The Development of Wicker Products from Gros Michel Banana Fibers with Natural Dyes for Promote Career Among the Elderly

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Abstract

The objectives of this research and development were to develop wicker products from Gros Michel banana fibers with natural dyes and to test the acceptance of the target consumer groups toward the products. The sample groups consisted of three types of the product prototype, 15 community representatives for selecting the draft products, three experts for product assessment, and 400 target consumers for product testing. The research instruments comprised a product prototype assessment and a questionnaire. Descriptive statistics was used to analyze the data for mean and standard deviation. The research results revealed that the fibers can be used to produce the product prototypes and small-sized fibers yield bright and durable colors after dyeing. For the development of the prototypes, about 15 to 20 fibers are twisted and braided to produce a suitable band. The designs of the three prototypes are based on the traditional ones. When the prototypes were evaluated by the experts, the total mean was 4.30, which was at a high level. The acceptance testing results of the target consumers were at the highest level. This is because the products were based on the local wisdom and environmentally friendly as a green product. Therefore, they should be promoted to create more jobs among the elderly as well as interested community members in order to establish community and socio-economic empowerment.

Keywords: Naturally-dyed banana fibers, Product development, Career promotion among the elderly, Value addition, Wicker work

Introduction

Banana is a fast-growing annual crop which can grow in all regions of Thailand and its stalk can be turned into natural fibers (Soiraya, 2016). All parts of banana are useful, such as, leaf, fibrous layer, raw and ripe fruit, flower, root, and underground trunk. The leaf has long been used for wrapping. Leaf over the fire is used to lessen muscle pains and young leaf is used to wrap up a wound. Its fibrous layer is well-known for making tough strings, especially the layers form Manila bananas grown in the Philippines. Banana fibers are used for cloth weaving, paper, and various kinds of handicraft (Tangkrock-olan, 2019). Studies have revealed that banana trees are variously useful. For instance, processed fibrous layers yield fibers for textile industry, banana trees are used in rituals in Thailand, and they are also used as a supplementary material for various structures. From a fieldwork survey at Cho Lae Village, it was found that most villagers are involved in agriculture and they grow Gros Michel bananas as an economic crop. The farming area was over 320 rai (128 acres) with 70 group members. About 400 banana trees can be grown in one rai (.40 acre) and 128,000 trees are grown in the 320-rai area annually. After harvest, the trees are cut down without further use, and about 30% are chopped up to decompose (Pinkham, 2016). Therefore, about 89,600 trees are uselessly discarded each year. Additionally, most elderly aged over 60 years in the community do not work and thus lead an idle life, despite the fact that they are still capable of working. As a consequence, they formed into an elderly group with 50 members, consisting of 32 members aged 60-69 years, 14 members aged 70-79 years, and 4 members aged 80 years and over. They were 64% of the labor force who were keen on producing wicker products which are considered local wisdom handed down from generation. The products are bamboo-based in the forms of household utensils and furniture. The products were sold in the community as a supplementary income (Thama, 2014). If the community knows how to exploit discarded materials, it will be a way to add more values to the wicker products.

From the field study to analyze problems and needs of the communities in Muang Kaen Municipality by organizing focus group discussions with community and Gros Michel banana farming representatives and municipality officers, it was revealed that they needed to exploit the banana fibers in order to produce souvenirs for tourists and visitors. One distinct and unique feature of the products was that natural dyes must be used. From an investigation on the feasibility of dyeing the fibers with natural dyes by Canbolat et al. (2015), it was found that banana fibers are classified in the cellulose fibers which can be naturally dyed like other types of natural fibers. The mordants should include 4% copper sulphate (CuS04), 15% alum, and 4% ferrous sulphate (FeS04). However, the fibers to be dyed must undergo the cleaning process to rid of dirt. Singh & Sharma (2020) found that the mordants of 5% alum, 5% ferrous sulphate, and 5% stannous chloride enable banana fibers with natural dyes to have color fastness against washing, brightness, and fineness (2,400 Nm) and to twist well after having undergone the quality improvement (Ortega, 2016). This indicates that the fibers can be developed into color-fast products. After the products have been used for a time being, the

fibers will not become fluffy, which can positively affect the acceptance of consumers on banana fiber-based products. The acceptance occurs when consumers personally feel toward particular products through their perceptions, attitudes, and opinions, ultimately leading to acceptance or rejection of the products.

In this investigation, discarded banana fibers after harvest at Cho Lae village in Mae Taeng district, Chiang Mai province, are exploited for maximum benefits. The fibers are separated and naturally dyed in order to produce wicker products as an alternative for the elderly to use instead of bamboo. One benefit from this investigation is for the community elderly to commercially produce banana fiber-based wicker products based on their local wisdom, which would ultimately create more jobs, incomes, pride, and better mental health for the elderly. Furthermore, the community is able to produce new green products that can preserve their cultural heritage and wisdom.

Objectives

1. To develop wicker products from Gros Michel banana fibers with natural dyes
2. To test the acceptance of the target consumers on wicker products from Gros Michel banana fibers with natural dyes

Methodology

This type of research is research and development. The research was carried out in the following steps:

The sample groups

1. Three prototypes of wicker products made from Gros Michel banana fibers with natural dyes selected by the elderly from a focus group discussion. They included a bag, a lampshade, and an office utensil.

2. Three experts for assessing the product prototypes. They included one expert in product development to assess the prototypes according to the product design principles, one expert in product production and sales to assess the feasibility of the production and commercialization of the products, and one textile academic to assess the propriety of the fact that the fibers could lead to sustainable production. The assessment was based on practicality and functionality.

3. Fifteen Cho Lae Community representatives to participate in selecting the product drafts and assessing their own production capability and potential.

4. One hundred target consumers for product testing. They included fifty domestic and foreign tourists visiting Anusarn Market and fifty people on the Tha Phae Walking Street. The accidental sampling method was used to select the sample group who were actually at the exhibition and interested in the wicker products.

Research instruments

To collect the data based on the research objectives, the product prototype assessment and the questionnaire for product testing were utilized.

Data collection and analysis

Information about wicker production and product identity in the community was investigated in order to find out unique designs and features of the products. Rapport was established with community members. A focus group discussion was organized with ten elderly members to analyze their production capabilities. Additionally, information about existing wicker production techniques, materials used, and designs was explored in an attempt to use the information as a guideline to create the new products from Gros Michel banana fibers. Twisted and braided fibers were used for the production. The representatives selected the weaving and twisting designs based on their capabilities. After that, three prototypes were produced, which comprised a bag, a lampshade, and an office utensil. The prototypes were then assessed by the experts for designs and recommendations. After improvement, the prototypes were tested for acceptance of the target consumers who were avid wicker product aficionados. The data from both domestic and foreign consumers were used to improve the products, so that they could be in line with their needs. The mean of the product testing was 4.00, which indicated that the products were truly acceptable among the consumers, and the result would be incorporated for further analysis.

For the data analysis, the descriptive statistics was employed to obtain the mean and standard deviation.

Results

The research results are summarized as follows.

1. From the fieldwork data collection in the community, it was revealed that all 50 elderly members gathered at the elderly center in the village in their free time to participate in activities organized by the center. Wicker production is one of the important activities because some of the elderly are skillful in and keen on producing wicker products. The products are used as household utensils in their everyday life and in rituals. The material is mainly bamboo which is easily available in the community. Current products are chicken coops, round baskets, and wide-mouth baskets, as shown in Figure 1.

Figure 1 Wicker products of the elderly group
(Source: Researcher, 2017)

From the data analysis, it was found that the banana fibers could be applied to produce wicker products. However, due to the limitations in that the fibers are small, soft and mono-fibrous, it is impossible to structure into wicker products. As a consequence, it is necessary to bundle up the fibers into a proper size to lay out the product structures. In this investigation, two bundling techniques, twisting and braiding, are used by incorporating 15 to 20 fibers. If more fibers are used, the bands will be too large for the products to be refined. Moreover, it was revealed that separating the fibers by a semi-automated machine would yield fibers small enough for the dyes to be absorbed well, making the dyes bright and distinct. This finding is in contrast with the method of scraping the layers in large pieces, sun-dried, and dyed. These dried and unclearned fibers are difficult to absorb natural dyes and do not have color fastness.

For the developed wicker products, they are based on the product design principles posited by Sooksod (2001), which emphasize functionality and beauty of the products. They are also based on the capabilities of the participating elderly, so that they are able to further develop and improve the products sustainably on their own. The steps of prototype product design and development are as follows.

1. The target group was specified. They were in the working age ranging from 30 to 60 years, whose lifestyles could be identified, who had purchasing power to buy community products, and who appreciated wisdom-and-culture-oriented products.

2. Preliminary ideas for product design were developed. Due to the soft feature of the fibers, the appropriate materials to erect and strengthen the structures of the products are used, which are leather, iron and wire. For a bag, the focus of the design is on strength and concealment of what is inside. For a lampshade, it is necessary for the light to pass through, so the structure must be transparent. For an office utensil to meet current lifestyles, it must be multi-functional.

3. Design refinement is to improve the design drafts with the combination of color, shape, figure, line, and surface with balance, unity, and beauty according to the principles of product design. There were ten drafts for each product with a total of 30 drafts to select the most suitable and feasible ones.

4. Analysis is to select the ones suitable and feasible for further development and commercialization. The selection was conducted by the elderly representatives in order to produce the prototypes. Furthermore, they collectively selected the colors for the three products, which are pink from lac for the bag, gray from Burmese rosewood bark for the lampshade, and blue from indigo for the office utensil.

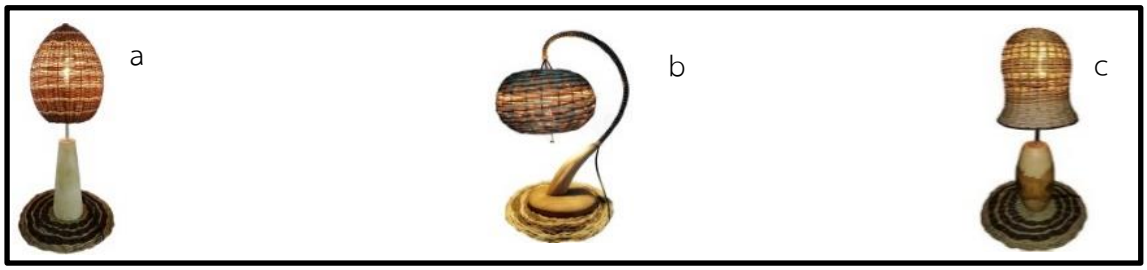
5. Production is when the twisted and braided fibers are made into the draft models by using the weaving and twisting techniques. There were a total of ten prototypes, divided into three types of bags, four types of lampshades, and three types of office utensils. The details of the three product prototypes are as follows.

5.1 The bags consist of a shoulder bag, a carry-on bag, and a handbag. They are made from banana fibers dyed from lac extract and those without dyeing. The design is intertwined twisting in the husked rice pattern, making the product thick, opaque, and strong. Only the round shoulder bag uses the transparent pentagon pattern and leather is used to support and strengthen the structure, as shown in Figure 2.

(a) Round shoulder bag (b) Carry-on and shoulder bag (c) Square handbag

Figure 2 Bag products
(Source: Researcher, 2017)

5.2 Lampshades are in the dome, round and bell shapes. The dye for the fibers is from the bark of Burmese rosewood and white cheese wood which are locally available. The wide and narrow design is proportionate, allowing light to pass through. A 1/8" wire is used to strengthen the structure and to make the product contemporary, as shown in Figure 3.



(a) Dome-shaped lampshade (b) Round lampshade (c) Bell-shaped lampshade

Figure 3 Lampshade products
(Source: Researcher, 2017)

5.3 Office utensils comprise a brief-case, a plant saucer, and a pencil case. The fibers used are natural and indigo-dyed ones. The weaving techniques include twisting, knotting, and transparent twisting (pentagon). Leather is used to decorate and strengthen the structures, as shown in Figure 4.

(a) A brief case (b) A plant saucer (c) A pencil case

Figure 4 Office utensils
(Source: Researcher, 2017)

6. Appraisal is to assess the product prototypes by the experts and their recommendations are used to improve them. The appraisal results revealed that the mean scores for the bags were 4.09 ± 0.67 at a high level, 4.59 ± 0.45 at the highest level for the lampshade, and 4.37 ± 0.52 at a high level for the office utensils. For their recommendations, it was revealed that the products were diverse enough to commercially develop at the community level. However, more colors should be added to be in line with fashion trends, so that the products could be fashionable and as an alternative for consumers. The appraisal results are shown in Table 1.

Table 1 Product appraisal results by the experts

Description	Bag			Lampshade			Office utensil		
	$\bar{x}$	S.D	Level	$\bar{x}$	S.D	Level	$\bar{x}$	S.D	Level
1. Wicker designs are suitable for the products.	3.67	0.58	high	4.67	0.58	highest	4.33	0.58	high
2. Using Gros Michel banana fibers for the products is appropriate.	4.67	0.58	highest	4.67	0.58	highest	4.66	0.58	highest
3. Supplementary materials for the products are suitable.	4.67	0.57	highest	4.67	0.58	highest	4.66	0.58	highest
4. The products maintain local wisdom identity of wickerwork.	4.00	1.00	high	5.00	0.00	highest	4.33	0.58	high
5. The colors used for the products are appropriate.	3.33	0.58	moderate	4.33	0.58	high	3.33	0.58	moderate
6. The sizes of the products are suitable.	3.67	0.58	high	4.00	0.00	high	3.67	0.58	high
7. Utility of the products is appropriate	4.33	0.58	high	4.67	0.58	highest	5.00	0.00	highest
8. The products can create value addition according to creative economy.	4.44	0.58	high	4.67	0.58	highest	4.67	0.58	highest
9. Overall satisfaction with the products	4.00	1.00	high	4.67	0.58	highest	4.67	0.58	highest
Total	**4.09**	**0.67**	**high**	**4.59**	**0.45**	**highest**	**4.37**	**0.52**	**high**

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From Table 1, it is revealed that the overall mean of the appraisal was 4.35, with the lampshades having the highest mean scores at 4.59 followed by the office utensils, 4.37, at a high level and the bags, 4.09, at a high level respectively. When the items were considered, it is found that the mean scores of the suitability of using the fibers to produce the products and the use of supplementary materials were at the highest level in all products. This finding indicated that the fibers could be properly used to produce wicker products by the community.

Product testing was conducted to find out the acceptance of 100 domestic and foreign tourists visiting the target areas and having an interest in wicker products. From the questionnaire, it is revealed that 56% of the respondents were females, 57% were single, 30% were in the age range between 26 and 30 years, and 38% were self-employed. Additionally, 36% held an undergraduate degree and 39% had a monthly income between 40,001 and 50,000 baht. The acceptance of the respondents on each product is shown in Table 2.

Table 2 Product testing results on the products of the respondents

Description	Bag			Lampshade			Office utensil		
	$\bar{x}$	S.D	level	$\bar{x}$	S.D	level	$\bar{x}$	S.D	level
Beauty									
1. Weaving designs are suitable for the products	4.78	0.46	highest	4.65	0.54	highest	4.65	0.48	highest
2. The colors used for the products are suitable.	4.69	0.56	highest	4.35	0.54	high	4.56	0.52	highest
3. The product designs are suitable	4.68	0.53	highest	4.49	0.53	high	4.36	0.54	high
4. The product designs are innovative	4.45	0.56	high	4.65	0.58	highest	4.25	0.56	high
5. The supplementary materials are suitable.	4.69	0.51	highest	4.69	0.54	highest	4.56	0.55	highest
Total	**4.65**	**0.52**	**highest**	**4.56**	**0.55**	**highest**	**4.48**	**0.53**	**high**

Table 2 Product testing results on the products of the respondents (Continue)

Description	Bag			Lampshade			Office utensil		
	$\bar{x}$	S.D	level	$\bar{x}$	S.D	level	$\bar{x}$	S.D	level
Products									
1. The material is suitable for the products.	4.50	0.46	highest	4.59	0.57	highest	4.53	0.58	highest
2. The sizes of the products are suitable.	4.45	0.52	high	4.22	0.60	high	4.18	0.62	high
3. The products are fashionable and innovative.	4.42	0.55	high	4.66	0.61	highest	4.00	0.63	high
4. The products can create value addition according to the creative economy.	4.55	0.56	highest	4.56	0.60	highest	4.57	0.59	highest
5. The products can be produced at the community level.	4.65	0.52	highest	4.60	0.55	highest	4.50	0.57	highest
6. The products are commercialized of the local wisdom.	4.66	0.50	highest	4.69	0.53	highest	4.68	0.53	highest
7. The weaving techniques indicate the maintenance of local wisdom.	4.65	0.50	highest	4.66	0.55	highest	4.63	0.56	highest
8. The materials are locally available and environmentally friendly.	4.55	0.54	highest	4.67	0.53	highest	4.49	0.48	high
9. The products optimally exploit locally available materials.	4.62	0.51	highest	4.78	0.53	highest	4.63	0.45	highest
Total	**4.56**	**0.52**	**highest**	**4.60**	**0.56**	**highest**	**4.47**	**0.56**	**high**
Functionality									
1. The products are suitably functional.	4.64	0.64	highest	4.54	0.56	highest	4.47	0.46	high
2. The products are convenient to use.	4.69	0.60	highest	4.35	0.48	high	4.54	0.50	highest
3. The products are safe, strong, and durable for use.	4.73	0.50	highest	4.30	0.51	high	4.59	0.50	highest
4. The designs of the products are suitable and functional.	4.67	0.53	highest	4.45	0.62	high	4.6	0.62	highest
5. The products are easy to maintain.	4.31	0.62	high	4.42	0.58	high	4.49	0.54	high
Total	**4.60**	**0.58**	**highest**	**4.41**	**0.55**	**high**	**4.54**	**0.52**	**highest**

From the table, it can be summarized that the overall mean of the products is 4.54± 0.54, indicating that the target consumers accepted the products made from the banana fibers. This is because the overall mean scores are higher than the predetermined scores of 4.00. It is thus a good opportunity for the community to further develop the products for commercialization. Moreover, additional suggestions revealed that the lampshades should be collapsible for interested foreigners to bring home. If this feature could be improved, it would provide another channel for the products to be available in an international market. Furthermore, the products should be more diverse in order to provide consumers more alternatives. For the products with transparent designs like round-shaped lampshades and briefcases, weaving spaces should be smaller and more reinforcement materials should be added to strengthen the structures of the products.

Discussions

1. In developing the wicker products, the fine and small banana fibers were scraped by a semi-automatic machine. The twisting and braiding techniques were employed to derive the yarns big enough for weaving. The tensile force of banana fibers is at 233-337 MPa with 2-3% resistance and flexibility of 17-22 GPa (Inpakdee & Boonyanate, 2019), making the fiber bundles strong and tough. The wicker designs of the three product types are in line with the traditional ones of the community. Wickery is folk knowledge passed down from generation to generation. It is a type of folk asset, wisdom, culture, and handicraft skill. It is also a social capital because it has been passed down and owned by community members (Ngamlamom, 2015). Therefore, it is essential to turn this local wisdom into tangible new products. Designs, fineness, and materials for wicker products are uniquely different from community to community. Product design must be based on suitability and functionality. Leesuwan (1996) stated that appraisal of wicker products should be based on functional and esthetic or artistic values. Product development based on local wisdom not only promotes the wisdom but also maintains conventional wisdom and identity as well as empowers community handicraft. Wicker identity and uniqueness are valuable and should be investigated as the foundation for further product development. If the development is not in a correct and appropriate manner, identity and unique aspects of wicker works can be damaged irreparably. Khamhan *et al.* (2016) reiterated that the development of local wisdom and knowledge for commercial purposes would make community economy sustainable in accordance with the Sufficiency Economy Philosophy by managing and utilizing local natural resources and environment. Thus, adding more values to discarded materials by producing wicker products for commercial purposes creates jobs and incomes for the elderly as well as empowers the community and promotes community economic growth sustainably. The product development process requires an investigation, thinking, designs, revision, and improvement in an attempt to derive innovative and quality products. Ulrich & Eppinger (2012) stated that the product development process is a sequence of steps that transforms a set of inputs into a set of outputs. A clear process contains quality assurance, coordination, planning, management, and improvement.

The conclusion of the product development process is the product launch, and subsequently the product becomes available for purchase in the market.

2. From exploring the acceptance of the products by the target consumers, it is concluded that the mean scores of all product types were at the highest level in all aspects. For the beauty aspect, the highest level was on the wicker designs suitable for each product type. The designs were applied from the conventional ones practiced by the community, conveying the artistic beauty of folk wicker regarding shapes, structures, designs, and materials. The structures are an essential component that reinforces artistic beauty and values of the products. Attractive and functional products can raise the consumption taste of consumers (Wiangamphon, 1997). The focus of these current designs is on both beauty and functionality. Therefore, product beauty is the first impressive factor influencing consumers to buy products. This notion confirms Tangcharoen (1996), stating that product design must be related to consumers' needs. For instance, it must be in line with their lifestyles, economic needs, and esthetic values and beauty. For the natural dye extracts used for this product development, they are locally available. Separating the fibers before dyeing enables the dyes to absorb into the fibers well, and when they are bundled, twisted, or braided, the colors are even more distinct and outstanding. This finding contradicts with that of Leesuwan (1996), saying that the fibers were torn into small bands, sun-dried, and wove into utensils. In this investigation, the fibers were separated individually. When they were dyed with natural dyes, color fastness on the fibers was better. Thus, the colors of the products are distinctly bright, making the mean scores on the product acceptance at the highest level, and higher than the predetermined scores of 4.00. This is regarded that the product development with an emphasis on both beauty and functionality is able to produce for commercial purposes. The product testing before the product launch reduces the opportunity for mistakes in actual production. A small number of the products were put for sale in the market for consumers to try and express their reactions, so that product adjustment or improvement and marketing strategies could be altered accordingly. This is in line with the acceptance theory of Hambling (2013) in that user acceptance requires formal testing and the tests should be designed and conducted in a structured way that provides objective evidence of the acceptability of the system. The test for this investigation was formulated according to the aspects of the products, namely beauty, product, and functionality, in an attempt to derive the overall information in accordance with market needs.

For the product development, the product designs were intended for actual practicality at the community level. The products are based on local wisdom for commercial purposes and value addition according to creative economy. This is to bring cultural capital for commercial and social value addition. In order to further exploit cultural capital, collaboration from state and private sectors must be established with a common goal of maintaining traditional identity, arts, and culture (Naenna, 2016). This is in line with Khamhan et al. (2016) in that banana fiber-based fabric is a commercial development of local knowledge and wisdom in order for sustainable economic development of communities according to the Sufficiency Economy Philosophy. The designs of these products focus on modernity, influencing the consumers to accept and purchase the products. The acceptance is an individual behavior to accept things

regarded as concretely and abstractly better to apply or practice with satisfaction (Wandee, 2002).

As for functionality, the products were designed and produced with a focus on both beauty and functionality. As a consequence, the product testing scores on this aspect were at highest level. This finding is similar to that of Sooksod (2001) in that functionality is the first priority in product design that must be taken into consideration. In this research, functionality of the developed products is suitable and correct according to the objectives, that is, they are able to meet consumers' needs efficiently and conveniently, and they are easy to maintain and take care of. Additionally, they are safe, strong, and durable. The strength of the products depends on the structures and materials used for product development. For these products, the supplementary materials to reinforce the structures are leather, iron, and wood, which are suitable for the products to remain strong and durable after use. Besides appropriate main and supplementary materials and structures, economy must be taken into consideration simultaneously.

Conclusion and suggestions

The development of wicker products by using Gros Michel banana fibers revealed that the fibers can be made into the product prototypes with supplementary materials, e.g., leather, iron, wood and wire, as their structure foundations in order for the products to be in shape and beautiful. For weaving, around 15-20 dyed fibers are used for twisting and braiding into a strong and brightly colored band. The developed product models are initially based on the techniques that the elderly are keen on. Then, new techniques are incorporated to make the products more diverse. Moreover, they can be used as a guideline to further develop new products in the future. It is certain that the products are commercially viable due to the fact from the testing that the target consumers accepted the products with mean scores higher than the predetermined 4.00.

Recommendations of Research

1. These banana fiber-based products are environmentally friendly. Therefore, supplementary materials to reinforce the structures should be in line with product types.

2. From the research findings, there are only two weaving designs, twisting and transparent pentagon, and they are the ones the elderly are able to do. It is thus recommended that they be trained to create other designs to apply to producing more diverse designs and products.

3. Transportation should be considered during the product development because these products are attractive for tourists and foreigners.

4. The fibers should be considered during the products, so that suitable methods can be applied to develop other product types.

5. An investigation on the guideline to improve the quality and standard of the banana fiber-based products should be carried out, so that they can be in line with the needs of domestic and international markets in order to increase distribution opportunities in the future.

6. There should be a study on dyeing Gros Michel banana fibers with other natural dye extracts, e.g., bark from Broken Bones trees and Myrobalans, Sappan wood, and turmeric, so that shades are diverse enough to provide more alternatives to consumers.

7. There should be a SWOT analysis of the elderly in order to find a guideline to improve and develop research studies that are able to solve community problems in a multi-dimensional manner.

8. There should be an investigation on the development of diverse banana fiber-based products, such as, furniture, attire, or eating utensils. This will provide consumers more alternatives to buy and it will be a guideline to expand marketing opportunities for natural fibers.

New knowledge and the effects on society and communities

This wicker product development based on Gros Michel banana fibers with natural dyes provides another career for the participating elderly. The discarded fibers after harvest were undergone a fiber separating process by using a semi-automatic machine. They were then dyed with natural pigments. They can absorb the dyes better than the sun-dried fiber bands. The colors are relatively bright and fast. Twisted bundled fiber bands are able to weave into products. As a consequence, not only does exploiting the fibers use for wicker production, but they can also be applied to developing other products by using other methods like weaving and embroidery. The developed products in this study are based on a new locally available material in order to add more values to them. The community is also able to find a way to manage agricultural waste and to exploit it for optimal benefits. This practice can create more jobs and incomes at the household and community levels, driving the community economy better. Futuremore, the community is able to depend on itself sustainably. They can also transmit this knowledge to neighboring communities. However, to sustainably drive the economy with handicraft, it requires cooperation from concerned agencies and state offices by formulating visions and strategies to strengthen the efficiency of integration and development of local handicrafts, so that community economy can grow and be developed sustainably.

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