

Woven fabrics colored with natural pigments: Innovation for sustainable community Sam Sung subdistrict, Khu Kham district, Khon Kaen

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Abstract - The community lifestyle of Sam Sung subdistrict, Khu Kham district, Khon Kaen province is identical to the Thai concept of weaving as a way of life passed down from generation to generation. There is a rich lineage of the craft of weaving, which preserves the community's individuality. The majority of the group's members are elderly women who have been finished from farming and other forms of agriculture in order to create hand-woven cotton silk, which provides an additional 1,000-2,000 baht per month for their families. The textiles are woven in 2 x 2 meter and 2 x 4 meters sizes per piece, as well as scarves. As chemical colors are readily available, woven cotton silk is frequently colored with them. It is straightforward to make and obtain the desired hue, withstanding the tendency toward environmental preservation and optimal utilization of natural resources. Therefore, weaving using natural dyes has had a significant impact on the Thai textile sector. Therefore, when the group learned from the experts of Maharakham University how to use natural materials to color fabric, it was a significant step forward. Organized training sessions with group members and

collaboratively developed new and gorgeous cotton silk dyes. Additionally, it does not harm the environment. It is a product called “Natural Colored Clothes” that adds value to the cotton silk products that the business previously manufactured. It can earn roughly twice as much revenue as its predecessor and expand internet marketing channels. (Online Marketing) increases the number of customers. In addition, the Ban Khu Kham Hand-Woven Fabric Group intends to collaborate with the University to diversify product processing in the future. Such include purses, hats, clothing, work attire, key chains, and hairpins. This will ensure the ongoing viability of Ban Khu Kham’s hand-woven cloth group.

Keywords: Dyed Clothes, value-added, online marketing, fair price, sustainability

1. Origin and importance

Clothing is one of the most important aspects of human existence. The majority of garments are made from natural or synthetic fibers, such as silk, cotton, wool, etc., or natural or synthetic fibers, such as nylon, polyester, etc. If these fibers also originate from nature, they will be quite light in color. The creation of clothing may not be exceptional or as intended. Therefore, in order for these fibers to form the required pattern, it is necessary to add color to them, a process known as dyeing. The material used for dyeing can be either natural or synthetic, which adds value to the fibers.

With a growing concern for the environment, the use of natural-dyed materials is becoming increasingly popular. Utilization of more natural roots Therefore, the reuse of resources is an extension of natural colored woven fabric products ; yet, there is still a long way to go. Community enterprises weaving in Khu Kham Subdistrict, Sam Sung District, Khon Kaen Province, have emerged from the gathering of female villagers who are unemployed from farming or other agriculture and wish to earn supplemental income during a time when agricultural produce is not yet for sale. Most of them are senior weavers of colored fabrics. Around 50 to 60 years old, their ancestors taught them the weaving method, including fabric design, tying, weaving, and dyeing, frequently utilizing fresh chemical dyes to achieve the desired hue quickly. It is readily accessible and widely available on the market, but the difficulty is that environmental pollution, such as effluent from chemical dyeing, renders agricultural water sources unsuitable. The accumulation of harmful residues induced by chemical dyeing degrades the health of producers that utilize chemical paints. Some of them exhibit such severe symptoms that they cannot live normally. Therefore, the solution is to use natural materials. In addition to resolving the problem of hand-dyed hand-woven garments in the Ban Khu Kham village, this solution is capable of consistently generating additional cash for the community.

In addition, the ability to create a unique, beautiful fabric pattern differs from that in the past. It will also make hand-woven textiles dyed with the natural hues of The Khu Kham House acceptable and in high demand. The university will convey the four-tapered weaving technology to the community in order to increase the added

value of the community's products. This project is an innovation that complements the community's way of life. It also receives support and collaboration from government agencies such as district agriculture, bailiffs, community development, hospitals, etc. village headman, chieftains of all clans, and allied agencies such as the Sub-District Administrative Organization (S.A.T.) Khu Kham. This is to facilitate the growth of community-based goods and services. Create jobs and careers for residents of the community. Community environmental pollution problem resolution and knowledge sharing for production process enhancement. This will allow the commercial community of Ban Khu Kham to grow sustainably persists.

2. Objective

For professional growth and the improvement of OTOP products in the Khu Kham subdistrict of the Sam Sung district, Khon Kaen. There are universities in the vicinity that provide system integrators. To strengthen the community as a whole.

3. Processing time period

During 1 February - 31 December 2021

4. Target audience

Member of the Khu Kham subdistrict, Sam Sung district, Khon Kaen community.

Project implementation

Yanin Tangpinyoputtikhun *et al.* (2021) of the Faculty of Accounting and Management at Mahasarakham University have been permitted to conduct an integrated sub-district economic and social upliftment project (1 sub-district, 1 university). Mahasarakham University 2021 under the OTOP Career Development and Product Upgrading Project for the economic and social development of the Khu Kham Subdistrict, Sam Sung District community. Khon Kaen Due to the COVID-19 pandemic in 2021, the project chair convened a discussion and planning meeting with the research team members to establish the activities and locations to carry out the planned activities to achieve the objectives, which can be characterized as two phases for a total of four activities. Consequently, the first phase was implemented in April 2021, which included: 1) training activities for the application of natural dyeing in compliance with Community Product Standards (MIT). and 2) workshops to manufacture horse whites and shawls using the four-skew technique of natural dyeing. In October 2021, subsequent activities included 3) manufacturing cost calculation seminars and 4) online marketing workshops. Khon Kaen and related government entities must be capable of meeting the demands of the region in a suitable manner. It can successfully manage local resources and produce

extra cash for the community and society. To be sustainable, this means conserving the environment in the community.

Workshop activities foster cooperative thought. Cooperative Thinking for the same purpose of the activity in order to assess the problem and provide solutions jointly, it is an exchange of learning among group members with the objective of attaining the defined goals. The principle is a sort of brainstorming that can be applied to the spatial creation of academic service projects that institutions transfer to the community efficiently. As exemplified by the university's "Phahunang Pandito Chiwe" philosophy, "Wise People should be for the public," the university's expertise and guiding principles are essential to the development of innovations that improve the quality of life of local community members. As a system integrator for OTOP in Khu Kham Subdistrict, Sam Sung District, Khon Kaen Mahasarakham University serves. Together, in an effort to develop the community, they initiated upstream operations that enhanced the production process of hand-woven garments by dyeing with natural ingredients and weaving with a four-tap technique. This includes downstream activities in which knowledge of the cost of production for community goods or services can be utilized to determine appropriate sales pricing. and internet marketing strategies that will allow community products or services to be distributed more rapidly and broadly to customers.

5. Summary of project implementation and key indicators

Implementation of activities in accordance with the Integrated Sub-District Economic and Social Upliftment Project (1 Sub-district, 1 University) of Mahasarakham University for the year 2021, funded by the Ministry of Higher Education, Science and Innovation (UAW). The province of Khon Kaen has split its activities into the following four categories:

1) Training in the use of natural dyes in compliance with community product standards (MIT) and OTOP

Mahasarakham University has organized training for the community by inviting speakers with expertise in dyeing silk or cotton with natural materials such as lacquer, macaque, khe, indigo, eucalyptus, etc., who have conducted training for existing Ban Khu Kham community members. To be able to make cotton silk that has been naturally colored. Using chemical paints, change the color of the fabric from what it was. It is a value-added product that satisfies the needs of the current market really well. With the push toward nature conservation, reduce environmental pollution. It also conforms to the favorable market trends for Thai hand-woven silk.

Natural pigments such as red, dark yellow, bright yellow, and light yellow can be utilized to create the appropriate hue. Indigo produces blue-blue, eucalyptus produces gray-black, etc., and mixing many colors produces new hues, such as red lacquer mixed with yellow khe to create vivid orange. The red from the shellac mixed with the black-gray color from eucalyptus will be dull green, etc., where the intensity or

lightness of the resulting color will depend on the color mixture, or the proportional weight of the color will be more prominent, for example, if you wear more shellac than khe, you will get a reddish-orange color, but if you wear more shellac than khe, you will get a yellowish-.

There are additional strategies for creating new hues by combining different substances. As a component of the dyeing process, it will also provide a wider range of unexpected colors, such as purple when rusty water is used to dye silk or cotton that has already been dyed. If you desire a little amount of rusty water, however, a larger amount of rusty water will produce a richer purple hue. Alternatively, you can use alum juice by dissolving alum in clean water for 10 minutes, then mixing it with the lacquer and pink-dyeing silk or cotton. If you desire a light pink hue, increase the quantity of alum juice or reduce the amount of lacquer, for instance. One can create rusty water by soaking nails or iron in water. And if you want the iron to rust more quickly, you can use vinegar-soaked water instead of plain water to obtain rusty water for use in the dyeing process more quickly. (Boontawee, 2022) In addition, crumpling or soaking silk or cotton in natural coloring water for varying amounts of time or repeatedly using the same hue. It will also alter the color intensity of cotton and silk. By crumpling or soaking with a longer duration, it becomes darker, but this should not exceed a half-hour into each dye to provide silk or cotton of equal hue, which will be related with the change in temperature during dyeing.

These procedures help to color silk and cotton strands such that they are distinctive, uncommon, and distinct, and they can be weaved into fabrics for sewing or scarves. Various sizes of shawls can be created. It is a novelty for the silk and cotton items of the neighborhood. The project also incorporates branding or branding for marketing purposes based on a community's identity. And persuaded the Ban Khu Kham Textiles Group to embrace natural colored woven fabrics in order to apply for community product standards (NCPO) and OTOP in order to establish more customer trust and credibility. The product's worth is widespread and widely acknowledged. It will have a favorable effect on the community's sustainable income generating.



Figure 1. Various silk colors derived from natural materials in natural dyeing activities



Figure 2. The preparation and dyeing of silk with loops



Figure 3. Crumpling and immersing silk in water containing natural dyes



Figure 4. Silk strands being washed with clean water



Figure 5. Bamboo railing aeration after dyeing



Figure 6. Separating silk strands after dyeing by jerking or pulling the strands



Figure 7. Members of the community after completing the natural dyeing operation

2) The workshop manufactures horse whites and shawls using the quadrilateral process with natural dyes

Dei taught members of the Ban Khu Kham weaving group the four-taped weaving technique he learned from experts at Mahasarakham University in order to produce woven fabrics. A variety of horse whites and shawls with a distinct look. It has a characteristic embossing effect from the woven fabric, enhancing the visual appeal of hand-woven cotton silk. It is capable of fetching a greater price. Continue generating additional cash for communities and groups. The production of hand-dyed natural-dyed fabrics with the four-hook technique necessitates a structure with a different number of weavers than the preceding two-woven fabric, with the number of sticks increasing to four (according to the number of nails). Weavers must be extremely attentive and focused on the weaving process.

4-tap weaving generates a pattern on the fabric by raising more than one silk thread to create an enlarged pattern against the standing line, so creating an embossed height from the surface of the woven fabric. When touched, the fabric's embossing becomes more beautiful than the original patterned fabric, so increasing the fabric's worth. It is capable of fetching a greater price. Regarding the design of the pattern, it is up to the weaver to determine how the fabric's pattern, such as the Mahasarakham regional pattern, would appear. The Saket design is the pattern of the province of Roi-Et, while the watermark resembles the provincial stripe of Nan. It takes more time to weave a 4-sak than a standard one, but the result is a more beautiful canvas that can be sold for a higher price than a typical one, especially if the patterns and colors are rewarded with a promise of beauty.



Figure 8. Preparing standing lines, connecting firewood to a couple of them, and preparing stepping sticks prior to weaving



Figure 9. Combing teeth in preparation for weaving (hundreds of fumes)

3) Workshop exercises for calculating production cost It involves educating on the concepts and principles of production cost calculation

The composition of production cost calculation is separated into three parts: direct material, direct labor, and overhead costs, in order to accurately identify the cost of manufacturing each product and its selling price. It can also be used to plan the profitability of both short- and long-term communal enterprises (Budsali, 2022).

For the production of hand-dyed silk of this natural hue. Silk is the most essential and significant direct raw resource, originating from the silk cultivation and silk maidens of the community. Consequently, purchasing direct objects is relatively inexpensive (Benjapa, 2010). However, if it takes a particular length of time to raise silk in order to acquire high-quality silk fibers, the variety of silk will determine its quality. Food consumed by silkworms Care and cleaning of cocoons, as well as silk shedding, will involve intricate procedures. Here, only the acquisition of high-quality silks may be utilized for natural dying, so that the market-desirable, high-quality natural-dyed silk products can be offered at a considerably greater price than before. Consequently, the direct estimation of the cost of raw materials is comparable to the cost of purchasing silk from a third party. The amount of silk required to weave one piece of silk is approximately 1 kilogram, which, if acquired from abroad, would cost approximately 2,000 baht per kilogram.

Compared to the law-mandated minimum wage rate of 300 baht per day, the majority of the cost of direct labor is incurred by female enterprises that are excluded from farming. With each silk weaving taking approximately one week or seven days, the cost of direct labor is calculated to be approximately 2,100 baht per piece. For production costs, there are various costs associated with weaving silk that are not direct raw materials and direct labor costs, such as dyes, water, electricity, and other consumables such as soap, salt, rusty water, etc., with an average estimate per fabric weaving of 500 baht, so the total cost of producing 1 piece of hand-woven silk is approximately 4,600 baht.



Figure 10. Instruction in production cost computation

4) *Online marketing workshops*

It gives information and comprehension regarding the use of tools to develop the Website in a variety of methods, including supervision of the individual responsible for the Website. This will be utilized to make online community items and products accessible. This increases the community's products' visibility and acceptance among consumers. This expands the distribution channels for locally made goods. At some seasons, like as New Year's, it was formerly sold exclusively at community markets or government-sponsored festivities. Lent and Lent, etc. are regarded as successful distribution methods. It is also the community's introduction of new products, which is a perpetual public relations and marketing endeavor. Locally made goods can be sold to a wider audience. This is accomplished through a variety of distribution channels, including Facebook pages and line offices, which can raise the community's income in another way and should continue to be effective in the future.



Figure 11. Online Marketing Training

6. Discuss the results and suggestions

1. Enhancing the quality of cotton silk production through natural dyeing and weaving using the four-taper process distinguishes ban Khu Kham's hand-woven cotton silk products from those of others, and expresses the individuality of the community to which the tale has been passed down for generations. The Thai silk market is quite competitive. Currently, naturalness and environmental conservation are on the rise. It is gaining recognition and popularity among people worldwide. Since ancient times, Thai cotton silk fabrics have been regarded as renowned goods. Every stage of the production process is carried out with great care in order to produce fabrics of exceptional beauty and value. Dresses, handbags, shoes, packing boxes, handkerchiefs, and so on.

2. The future development of cotton silk may necessitate the incorporation of a modern design method in order to better accommodate the present generation of youthful consumers. In the past, the manufacture and distribution of cotton silk was aimed mainly at adult consumers of working age. And if you wish to broaden your market to include teenagers. A contemporary blend of innovation and technology is required. Thai cotton silk is likely to have a brighter future if adjustments are made to a product that resonates with the younger generation (Gen Z).

A partnership

The synergy between the community and the university generates benefit for both the community as a whole and the university. Expanding knowledge and sustainability that can be transmitted to the following generation of children and grandkids.

Mutual advantages for all stakeholders

Positively impacting both the community and the university is a very satisfying consequence. The community gets new knowledge to build market-competitive products. The basis of the Thai economy, the university has a robust network for future self-sufficiency.

Information exchange and scholarship

The implementation of this project has resulted in mutual education among the project's personnel. Communities, government agencies, and other stakeholders in the creation and development of standards-compliant community products and services. ensuring widespread approval Add marketing channels Promote marketing through a wider variety of media Specifically, internet marketing is provided via a variety of channels, including Facebook pages, line offices, Instagram, etc. This raises the number of clients. Produce income for the community The professors in charge of the project might use its activities and outcomes to create and publish research papers in numerous subjects. Create academic works that assist the nation, as well as a network of government agency cooperation. Other relevant community agencies aspire to continue community development.

Quantifiable social impact

This project's actions have numerous good effects on the community, including the improvement of the quality of their own products. It adds value to the product itself, comprehends the correct product costing, and may estimate the suitable selling price more accurately. This involves expanding marketing channels that target new clients via online media, enabling the community's products to be sold globally. In addition, a tourism route that will help the town in the future might be developed by considering the community's points of interest.

7. Benefits

1. Natural materials that do not harm the environment are used to add value to hand-woven fabric items, which are then sold for a premium.
2. Collaboration between the community and the university to enhance one's knowledge in order to achieve constant improvement.
3. Developing a government-wide partnership network Private & Public Sector In creating the nation based on Thailand's foundational profession. It may contribute to sustainability. In addition, the country's stability has persisted.

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