

# Development of Mudmee silk patterns from community stories and natural dyeing: A case study of a community enterprise for growing mulberries and raising sericulture, Ban Bua Kaew, Kut Rang District, Maha Sarakham Province, Thailand

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**Abstract** - Academic article on Development of Mudmee silk patterns from community stories and natural dyeing: A case study of a community enterprise for growing mulberries and raising sericulture, Ban Bua Kaew, Kut Rang District, Maha Sarakham Province, Thailand. It has two objectives: to design and develop Mudmee silk patterns from community stories that reflect the identity of the Ban Buakaew Sericulture Community Enterprise Group; and promotes learning about natural dyeing and developing prototype products according to the standards of the Sericulture Department. Data collection methods include surveys, interviews, group discussions with local leaders, community leaders, key informants and community enterprise group members and bring all the information into developmental activities which divided into 3 phases: upstream, midstream, and downstream activities. The results of the study found that the community has outstanding social and cultural capital. Community enterprise members can take the aforementioned social and cultural knowledge to design and develop two patterns of Mudmee silk, namely (1) the Naga Chern Bua Kaew pattern and (2) the Bua Kaew pattern, and dye the silk with available natural materials in their own locality, such as the red soap tree, Cassia tree, lacquer, coconut shells, etc. In addition, some of the silk has been taken to increase quality by making plasma. After that, the silk was woven into prototype products, which are (1) a Naga Chern Buakaew pattern and (2) a Naga Chern Buakaew pattern birthday shawl and a Buakaew pattern sarong, and (3) a backpack product. The product has been certified to the Blue Peacock Brand standard from the Sericulture Promotion Center and can sell and create more income for members.

**Keywords:** Mudmee silk patterns, community stories, natural dyeing, community enterprise, growing mulberries and raising sericulture

## 1. Introduction

The Ban Bua Kaew Community Enterprise, located in Loei Faek Sub-district, Kud Rang District, Maha Sarakham Province, is a group formed to cultivate mulberries and raise silkworms within their community. Registered under the Community Enterprise Promotion Act, B.E. 2548 (2005) by the Kud Rang District Agricultural Office (Udom Upawong, 2023: Interview), the group members cultivate mulberries, raise silkworms, produce silk threads, and sell their products collectively to prevent price suppression from middlemen. On March 6, 2020, they received certification for good practices in the production of raw silk threads, specifically hand-reeled Thai silk threads (Anong Faising, 2023: Interview). Currently, the group has 46 members, with 17 meeting the standard for silk thread production (Jarunee Upawong, 2023: Interview). They work either individually or collectively, depending on suitability, and can raise silkworms seven times a year (Somwang Upawong, 2022: Interview). They sell raw silk threads for up to 1,500 baht per kilogram, and if the silk meets the standard, the price is 1,700 baht, with a recent increase to 1,750 baht per kilogram (Stat Buaparn, 2023: Interview). The group's production capacity has historically focused on raw silk threads.

The Faculty of Humanities and Social Sciences at Mahasarakham University has implemented a community service project through the Integrated Sub-district Economic and Social Upgrading Project. This initiative promotes learning about natural dyeing and the design and development of unique Mudmee silk patterns that reflect the community's identity, utilizing local wisdom derived from community history, beliefs, religion, traditions, and local culture. Additionally, the project supports the development of prototype products, which have successfully achieved the Silver Peacock Standard from the Department of Sericulture.

Currently, the Ban Bua Kaew Community Enterprise has a need to further develop products from naturally dyed silk to create new items that reflect the community's identity, meet quality standards, and enhance the value and worth of these products. This effort aims to help the community increase income, reduce expenses, and allocate part of the revenue generated from these products to fund the sustainable management of the community enterprise, in line with the United Nations Sustainable Development Goals (SDGs) and the Bio-Circular-Green (BCG) economic policy. This is a key reason for the implementation of the current academic service project.

## 2. Objectives of Study

2.1 To design and develop Mudmee silk patterns inspired by community stories that reflect the identity of the Ban Bua Kaew Community Enterprise, which focuses on mulberry cultivation and silkworm farming.

2.2 To promote learning about natural dyeing and develop prototype products in accordance with the standards set by the Department of Sericulture.

### 3. Materials and Methods

#### 3.1 Method of study

The implementation of this academic service project is divided into three phases: upstream activities, midstream activities, and downstream activities. The steps and details are as follows:

##### 3.1.2 Activities in the upstream

The project involves studying the area context and history of the community, including beliefs, religion, traditions, and local culture. It also covers the history of the establishment, capabilities, and activities of the Ban Bua Kaew Community Enterprise for mulberry cultivation and silkworm farming in Loei Faek Sub-district, Kud Rang District, Maha Sarakham Province. This study will be conducted through field surveys, creating a community map, and documenting the mulberry cultivation and silkworm farming wisdom of the 46 members.

##### 3.1.2 Activities in the midstream

Plan a spatial operation in collaboration with group members to study the historical narratives of the community, analyze the group's needs, and integrate design knowledge for silk patterns. This includes using plasma coating technology from Mahasarakham University and conducting natural dyeing operations using distinctive local materials. Additionally, the process will involve traditional Mudmee pattern tying and silk weaving.

##### 3.1.3 Activities in the downstream

Transfer the knowledge through training workshops, practical exercises, development, modification, and prototype product creation using naturally dyed Mudmee silk patterns. Additionally, conduct quality assurance activities to seek certification standards from the Silk Promotion Center in Roi Et Province.

#### 3.2 Data analysis and presentation of study results

To analyze the field data gathered from interviews, subgroup meetings, training activities, and relevant documents, a comprehensive approach is needed. Firstly, categorize the information into key themes such as community history, beliefs, local culture, silk production processes, and market trends. Then, identify patterns, trends, and challenges within each theme. Utilize this analysis to inform the design and development of Mudmee silk patterns, natural dyeing techniques, and prototype product creation. Additionally, consider the feedback and suggestions from community members to ensure that the designs and products accurately reflect their identity and needs.

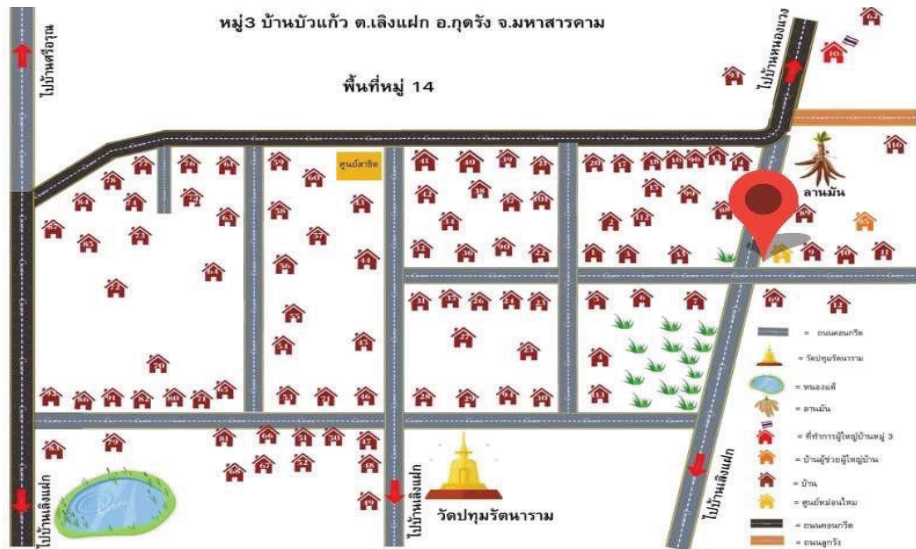
## 4. Results of study

For the study outcomes, they can be divided into 3 phases according to the activity process as follows:

### 4.1 Upstream result:

Ban Bua Kaew is an agricultural community whose primary occupation is farming, cultivating various crops such as rice, sugarcane, and cassava. The community follows the Hiet 12 traditions and predominantly practices Buddhism, as evidenced by the name “Bua Kaew,” reflecting the geographical features of the area, characterized by a pond with lotus flowers symbolizing beauty and goodness, which are associated with the worship of the Buddha and moral principles. Lotus flowers, emerging above the water’s surface to receive sunlight, symbolize liberation from suffering and enlightenment. Additionally, the term “Kaew” signifies faith in Buddhist principles, referring to the Dhamma Pitaka (Prayut Payutto, 1972), which categorizes individuals into four types: those with quick intuition, intellectuals, trainable, and those who have basic knowledge. “Kaew” also alludes to local beliefs related to the Naga deity, a cultural belief in the Isaan region. This reflects the community’s location near water bodies and signifies the fragrant and abundant Kaew flower prevalent in the area (Dhammapada (Piyut Payutto), 1972).

Furthermore, the community also engages in mulberry cultivation and silkworm farming by forming a community enterprise. On March 6, 2020, they received certification for good practices in raw silk production, specifically hand-reeled Thai silk, with 46 community members joining the community enterprise. Among them, 17 members meet the standard for silk production. Members can either work on their private land or at home but collectively sell their produce to prevent price manipulation from middlemen. In case of issues, members can share knowledge and problem-solve through learning exchanges or consultations with the Silk Promotion Center in Maha Sarakham Province. Presently, the community enterprise cultivates a hybrid variety of yellow mulberry from Sa Buri, which is a crossbreed between Thai and foreign varieties, known for disease resistance, quality, and increased yield. This variety typically yields yellow or off-white silk cocoons, such as those from Thai breeds mixed with Chinese or Japanese breeds.



**Figure 1.** Community area and location of the community enterprise growing mulberries and raising sericulture, Ban Bua Kaew.



**Figure 2.** cocoon and cocoon assorting Sorting

## 4.2 Midstream result:

The production of silk threads in the community enterprise involves each member processing silk cocoons to separate the shell layer, outside-waste, and inside-waste, following traditional weaving methods. These threads are then categorized into two types: “warp” and “weft” threads, and further classified into four types based on local names, which are:

1) “Broken silk threads” or “bark silk” are silk threads obtained from the outer layer of the cocoon. They have large sizes, irregularities, and rough textures due to the presence of a lot of silk glue. After the broken silk threads are removed from the cocoon, the cocoons are then taken out of the boiling pot and left to rest. Then the cocoons are used for spinning or in various ceremonies, especially in weaving as warp threads.

2) “Splintered silk threads” are silk threads obtained from the process of reeling together both the floss and the outer fibers of the cocoon until the inner fibers are completed in one process without separating the layers of silk. The resulting silk threads thus contain both broken silk and fine silk combined together. As a result, the silk threads are not smooth, rough, and have uneven sizes.

3) “Fine silk threads” or “silk filaments” are silk threads obtained from the inner layer of the cocoon after removing the broken or bark silk. The cocoons are boiled in water before the silk filaments are reeled. The resulting silk threads have smooth, consistent characteristics and are golden yellow in color. When woven into fabric, the texture is soft, smooth, and has excellent elasticity due to the high quality of the silk threads. The silk threads are sticky and can be used to make both warp and weft threads.

4) “Lingering silk threads” are silk threads found in the innermost layer of the cocoon, almost reaching the silkworm pupa. These silk threads are small in size, hence the name “lingering silk.” In the past, villagers preferred to reel silk in the morning. After extracting the fine silk threads, they noticed that more silk threads could still be obtained from the cocoon. They then boiled the cocoon again and extracted more silk threads, typically done in the evening or during the late hours of the day. This process became known as “lingering silk,” and the silk obtained from it is often used to weave into white cloth.



**Figure 3.** Collecting silkworm cocoons from baskets; silk reeling



**Figure 4.** Mai Noi -little silk or silk thread; Mai Lang

As for the design and development of patterns reflecting the community's identity, speakers and group members collectively analyzed and suggested creating fabric patterns based on the community's history, culture, and distinctive traditions to enhance unique fabric patterns and select colors according to the group members' preferences. The group members collectively chose three colors: pink, light pink, and purple. The fabric patterns consist of lotus flowers, glass flowers, and the principles of Buddhism, as well as cultural and traditional elements reflecting the community's way of life and beliefs. Two fabric patterns were designed: (1) Lotus in Glass and (2) Inviting Lotus in Glass.



**Figure 5.** Bua Kaew pattern; Nak Chern Buakaew pattern

After obtaining the silk threads, they were subjected to a plasma spraying process by the Faculty of Science at Mahasarakham University. This process endowed the silk threads with properties such as antibacterial resistance, water repellency, and good air permeability, ensuring that the colors dyed from natural materials remained vibrant for

a longer period. Subsequently, the community enterprise group proceeded to weave the silk threads into patterns as designed.



**Figure 6.** Mudmee - silk bookin

Once the weaving was complete, the silk entered the natural dyeing process, primarily using various parts of plants such as bark, leaves, fruits, stems, roots, and even wood, including substances like shellac from the krang tree, fresh coconut shells, bellyache bush, and eucalyptus bark and leaves. There are different methods for preparing the dye and dyeing process depending on the type of plant and its parts used. This process typically takes about a week.



**Figure 7.** Bleaching of silk and drying silk before dyeing



**Figure 8.** Silk dyeing and drying

For the verification and certification of natural dyeing standards, the community enterprise group will submit fabric samples for quality inspection of natural dyeing to obtain certification standards from the Silk Promotional Center, Mahasarakham University. If they meet the standards, they will receive certification to use the “Nok Yoong” standard label.

### 4.3 Downstream result:

The innovative knowledge collaboration between university and external researchers has led to the development of two silk patterns that reflect the community's identity and incorporate these concepts into the design of silk patterns. The details of both patterns are as follows:

1) The “Naga Inviting Bua Kaeo” pattern consists of the following elements:

- The lotus flower symbolizes the name of the village or is it a symbol in Buddhism. The lotus flower emerges from the water, representing the teachings and guidance of Buddhist principles. Additionally, with a pagoda atop the lotus, it reflects the beautiful cultural and traditional customs within the community.

- The Naga is a celestial being of water, symbolizing abundance and fertility.

- “Crystal ball” or “gem” here symbolizes beauty and goodness.

- “Water” signifies tranquility and calmness. Additionally, Ban Bua Kaeo has a tradition called “Boon Bang Fai,” which is related to water based on the community's beliefs and customs.

Therefore, the “Naga Inviting Bua Kaeo” pattern symbolizes a community with sacred protection, preserving its culture, beautiful traditions, and values for a peaceful and serene way of life.

The “Lotus Bua Kaeo” pattern consists of a lotus flower surrounded by a lotus bud, symbolizing

- The “Lotus Bua Kaeo” pattern features lotus flowers blooming, symbolizing the name of the village or representing a religious symbol. The lotus flower emerges from the water, symbolizing the principles and teachings of Buddhism. As for the lotus bud, it signifies purity and openness, reflecting the community’s pure-heartedness and openness in practicing the Buddhist teachings.



**Figure 9.** Mudmee silk with Naga Chern Bua Kaew pattern and Bua Kaew pattern.

Once the design and development of the silk patterns were completed, the members bundled and dyed both patterns using natural dyes before proceeding to the weaving process. Simultaneously, at certain intervals, members engaged in additional dyeing activities while also tending to the silkworms for the next cycle. This is because the weaving process typically spans several months to complete.

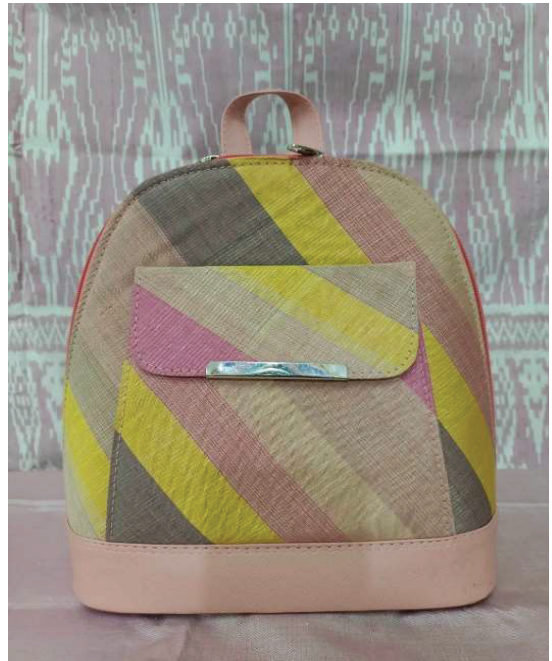


**Figure 10.** Silk reeling and silk weaving

From the results of weaving silk fabrics bundled and dyed with natural colors, the group has obtained “prototype products,” including (1) 7 pieces of silk shawl with the pattern of “Naga inviting the glass lotus” and (2) 7 pieces of birthday shawl with patterns of “Naga inviting the glass lotus” and “glass lotus”, meeting the standard of the blue peacock emblem from the Silk Promotion Center, Mahasarakham, and (3) 32 sets of backpacks made from naturally dyed silk fabrics. The group has successfully produced and can generate income for its members with these products.



**Figure 11.** Birthday shawl with Bua Kaew pattern



**Figure 12.** Natural dyed silk backpack



**Figure 13.** Naturally dyed Mudmee silk sarongs and shawl

## 5. Conclusion and discussion

For the initial phase of knowledge acquisition, this academic service project aims to answer the question “What are the community’s resources and potentials, and what are the actual needs of the community enterprise in mulberry cultivation and silk production?” Activities in the upstream phase involve surveying the area, studying the community’s history, and understanding the genuine needs of the community enterprise group. This helps in understanding the culture, traditions, and way of life of the community. However, this process involves various groups of people such as community members, local leaders, local experts, group members, and monks. Therefore, it requires approximately 1-2 months to execute. Proper planning is essential to ensure that the overall operation is not adversely affected.

During the midstream phase, the activity involves synthesizing the community’s knowledge, including its history, beliefs, Buddhism, customs, and local culture, to design and develop silk patterns that reflect the community’s identity. This includes designing two silk patterns: (1) “The Inviting Naga and Bamboo” pattern and (2) “Bamboo” pattern. This process requires interpreting and analyzing data meticulously before proceeding to tie-dye and dye the silk patterns using natural materials available in the community, such as Bellyache bush, ironwood, shellac, coconut shells, and others. In the downstream phase, the focus is on developing the tied and dyed silk into prototype products.

From this process, the community enterprise group of Bua Kao, which focuses on cultivating and nurturing silkworms, has gained new knowledge. They have utilized this knowledge to develop their own group, aiming to enhance the value of their silk production. Group members have learned and developed themselves into experts in silkworm cultivation and silk production stages, starting from the upstream phase of silkworm cultivation, through the midstream phase of producing high-quality silk threads, to downstream activities such as dyeing and weaving silk. Their expertise in silk production has enabled the group to excel in silk reeling competitions at the national level, winning first prizes. Additionally, they have mastered the art of natural dyeing and weaving, turning their handwoven dyed silk into various products, thus increasing both the value and significance of their work.

Therefore, it can be concluded that the community silk farming enterprise has developed new knowledge sets, including natural dyeing, silk pattern design, and the transformation of fabrics into marketable products. Additionally, it is observed that the members of the group have increased their expertise to the extent that they can now serve as instructors in silk farming.

As for the challenges and obstacles in implementing the project, it was found that the members of the community enterprise group have intermittent availability due to the need to care for the next generation of silkworms, as the group engages in silkworm rearing approximately 7 times per year. This intermittent availability poses a challenge to project activities. However, the solution to this problem lies in creating a

schedule for silkworm rearing within the group, aligning it with the project activities at different times. Most of the problems and obstacles are addressed through good cooperation within the group. The success factors of the academic service project include a deep understanding of the genuine needs of the community (needs) and continuous engagement in activities with the community, along with project monitoring, evaluation, and adjustment to fit the community's schedule or calendar. The hands-on involvement with the community ensures that the project aligns with the university's mission of "providing academic services to communities and society, enabling them to sustainably self-rely."

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