

# Sericulture community enterprises and grassroots economic promotion: A case study of Maha Sarakham Province, Thailand

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**Abstract** - The title of this academic article is “Sericulture community enterprises and grassroots economic promotion: A case study of Maha Sarakham Province, Thailand”; Which has 3 objectives; that is, (1) to survey information and operations of the sericulture community enterprise group in Maha Sarakham Province; (2) to study the potential, wisdom, activities and operations of the Sericulture Community Enterprise and (3) to assess the income from mulberry planting and silk raising activities of the target community enterprise members. The instruments used in this study were surveys, interviews, and focus group discussions. The target groups were the Ban Buakaew Sericulture Community Enterprise, Kut Rang District, and the Ban Hong Bua Pae Sericulture Community Enterprise, Yang Sisurat District, Maha Sarakham Province. The survey included 24 Sericulture Community Enterprises in Maha Sarakham Province and interviewed 17 members of the target Sericulture Community Enterprises.

The results of the study found that The Sericulture Community Enterprise in Maha Sarakham Province needs local government agencies to support at least 6 things, namely (1) Mulberry planting, (2) Silk farming, (3) Silk reeling, (4) Natural dyeing, (5) Product processing, and (6) Marketing. This academic service project has implemented training and development activities for group members in both locations to provide them with the knowledge to be self-reliant and sell products from silk farming and silk reeling, and to generate income for group members throughout the year.

**Keywords:** Community enterprises, sericulture, silk, grassroots economic, Maha sarakham

## 1. Introduction

Maha Sarakham Province is in the group of provinces in the central northeastern region, with the slogan “Isan Buddhist Monument, the home of civilization, valuable silk, Taksila City” (Royal Institute. 2020). Maha Sarakham Province has silk fabric with a garland pattern of betel nut flowers as the “provincial identity pattern” (Maha Sarakham Provincial Community Development Office. 2016). According to the basic information of the Office of the Permanent Secretary, Ministry of Agriculture and Cooperatives, information about sericulture in Maha Sarakham Province (Office of the Permanent Secretary, Ministry of Agriculture and Cooperatives. 2024) is that Maha Sarakham Province has 4,687 mulberry farmers, a planting area of 2,343.5 rai, divided into 27 groups of farmers producing silk under the Royal Peacock brand, 2 groups of Maha Sarakham Province standard silk yarn producers (GI), 2 groups of Thai Industrial Standards, (TIS), and 16 shops selling silk under the Royal Peacock brand. In addition, there are 112 mulberry smart farmers and 81 volunteer mulberry farmers.

This academic service project has 2 operating areas: the Ban Buakaew Sericulture Community Enterprise Group, Leing Faek Subdistrict, Kut Rang District, and the Ban Nong Bua Pae Sericulture Community Enterprise, Sang Saeng Subdistrict, Yang Sisurat District, Maha Sarakham Province. Both groups have received operational support from the U2T for BCG project during 2021-2022. For the sericulture community enterprise, Ban Nong Buapa Sangsaeng sub-district, Yangsisurat District, Mahasarakham province. It is a gathering of villagers since 2004, numbering 40 people. But at present, there are more than 200 members, most of whom sell raw silk, and some members make products from silk, such as silk scrubs and hand-woven cloth. For the Ban Buakaew Silk Community Enterprise, Leing Faek Subdistrict, Kut Rang District, Maha Sarakham Province, it was registered as a community enterprise under the Community Enterprise Promotion Act of 2005 on March 30, 2017. It has 46 members and 17 members have been certified for hand-spun Thai silk standards. The silk is made individually but sold together so as not to be undercut by middlemen and if problems arise, members can share knowledge and solve problems together.

Initially, this service project surveyed and collected information about community enterprises in Maha Sarakham Province and both sericulture community enterprises. It was found that both sericulture community enterprises grow mulberries and raise sericulture by producing silk thread and selling only raw silk at 1,700 baht per kilogram. As for bleached and twisted silk, it costs 2,800 - 3,000 baht per kilogram. In addition, both sericulture community enterprises have processed some of the silk into souvenir products to add value, such as backpacks, sarongs, shawls, guard bags, etc., making group members have Income increased.

However, growing mulberries, raising silkworms, reeling silkworms, and natural dyeing and processing of naturally dyed silk products It is also considered an essential need of the two sericulture community enterprises in developing the products from growing mulberry and sericulture, which will develop a career in producing quality silk, and produce standard products that can reflect the identity of the community that can add value and worth to the product more, which will increase income, reduce expenses, which

such income is considered to be a promotion of the grassroots economy and is linked to 17 Sustainable Development Goals (SDGs), 3 items: (1) no poverty (2) decent work and economic growth and (3) responsible consumption and production Which will be able to create the project's key results, namely: Creating an impact on the community, solving spatial problems, creating model communities, creating social innovation, and creating additional value or value for the community.

## 2. Objectives of study

- 1) To survey information and operations of the sericulture community enterprise group in Maha Sarakham Province.
- 2) To study the potential, wisdom, activities and operations of the Sericulture Community Enterprise Group in Maha Sarakham Province..
- 3) To assess the income from mulberry planting and silk raising activities of the target community enterprise group members, namely, Ban Bua Kaew Sericulture Community Enterprise and Ban Nong Bua Pae Sericulture Community Enterprise, Maha Sarakham Province.

## 3. Materials and methods

### 3.1 Material and methods of study

For the study tools of this academic service project, they consist of questionnaires, interviews, and focus group discussions. Methods of study are divided into three phases: upstream activities, midstream activities, and downstream activities. The steps and details are as follows:

#### 3.1.1 Activities in the upstream

The meeting to explain the academic service project and the objectives of the activities for the sericulture community enterprise groups and networks consisted of (1) surveying the information of the sericulture community enterprise groups in Maha Sarakham Province that are still in operation by using the questionnaire of 24 sericulture community enterprise groups in Maha Sarakham Province. (2) Community history and establishment of 2 target sericulture community enterprise groups, namely, the Ban Buakaew Mulberry and Silk Farming Community Enterprise, Leing Faek Subdistrict, Kut Rang District, and the Ban Nong Bua Pae Mulberry and Silk Community Enterprise, Sang Saeng Subdistrict, Yang Sisurat District, Maha Sarakham Province, to survey and assess the necessary needs for supporting the activities of the groups.

#### 3.1.2 Activities in the midstream

Study the potential and wisdom of members of the target community enterprise groups on mulberry planting, silk farming, silk reeling, natural dyeing, and product processing, and analyze and synthesize data to design activities to support community enterprise groups in the next phase.

### 3.1.3 Activities in the downstream

Organized activities to promote mulberry planting in the Ban Buakaew Mulberry Community Enterprise Group and expanded the mulberry planting area to Leing Faek Pracha Bamrung School by training 20 students to be the new generation of mulberry “heirs”, including organizing a short-term mulberry course, silk farming training activities, silk reeling, and natural indigo dyeing according to the Sericulture Center’s standards, namely the Silver Peacock Standard and the Agricultural Cooperatives’ Standard, as well as activities to transform natural-dyed silk products for commercial use, such as bags, shoulder cloths, and bags according to the zodiac year. In addition, the Academic Service Project surveyed and assessed income from mulberry planting and silk farming activities of the member groups throughout the year.

### 3.2 Definition of specific terms

1) **Community enterprise** refers to the mulberry growing and sericulture group at Ban Bua Kaew, Loeng Faek Subdistrict, Kut Rang District, and the mulberry growing and sericulture group at Ban Nong Bua Pae, Yang Si Surat District Maha Sarakham Province, which carries out mulberry planting, sericulture, silkworm harvesting, natural dyeing and processing of silk products under the implementation of this academic service project.

2) **Sericulture** means raising silk worms to produce silk for the target sericulture community enterprise that raises sericulture approximately 7-8 times per year. The production of silk according to the Thai Agricultural Standard (TAS) consists of silk thread, little silk, and Mai Lang, which is the product of the silk reeling of only the group members.

3) **Grassroots economy** means the economic system of local communities, that can be self-reliant under the philosophy of sufficiency economy with mutual assistance of the target sericulture community enterprise group, including economy, society, group members, and cultural traditions That creates income from growing mulberries and raising sericulture about 7-8 times per year, which is income for a sustainable living.

### 3.3 Concepts and theories for study

#### 3.3.1 Concept of community enterprise

Community Enterprise means a community business related to the production of goods, the provision of services or other activities carried out by a group of people who are connected, share a way of life and come together to conduct such business, whether it is a juristic person in any form or not, to generate income and for self-reliance of the family, community and between communities. In short, it is an entrepreneurial activity to manage “community capital” creatively for self-reliance. “Community capital” here refers to capital, including resources, products, knowledge, wisdom, cultural capital, social capital. (Office of Trade Policy and Strategy, Ministry of Commerce. 2023). There are 2 types of community enterprises: (1)basic community enterprises, which involve production, processing, and various operations to eat for family use in the community to meet basic needs and (2) progressive community enterprises and (2) Advanced community enterprises, which are operations systematically

and in a modern format, using capital and technology to serve communities, networks, and markets at large. (Ministry of Agriculture and Cooperatives. 2015). Community enterprises have at least seven important elements: (1) the community is the owner and operator; (2) the products come from community processes, using mainly raw materials, resources, capital and labor in the community; (3) they are community-initiated and creative innovations; (4) they are a base of local knowledge, combining international knowledge; (5) they have integrated operations, systematically linking various activities; (6) they have a learning process at their heart; (7) they have family and community self-reliance as their goal.

### 3.3.2 Concept of Sustainable Development Goals (SDGs)

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity. The 17 SDGs are integrated—they recognize that action in one area will affect outcomes in others, and that development must balance social, economic and environmental sustainability. This academic service project is linked to three sustainable development goals (United Nations Development Programme, (UNDP). 2024):

1) Decent Work and Economic Growth; there are 8 goal targets, such as: Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries; and Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services etc.

2) Responsible Consumption and Production, and (3) Partnerships for the Goals; there are 12 goal targets, such as: Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production; and Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products etc.

3) Partnerships for the goals; there are 17 goal targets, which covers 5 main issues, namely finance, technology, capacity building, trade and systemic issues. Enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries

### 3.3.3 Concept of grassroots economic

Grassroots economic is the economic system of local communities; that can be self-reliant under the philosophy of sufficiency economy, with mutual assistance, morality, and an economic system that facilitates the development of other areas in the area, including the economy, society, people, communities, culture, environment, and natural resources strongly and sustainably. It is a horizontal economic system that

affects and creates both economic and social relationships between people in local communities. It is not just an individual vertical economy, but can create cooperation, opportunities and good relationships between the community's joint economy and the individual economy. It is an economic system that has the characteristics of partnership cooperation, creating relationships both in the local community and at other wider levels and outside. (community organization development institute. 2021). In the master plan under the national strategy for grassroots economy (Office of the National Economic and Social Development Council. 2024), it emphasizes on creating fairness and reducing economic and social inequality in the country in order for the country's growth to be sustainable growth through promoting the local community economy to be strong, competitive, and self-reliant, which will help raise the standard of living and well-being of people in the community to be better by creating value in the processing or making local identity agriculture that can create opportunities to access the new market, which the grassroots economy has important components. The grassroots economy has important elements (community organization development institute. 2021) such as (1) having a group; (2) managing the community's financial system; (3) having a comprehensive, up-to-date information system both internally and externally; (4) There is a community production system, both basic and advanced; (5) there is a system of living together, (6) there is morality and ethics; (7) there is common ownership, and (8) there are people in the community area who can participate, etc. This academic service project has been integrated this concept with the above two concepts in operating in an appropriate manner according to the local context and in line with the needs of the sericulture community enterprise group, in order to strengthen the community, there must be a working system and mechanism that includes elements from various sectors, both in the operating area, together with government agencies and agencies within Mahasarakham University. However, there must be a community organization process as the main element in operating activities from the upstream, midstream and downstream.

### 3.4 Data analysis and presentation of study results

To analyze and synthesize data from questionnaires, interviews, focus group meetings, training activities, using concepts and theories as a framework for evaluating activities, namely mulberry planting, silk farming, silk reeling, natural dyeing, and product processing, including evaluating the year-round income of members of the mulberry community enterprise groups in Maha Sarakham Province and the target mulberry community enterprise groups. All data was presented in a descriptive manner, combined with statistical analysis.

## 4. Results and discussion

This academic service project has studied and reviewed basic information about the mulberry planting community enterprise in Maha Sarakham Province in order to use the group's needs as a basis for carrying out activities by surveying basic information and separating it into 3 objectives as follows:

#### 4.1 Result of study

Objective 1: The results of the data survey and operations of the sericulture community enterprise group in Maha Sarakham Province found that:

**Table 1.** Group activities

Group activities	Number	Percentage
1 Mulberry planting	11	25.58
2 Silk farming	14	32.56
3 Silk production for own use	1	2.33
4 Raw silk selling	4	9.30
5 Buying silk from outside groups	13	30.23
<b>Total</b>	<b>43</b>	<b>100</b>

From Table 1, a survey of activities of the sample groups from the silk community enterprise in Maha Sarakham Province from 24 sample groups (more than 1 answer possible) found that there were 11 groups that planted mulberry; 25.58 percent, 14 groups that raised silkworms; 32.55 percent, 1 group that produced silk for its own use; 2.32 percent, 4 groups that sold raw silk; 9.30 percent, and 13 groups that purchased silk from outside groups; 30.23 percent.

**Table 2.** Sale channels

Sale channels	Number	Percentage
1 Sell by yourself	15	42.86
2 Online	8	22.86
3 Buying agents	2	5.71
4 Others	10	28.57
<b>Total</b>	<b>35</b>	<b>100</b>

From Table 2, a survey of sales channels of the sample groups from the Sericulture Community Enterprise in Maha Sarakham Province from 24 sample groups (more than 1 answer possible) found that 15 groups sold themselves; 42.85 percent, 8 groups sold online; 22.85 percent, 2 groups had purchasing agents; 5.71 percent, and 10 groups; 28.57 percent, had other sales channels such as old customers who had purchased, annual events, OTOP booths, booths at district and provincial events.

**Table 3.** Supporting needs

Supporting needs	Number	Percentage
1 Product development	4	16.67
2 Group/product logo design	4	16.67
3 Natural dyeing	15	62.50
4 Product packaging/box	1	4.16
<b>Total</b>	<b>24</b>	<b>100</b>

From Table 3, the survey of the need to support the sample groups of the silkworm community enterprise in Maha Sarakham Province from 24 sample groups (more than 1 answer possible) found that there were 4 groups that needed product development; 16.66 percent; 4 groups that needed group/product logo design; 16.66 percent; 15 groups that needed natural dyeing; 62.50 percent; and 1 group that needed product packaging/box development; 4.16 percent.

**Table 4.** Dyeing

Dyeing amount	Number	Percentage
1 Natural dyeing	4	21.05
2 Chemical dyeing	11	57.90
3 Both types of dyeing	4	21.05
4 Other	0	0
<b>Total</b>	<b>19</b>	<b>100</b>

From Table 4, the survey of dyeing of the sample groups of the Sericulture Community Enterprise in Maha Sarakham Province from 24 sample groups (more than 1 answer possible) found that there were 4 groups that dyed with natural colors; 21.05 percent, 11 groups that dyed with chemical colors; 57.89 percent, and 4 groups that dyed with both natural and chemical colors; 21.05 percent.

**Table 5.** Product types

Product type quantity	Number	Percentage
1 Sarong	19	43.18
2 Shirt	1	2.27
3 Shawl	10	22.73
4 Other	14	31.82
<b>Total</b>	<b>44</b>	<b>100</b>

From Table 5, a survey of the types of products in the sample group of sericulture community enterprises. In the area of Maha Sarakham province from a sample of 24 groups (more than 1 answer), it was found that there were 19 groups that weaved sarongs; 43.18 percent, 1 group that turned silk into shirts, accounting for 2.27 percent, and a group that made shawls. Shoulders, 10 groups; 22.72 percent, and groups that make other types of products such as sarongs, plain cloth, Mudmee cloth, etc., 14 groups; 31.81 percent.

From a survey of 24 community enterprises of sericulture in Maha Sarakham Province, consisting of (1) activities within the group (2) sales channels (3) support needs (4) dyeing (5) types of products, it was found that most were growing mulberry trees, raising silkworms, selling silk threads and distributing the products themselves. As for the needs of the community enterprise groups, it was found that most wanted support for natural dyeing and product development. The products that the community enterprise groups produced were sarongs and shawls, which have been certified with OTOP standards, Thai Industrial Standards, (TIS) and the Silver Peacock brand.

Objective 2: The result of the study the potential, wisdom, activities and operations of the Sericulture Community Enterprise Group in Maha Sarakham Province found that:

**Table 6.** General information on special abilities of the Ban Buakaew sericulture community enterprise

<b>Part 1. General information (Special skills)</b>	<b>Nnumber</b>	<b>Percentage</b>
1. Silk farming	13	25.49
2. Mulberry planting	16	31.37
3. Silk weaving	6	11.76
4. Natural dyeing	1	1.96
5. Silk reeling	11	21.57
6. Tie-dyeing	4	7.84
<b>Total</b>	<b>51</b>	<b>100</b>

From Table 11, from the general data survey on special abilities of the Ban Buakaew Mulberry Group from 17 sample members (more than 1 answer possible), it was found that 13 people, or 25.49 percent, were skilled in silk farming, 16 people, or 31.37 percent, 6 people, or 11.76 percent, were skilled in weaving, 1 person, or 1.96 percent, 11 people, or 21.65 percent, were skilled in silk reeling, and 4 people, or 7.84 percent, were skilled in tie-dyeing.

**Table 7.** Mulberry species

<b>2.1 Mulberry varieties</b>	<b>Number</b>	<b>Percentage</b>
1. Nakhon Ratchasima 60	0	0
2. Buriram 60	0	0
3. Sakon Nakhon 72	17	100
<b>Total</b>	<b>17</b>	<b>100</b>

From Table 7, the survey of mulberry species used for planting by 17 members of the Ban Buakaew Sericulture Community Enterprise (more than 1 answer possible) found that the mulberry species planted in the Ban Buakaew Silk Farming Group was the Sakon Nakhon species, with 17 members, or 100 percent.

**Table 8.** Mulberry planting area

<b>2.2 Mulberry plantation area</b>	<b>Number</b>	<b>Percentage</b>
1. 400 square meters (1 Ngan)	3	17.65
2. 800 square meters (2 Ngan)	2	11.76
3. 1,200 square meters (3 Ngan)	4	23.53
4. 1,600 square meters (1 Rai)	7	41.18
5. More than 1,600 square meters	1	5.88
<b>Total</b>	<b>17</b>	<b>100</b>

From Table 8, the survey of mulberry plantations of members of the Ban Buakaew Mulberry Community Enterprise, 17 people, found that 3 people planted 1 ngan of mulberry, accounting for 17.64 percent; 2 people planted 2 ngan, accounting for 11.76 percent; 4 people planted 3 ngan, accounting for 23.52 percent; 7 people planted 1 rai, accounting for 41.17 percent; and 1 person planted more than 1 rai, accounting for 5.88 percent.

**Table 9.** Productivity of mulberry cultivation

<b>2.3 Mulberry cultivation yield</b>	<b>Number</b>	<b>Percentage</b>
1. For sale/sell mulberry to members	0	0
2. For raising silkworms	6	35.29
3. Both for sale and for personal use	11	64.71
<b>Total</b>	<b>17</b>	<b>100</b>

From Table 9, the survey of mulberry cultivation yield of 17 group members found that the yield from silkworm farming for selling silk thread to other members was

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0 people, the yield from silkworm farming for their own use was 6 people, or 35.29 percent, and the yield from silkworm farming for both use and sale was 11 people, or 64.70 percent.

**Table 10.** silkworm breeds raised

<b>3.1 Silkworm breeds raised</b>	<b>Number</b>	<b>Percentage</b>
1. Pure silk breed	0	0
2. Thai hybrid breed	17	100
<b>Total</b>	<b>17</b>	<b>100</b>

From Table 10, a survey of the silkworm breeds raised Of the 17 members of the Ban Buakaew Sericulture Community Enterprise, it was found that all 17 members raised Thai hybrid silkworms, accounting for 100 percent.

**Table 11.** Hybrid silk

<b>3.1.2 Hybrid silk</b>	<b>Number</b>	<b>Percentage</b>
1. Nakhon Ratchasima hybrid 1	0	0
2. Thai hybrid Udon Thani	0	0
3. Thai hybrid Sakon Nakhon 1	0	0
4. Thai hybrid J108* Nang Lai Saraburi	17	100
<b>Total</b>	<b>17</b>	<b>100</b>

From Table 11, the survey of the raising of hybrid Thai silkworms by 17 members of the Sericulture Community Enterprise found that all 17 members raised hybrid Thai silkworms, the hybrid Thai silkworm strain J108\* Nang Lai Saraburi, accounting for 100 percent.

**Table 12.** Silkworm farming places

<b>3.2 Silkworm farming places</b>	<b>Number</b>	<b>Percentage</b>
1. Central sericulture farm	0	0
2. Private sheds	17	100
3. Others	0	0
<b>Total</b>	<b>17</b>	<b>100</b>

From Table 12, the silk farming locations of 17 members of the Sericulture Community Enterprise found that all members used private silk farming locations, accounting for 100 percent.

**Table 13.** Objective of silk farming

3.5 Objective of silk farming	Number	Percentage
1. to sell silk thread	4	23.53
2. to weave silk	1	5.88
3. both selling and weaving	10	58.82
4. to sell cocoons	2	11.76
<b>Total</b>	<b>17</b>	<b>100</b>

From Table 12, the silk farming goals of the 17 members of the Sericulture Community Enterprise found that 4 people raised silkworms for silk thread sales, accounting for 23.52 percent; 1 person raised silkworms for silk weaving, accounting for 5.88 percent; 10 people raised silkworms for both silk thread sales and weaving, accounting for 58.82 percent; and 2 people raised silkworms for cocoon sales, accounting for 11.76 percent.

**Table 13.** Number of times of silk farming per year

3.6 Silk farming	Number	Percentage
1. 4 times/year	2	11.76
2. 5 times/year	2	11.76
3. 6 times/year	2	11.76
4. 7 times/year	0	0
5. 8 times/year	11	64.72
<b>Total</b>	<b>17</b>	<b>100</b>

From Table 13: For silk farming of the 17 members of the Sericulture Community Enterprise per year, it was found that 2 people raised silk 4 times/year, accounting for 11.76 percent; 2 people raised silk 5 times/year, accounting for 11.76 percent; 2 people raised silk 6 times/year, accounting for 11.76 percent; 11 people raised silk 8 times/year, accounting for 64.70 percent.

**Objective 3:** The result of sericulture activities and income assessment of members of the sericulture community enterprise found that:

For the results of the important academic service project which generated income for members of the silk community enterprise, only two training activities will be discussed here: (1) silk farming and (3) silk reeling, as follows:

### 1) Sericulture

There are 2 species of silk that the sericulture community enterprise uses to raise: a local Thai species and a hybrid Thai breed called the Yellow Saraburi breed.

As for local Thai varieties, they have the advantage of being strong, resistant to disease, compatible with the environment and resistant to heat well, but have the disadvantage of being less productive. As for the hybrid Thai breed, the advantage is that it produces a large amount of silk, but the disadvantage is that if the weather is hot, the silkworms will die. However, the advantage is that it produces more silk because 1 nest of the native Thai breed will produce about 1 kilogram of silk, while the hybrid Thai breed will produce at least 2.5-3 kilograms of silk. Therefore, it is popular to raise the hybrid Thai breed because it is the most worthwhile and requires the same amount of time to raise.

However, members of the Sericulture Community Enterprise cannot propagate the hybrid yellow Saraburi Thai strain themselves because it may spread disease. Therefore, they must buy eggs from the Sericulture Department of Maha Sarakham only because breeding silkworm eggs must be done in a sterile room. However, if it is the native Thai strain, group members can propagate the strain themselves. The cost of silkworm eggs is 10 baht for 1 nest of the native Thai strain and 30 baht for 1 nest of the hybrid Thai strain.

In terms of silk demand, it was found that both species were in demand in the market. Silk that meets the Geographical Indications (GI) standard will cost 2,500 baht per kilogram. Local silk that meets the GI standard can be woven into silk for applying for the Royal Golden Peacock standard. As for the Thai hybrid species, which are spun by hand only, can be woven into silk for applying for the Silver Peacock standard.



**Figure 1.** Silkworm eggs and silk farming, Ban Buakaew (the consent has been obtained from the participants for both photography and publication in the research, in accordance with ethical guideline for human studies)

It is noteworthy that currently, the market value of silk threads is increasing steadily, resulting in the production of silk threads still not being sufficient to meet the market demand. In terms of the spiritual value of the people in the community, silk threads are valuable for both auspicious occasions such as weddings, where silk is given as a gift to the groom's parents and relatives, etc. As for inauspicious occasions such as funerals, the community has a culture of belief in using raw silk threads to lead

the coffin around the crematorium because the people in the community believe that silk threads are a ladder to lead the dead to heaven. Therefore, the demand for silk threads or silk products is still in demand by the community and the market in general.

## 2) Silk reeling

For silk reeling, initially, good and complete cocoons will be selected. These characteristics include beautiful cocoons, oval shape, consistent color, and not soiled. They can be reeled into small silk or standard silk of the TISI. Other types of cocoons, such as twin cocoons, are separated from good cocoons in order to reel them separately. Damaged cocoons, such as thin or rotten cocoons, are selected and cannot be reeled.

As for the silk reeling process, the silk is reeled off, in other words, it is the process of reeling off the outer shell. After it is finished, it is scooped out and set aside by spreading a cloth on the soil and cutting off the silk that has been removed and set aside. This is a method to allow the soil to absorb water from the cocoon and facilitate the reeling process in the next step. After that, the water in the pot must be changed and new water must be boiled in order to spin the small silkworms. To spin the small silkworms, the desired number of cocoons must be counted and placed in the pot for the first time. If the number of cocoons that are depleted is scooped out, only the number of cocoons that are cut out will be put in. After spinning the small silkworms, the remaining cocoons from spinning the small silkworms will be spun into silk in the next step, which is called “Mai Laeng”.



**Figure 2.** Silk cocoon and silk reeling (the consent has been obtained from the participants for both photography and publication in the research, in accordance with ethical guideline for human studies)

For the quality of the thread, it has consistent threads. The color of the silk thread is consistent and not mottled. The thickness of the silk thread is the same throughout the thread from the beginning of the first thread to the end of the thread. The thickness is not much different, approximately 1.2-1.3 throughout the thread. As for the price of the silk thread, it is divided according to the type of silk thread as follows

1. Little silk, 1,850 baht per kilogram.
2. Silk thread, 600 baht per kilogram
3. Mai Lang, 700 baht per kilogram.
4. Twisted silk thread, 1,200 baht per kilogram

It is noticeable that members of the Sericulture Community Enterprise will have different incomes from each silk farming session because some people who raise a lot of silk will get a lot of production while some who raise a little will get a little production. It was also found that each member has different areas for planting mulberry trees to raise silkworms, some more, some less. Some raise silkworms several times a year. It was found that the member who raises silkworms the most times a year is 8 times, and the least is 4 times. A survey of the income of 34 members of the two Sericulture Community Enterprises found that the income of members varies according to the silk farming sessions as follows:

**Table 14.** Income of the Sericulture Community Enterprise, Ban Bua Kaew

Members	Number of silk farming rounds per year	Average income per time	Total income per year
1	4	3,000	12,000
2	5	3,000	15,000
3	8	7,000	56,000
4	5	3,000	15,000
5	5	3,000	15,000
6	8	5,000	40,000
7	8	5,000	40,000
8	6	5,000	30,000
9	8	5,000	40,000
10	8	7,000	56,000
11	8	5,000	40,000
12	8	5,000	40,000
13	8	5,000	40,000
14	6	5,000	30,000
15	8	5,000	40,000
16	8	3,000	24,000
17	4	2,000	8,000
<b>Total income</b>			<b>541,000</b>

From surveying the income of members of the sericulture community enterprise, Ban Bua Kaew, Loeng Faek Subdistrict, Kut Rang District, Maha Sarakham Province, it was found that the members with the lowest income per round of sericulture were 2,000 baht and the total income per year The amount of 8,000 baht by raising sericulture 4 times per year, while the member with the highest income per time is 7,000 baht and has a total annual income of 56,000 baht by raising sericulture 8 times per year and there are 17 members. Have a total annual income of 541,000 baht

**Table 15.** Sericulture community enterprise income Ban Nong Bua Pae

Members	Number of silk farming rounds per year	Average income per time	Total income per year
1	7	5,000	35,000
2	8	8,000	64,000
3	7	5,000	35,000
4	6	6,000	36,000
5	6	5,000	30,000
6	8	12,000	96,000
7	8	4,000	32,000
8	7	4,000	28,000
9	6	4,000	24,000
10	7	4,200	29,400
11	6	4,500	27,000
12	8	4,000	32,000
13	8	4,000	32,000
14	7	4,500	31,500
15	7	4,000	28,000
16	8	4,000	32,000
17	5	5,000	25,000
<b>Total income</b>			<b>616,900</b>

From a survey of the income of members of the silkworm community enterprise, Ban Nong Bua Pae, Tambon Sang Saeng, Amphoe Yang Sisurat, Maha Sarakham Province, it was found that members who raise silkworms 5 times a year have the least income per round of silkworm raising, at 4,000 baht, while the member with the highest income per round is 12,000 baht and has a total income per year of 96,000 baht, raising silkworms 8 times a year, and all 17 members have a total income per year of 616,000 baht.

## 4. Conclusions and discussion

This academic article has three objectives: (1) To survey information and operations of the sericulture community enterprise group in Maha Sarakham Province. (2) To study the potential, wisdom, activities and operations of the Sericulture Community Enterprise. (3) To assess the income from mulberry planting and silk raising activities of the sericulture community enterprise members, namely, Ban Bua Kaew and Ban Nong Bua Pae Sericulture Community Enterprise. The target group consists of 100 people, divided into 5 lecturers, 5 officers, 10 government personnel, and 80 students. The key results of the project are creating impact on the community, solving spatial problems, creating a community prototype, creating social innovation, and creating added value or value for the community. This project is a service project that expands the operations of the project from U2T for BCG, starting in 2023 with the issue based on Thai fabric/naturally dyed fabric. In addition, this academic service project is also related to tourism, services and upgrading products from the community, namely traditional tourism, culture, Isan civilization, and is linked to sustainable development goals, namely Partnerships for the Goals, Decent Work and Economic Growth, and Responsible Consumption and Production.

Initially, the Academic Service Project surveyed information about the Sericulture Community Enterprise in Maha Sarakham Province. It was revealed the needs of the group, such as the group's activities, sales channels, and the need for government agencies to support the group's products and marketing, etc. Then, this project was surveyed information about the potential of the members of both community enterprises. The potential and needs of the two sericulture community enterprises can be divided into 6 issues as follows: (1) mulberry planting, (2) silk farming, (3) silk reeling, (4) natural dyeing, (5) cost calculation and marketing, and (6) product processing. The mulberry community enterprise, Ban Buakaew, has developed a new set of knowledge: natural dyeing with indigo. Other activities include the extension of silk product processing and the expansion of mulberry plantations in the area of the mulberry community enterprise, approximately 2 rai. In addition, it was found that group members have increased expertise in silk reeling and can act as lecturers to share knowledge with group members and other networks.

The Ban Buakaew and Ban Nong Bua Pae Mulberry Planting Community Enterprises have a total of 100 members who have participated in activities from the upstream, midstream, and downstream regarding mulberry planting and silkworm raising, silk reeling, and silk thread making. Many members have their own mulberry planting areas, but many members do not have areas to grow mulberry plants. They reel silk by purchasing silk from members. Both groups grow two mulberry species: Sakon Nakhon mulberry and Buriram mulberry, using their own areas and the Mulberry Community Enterprise's shared mulberry plot. They can raise silkworms about 7-8 times per year, but some members can only raise silkworms 4-5 times per year because the mulberry is not enough to raise them all year round. This academic service project has expanded the mulberry planting base for the Ban Buakaew Mulberry Community Enterprise and has also expanded the mulberry planting area to Leing Faek Pracha Bamrung School, with the participation of teachers and students.

The natural dyeing of the two groups of silk community enterprises is divided into two parts: (1) natural dyeing with common materials that are naturally available and can be found in the local area, such as lac, cassia tree, ironwood tree, ebony tree, banana tree, and others according to the desired color, which is considered to be still available in the local area. Both groups can dye natural dyes to the standard of "Silver Peacock" according to the standards of the Sericulture Department. As for (2) natural dyeing with indigo, the groups are still unable to dye to the standard because they still lack knowledge about indigo dyeing. Therefore, the project has supported the natural dyeing with indigo activities for both groups until some members have the knowledge to dye with indigo. However, they still need to study more details about indigo dyeing.

In terms of the grassroots economy, it was found that members of the two silk community enterprises earn approximately 3,000 to 12,000 baht per silk-raising cycle, and their total income throughout the year is approximately 30,000 to 96,000 baht, which is considered additional income from farming and rice fields. From interviews with some group members, it was found that income from silk-raising and silk-spun sales is better than rice farming because they provide a monthly income and can be used for household expenses without any financial difficulties, including providing income for children to pay for their education. Grassroots economic is the economic system of local communities; that can be self-reliant under the philosophy of sufficiency economy, with mutual assistance, morality, and an economic system that facilitates the development of other areas in the area, including the economy, society, people, communities, culture, environment, and natural resources strongly and sustainably. It is a horizontal economic system that affects and creates both economic and social relationships between people in local communities. It is not just an individual vertical economy, but can create cooperation, opportunities and good relationships between the community's joint economy and the individual economy.

However, both sericulture community enterprises still lack many elements, such as (1) managing the community's financial system; (2) having a comprehensive, up-to-date information system both internally and externally; (3) There is a community production system, both basic and advanced. Therefore, it is an opportunity for both sericulture community enterprises to develop according to the concept of sustainable development goals in many dimensions, that is, (1) Decent Work and Economic Growth; (2) Responsible Consumption and Production, and (3) Partnerships for the Goals. In addition, the activities of the two sericulture community enterprises have brought social capital within the communities to further develop economically and generate income. which is consistent with the concept of community enterprise, that is, in short, it is an entrepreneurial activity to manage "community capital" creatively for self-reliance. "Community capital" here refers to capital, including resources, products, knowledge, wisdom, cultural capital, social capital.

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