a coastal land area of 283.55 ha (RPJMD 2016-2021). According to a field survey, the sandy land in the western region of Pangandaran Regency is overgrown with Pandanus tectorius trees for approximately 44.85 kilometers. Pandan plants grow wild and thrive throughout the area.

The Pandanus is distinguished by its trunk, which can grow to be 4–14 m tall and has green leaves that measure 90–150 cm in length and 4–8 cm in width. In one year, Pandanus produces 10–300 leaves per stem. At the first-year phase, the leaf growth reached 10–90 cm, whereas the stem and branch growth reached 10–90 cm and 2–80 cm, respectively. Phase 4, 5 to 9 years, the growth was followed by the development of upright stems reaching 5–12 m in height. This growth information was gathered by calculating the number of leaves and measuring the distance between marked leaf scratches and flower stalks. The age of the pandanus plant can be estimated based on these markings. The following stage is the flowering phase, which lasts for 40 years or more. Male plants produce about 30 branches and flowers per year, while female plants produce about 16 branches and flowers every two years.

The pandan fruit is shaped like a bunch (dompok) and contains between 76 and 100 seeds in each bunch. Each seed contains 8–10 embryos (small seeds that will later develop into new plant shoots), though many die and do not develop new shoots because they are killed by insect larvae. Pandan leaf processing typically begins with cutting pandan leaves, which are then boiled, washed with clean water, dried in the sun, colored, and then made into woven or rope.

Pandanus is used in religious rituals known as the Pandanus War Ceremony by the Bali Aga Tribe. In other religious rituals, pandanus made of mats is used to wrap the corpse after it has been wrapped in a shroud to complete the death ceremony. Pandanus leaves are now mostly used for weaving and roping, and are then used to make mats, hats, bags, baskets, multifunctional storage boxes, and furniture. Furthermore, pandan fiber can be used as cement composite reinforcement, paper composite reinforcement in place of wood planks, and concrete tile composite reinforcement.

The process of working on Pandan application products, from taking leaves to becoming pandanus woven (Fig. 3) and/or becoming pandan rope materials, can be explained in the implementation of this applied research (Fig. 4). The following are the stages of pandan rope processing:

- (1) Fresh pandan leaves are cleaned of thorns, cut into size, boiled, soaked in cold water, and thoroughly washed with running water;

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- (2) Pandan leaves are then dried in the sun to dry;
- (3) Dried Pandan leaves are then twisted one by one according to size using simple manual tools;
- (4) The double twisting stage is the merging of one gyre into a rope (telampar) using a swivel technique;
- (5) Pandan rope spools come in a variety of sizes (diameters of 2 mm, 3 mm, 4 mm, and 7-8 mm).



Fig. 3: Weaving Processes of Pandan (*Pandanus Tectorius*)  
Source: Authors

Description:

- a = collecting the pandan leaves
- b = thorny pandan leaf shape
- c = thorn removal process
- d = leaf cutting processes into specified size
- e = boiling process
- f = drying process
- g = weaving process
- h = woven pandan



**Fig. 4:** Processing The Pandan Ropes (Pandanus Tectorius Rope)  
Source: Authors

The Design Thinking-Craft Preneur, as explained in the method section, is used to complete descriptions and discussions about experiential learning, practical experience, socially inclusive society empowerment, and craft attitude. Design Thinking has been around since the 2000s. Design Thinking is highly requested and is increasingly being applied to new design and human resources challenges (Baker & Moukhliiss, 2020). Since then, design thinking has fueled innovation in the fields of art and management design (Knight et al., 2020; Colombo et al., 2017), business (Geissdoerfer et al., 2016), and social theory and practice (Hoolohan & Browne, 2016).

However, design thinking is actually ubiquitous (Bjögvinsson et al., 2012). Every approach in everyday life to solving problems involves thinking (Shapira et al., 2017; Lynch et al., 2021). Design Thinking is also about demonstrating how and why something works so well. Human activities are so detailed and specific nowadays that they change the stability of life in a way that supports the improvement of their lives based on their various professions.

For the past few years, Design Thinking has been the subject of teaching, research, and real-life applications in almost every domain and field of education, research, and industrial endeavor (Pande & Bharathi, 2020; Leavy, 2010). In this context, the author creates a set of design thinking tools that discuss the specific characteristics of kriya-pandan creative entrepreneurship as it evolves (Hendriyana, 2021; Colombo et al., 2017). The design thinking tool is intended to help designer-entrepreneurs make decisions about their own start-ups. In this research method chart, the focus of design thinking comprises ideas, concepts, innovations, and prototypes.

Based on field data, community empowerment (Creative-preneurship) resulted in four groups of pandanus craftsmen from Cibenda Village, Legok Jawa Village, Ciparanti Village, and Kertamukti Village. The craftsmen are divided into three groups based on the type of work they do:

- Group of craftsmen who provide raw materials, namely the Tumpang Sari farmers who supply wet and dry raw materials (Figs 5 and 9).
- Group of craftsmen who provide ready-to-use materials in the form of woven and rope (Figs 3, 4, and 6).
- The group of craftsmen who make products consists of a sample maker and a production team (reproduction), (Figs 7-8).

The development of kriya pandan for these villages generates additional revenue for the local community. In addition to their main jobs as farmers and brown sugar producers, they can become pandanus craftsmen in their spare time. On average, the craftsmen work 5 days a week, with a yield capacity of dry leaves harvested and dried of around 50kg/m<sup>2</sup>. Here is the formula:

- When the market price reaches its maximum of 17,500/kg, the extra income of the crafting community is  $50 \times 17,500 \times 4 = 3,500,000$ /month utilizing only labor and avoiding costs and materials. They only do the processing.
- When the market price drops to 11,000/kg, the extra income for the crafting community is  $50 \times 11,000 \times 4 = 2,200,000$ /month (16 working days by two people) using only labor, no costs for materials, and only processing the material. The price of Rp. 11,000 is relatively equal to their earnings as brown sugar producers.
- According to data collected in the field, the average amount of dry leaf processed at harvest time is as follows: 23 craftsmen  $\times$  30kg/mg = 690 kg/mg;  $690 \times 4\text{mg} = 2,760$  kg/month;  $2,760 \times 10$  months = 27,600 kg/year.
- According to data from 2021, there were 19 house pandan craftsmen in Kertamukti Village who have intercropped pandanus up to 7.59 ha, totaling 5,815 pandanus trees.

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The community of the pandanus craft group appears to get additional livelihoods that can help meet their growing daily financial needs, as seen by the four points (a–d) above. It is also possible to guarantee that the supply of raw material requirements may be regulated in a sustainable way with the implementation of the pandanus intercropping scheme.



**Fig. 5:** The Activities of Craftsmen Processing of Pandan Raw Materials  
Source: Authors



**Fig. 6:** The Activities of Pandan Woven Craftsman  
Source: Authors

#### **Innovation Design, Sociocultural, and Environmental Benefits of Pandanus Tectorius**

The design, socio-cultural, and environmental benefits of pandan craft application items contribute to their added value. This is based on the idea and concept of the national research master plan (RIRN 2017-2045), namely the priority of the Green Economy. Research on handcrafted goods manufactured with natural components is closely tied to eco-friendly products. Additionally, research on nature-based material craft items will touch on global environmental and life cycle issues (Kobayashi, 2006; Dossche et al., 2018). In this situation, every nation has a responsibility to prepare for climate change. It's time for individuals to change the way they consume in order to stop plastic garbage from building up and becoming harder to decompose.

The activities of weaving and making pandan mines are similar to those carried out by the Weaving Meigu Liangshan artisans group, in China (Li, Wei, and Liu, Yiping, (2021), these two pandanus craftsmen and traditional weaving have their uniqueness through the expression of their respective cultural values.

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The goal of this research's utilization of the potential of natural and human resources is to create Kriya Pandan (KP) creative products based on creative entrepreneurs, eco-design, and sustainable design. Innovative KP product development unquestionably calls for the use of a variety of new ideas, concepts, materials, techniques, prototypes, and finished products.

The idea of innovation and the value of novelty does not always refer to profound ideas and concepts, but rather to the importance of advantages for users, both in urban and rural areas. The quality of a product is not defined by the perceived value of its concept and theory, or its kitschiness, but by its significance and usefulness for the community (Hendriyana, 2019-2021). The significance of this kind of work often lies in the use of inclusive and empathetic design, connecting to diverse societal living spaces and creating new societal living spaces from strong and caring social interactions (Viderman & Knierbein, 2020). The processing of these concepts, ideas, and innovations can be combined to create the following product prototypes.

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**Fig. 7:** Pandanus Storage, dan Standing Lamp  
Source: Authors

Description: Left, the position of the shopping bag is neatly folded and simple so it looks fashionable. On the right, the position of the open shopping bag is filled with groceries.



**Fig. 8:** Multifunctional Basket and Patio Chairs  
Source: Authors

### Sustainable Design

In this context, sustainable design is more concerned with the kind of product itself—an eco-friendly product that does not harm the environment (Khoso et al., 2021). Additionally, using raw materials with a sustainable supply, such as those obtained from intercropping agriculture and periodic harvesting methods, is related to sustainable design and climate change (Mahaarcha, 2019).



**Fig. 9:** Planting Pandan Seeds Will Help Ensure a Sustainable Supply of Raw Materials  
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### Conclusions

This practice-led Kriya-Pandan (KP) produced two products: (1) the Pandanus application craft product, the end result of exploration and experimentation that tested a variety of design thinking elements, including ideas, concepts, and forms; users, usability, solutions, value of novelty, innovation, aesthetics, significance, and meaning; and (2) the "design thinking

of Creative Preneurship KP" creative process model, which develops into a creative process model that involves a number of components, such as creative ideas, people, products, markets, venues, re-productions, support, and humanist.

This research leads to the conclusion that the design development presented complies with the requirements for aesthetics and usability. Due to the variety and value of pandanus products, there are also financial advantages. Another thing that can be inferred is that the environmental advantages of growing pandan product sales will result in a reduction in plastic waste. The final point that can be drawn is that there are socio-cultural advantages for people who feel pleased to be pandanus craftsmen and farmers since they earn financial advantages and raise environmental awareness.

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