
ABDIMAS

Jurnal Pengabdian kepada Masyarakat
<https://journal.unnes.ac.id/journals/abdimas/>

Capacity Building of Cassava Silkworm Cultivation Group with the Application of Spinning Machine and Identification of *Ungkrung* Content

Arsyad Cahya Subrata*, Sudarmini, Ibdal, Totok Eka Suharto, Tole Sutikno, and Erika Wulandari

Universitas Ahmad Dahlan, Indonesia

*Corresponding author: arsyad.subrata@te.uad.ac.id

Abstract

Silk fabric is still one of the exclusive fabrics sought after, especially by women. However, at the end of this decade, silk fabric production decreased. The decreasing availability of silk fabric raw materials influences the decline in silk fabric production. The availability of raw materials for silk fabric cannot be separated from the number of silkworms (*Bombyx mori L.*) cultivated as a cocoon producer which is later spun into silk yarn. Gunung Sewu is a silkworm cultivation group based in Rongkop District, Gunungkidul Regency, Yogyakarta, which has successfully conditioned silkworms to consume rubber cassava leaves as their main feed. Currently, sales of cultivation products are still in the form of ready-spun cocoons and fried *ungkrung* (inside of cocoons). The silk fabric factory is also willing to buy cocoons that have been spun into silk thread at a higher price. However, the Gunung Sewu group does not yet own a spinning wheel, so it cannot carry out the spinning process independently. On the other hand, derivative products in the form of *ungkrung* are still processed by frying. Even though there are still many foods that can be developed from silkworm *ungkrung* processed ingredients. In this community empowerment program, Gunung Sewu group capacity-building activities were carried out by applying spinning machines and identifying the content of *ungkrung*. The results obtained from the spinning machine application activity were that the turnover of the Gunung Sewu silkworm cultivation group increased by 200%. While the activity of identifying the content of *ungkrung* showed a significant increase in the knowledge of group members.

Keywords: Nutritional content, Cocoon, Cassava silkworm, Fried *Ungkrung*, Spinning machine

INTRODUCTION

Silk fabric is still one of the exclusive fabrics sought after, especially by women. This is because silk fabric is characterized by its unique smoothness and luster, as well as its soft and comfortable texture when worn. Furthermore, silk fabrics have good absorbency, are smooth, and comfortable to use (Yuniarti & Nurwana, 2020). The market demand for silk fabrics globally has increased by 5%, while in Indonesia it can touch 12.5% (Rusdi et al., 2021). However, the amount of silk fabric production continues to decline every year (Maru et al., 2021). By looking at the potential purchasing power of the community and the high selling price, the opportunity for upstream and downstream development of silk fabrics is wide open. Moreover, it is supported by a favorable climate in Indonesia for silkworm cultivation (Damayanti et al., 2022; Winda, 2022).

The decreasing availability of silk fabric raw materials influences the decline in silk fabric production. The availability of raw materials for silk fabric is inseparable from the number of silkworms (*Bombyx mori L.*) cultivated as a cocoon producer which is later spun into silk yarn. The decline in the number of silkworm cultivation is due to the conversion of silkworm feed land (Maru et al., 2021; Syam, 2017). The characteristics of silkworms that are not resistant to pungent odors and extreme weather changes are also an obstacle faced by silkworm farmers. In addition, mulberry leaves are still considered the only food consumed by silkworms (Diba & Tavita, 2019.; Djabar & Utiahman, 2020; Faradilla et al., 2022; Fauziah et al., 2018), while planting and cultivating mulberry trees is not easy.

Gunung Sewu is a joint silkworm farming group based in Rongkop and Girisubo sub-districts, Gunungkidul Regency, Yogyakarta. This group of silkworm farmers has successfully conditioned silkworms to consume rubber cassava leaves as their main feed. Silkworms can be fed with castor leaves, cassava tubers, or rubber cassava. However, feeding with rubber cassava can increase the percentage of eggs that hatch (Aprilia, 2019; Setiyawan & Fitasari, 2018). Furthermore, according to the Gunung Sewu group, the effect of feeding rubber cassava can increase the silkworm's resistance to pungent odors. The rocky geographical condition of the Rongkop Sub-district makes it difficult to plant trees. However, the Gunung Sewu group has planted rubber cassava trees on hilly slopes so that they can be used as the main feed for silkworms.

To date, Gunung Sewu has 30 community groups with more than 50 silkworm farmer members. Gunung Sewu has a daily board of 9 people consisting of representatives from various villages in the Rongkop sub-district. Currently, the Gunung Sewu group focuses on silkworm cultivation with the main sales being cocoons that will be made into silk thread. Meanwhile, the derivative product produced is a food product in the form of processed *ungkrung*. Gunung Sewu can maintain the stability of silkworm cultivation by managing the rearing needs of each member.

Each member usually grows 1000 to 3000 silkworms. By calculation, 1kg of cocoons can produce 2 ounces of ready-to-spun cocoons and 8 ounces of *ungkrung*. Each 1kg cocoon is sold to a silk fabric factory for Rp 40,000 to Rp 60,000. Meanwhile, every 1kg of fried *ungkrung* is sold in the market for Rp 120,000.

Currently, sales of cultivation products are still in the form of ready-to-spin cocoons and fried *ungkrung*. The silk fabric factory is also willing to buy cocoons that have been spun into silk yarn at a higher price. However, the Gunung Sewu group does not yet own a spinning wheel, so it cannot carry out the spinning process independently. On the other hand, derivative products in the form of *ungkrung* are still processed by frying. There are still many foods that can be developed from silkworm *ungkrung* processed ingredients.

This community service program is proposed in a multi-year scheme. The focus of the program in the first year is the manufacture of spinning machines and assistance in determining the nutritional content of *ungkrung* products. The second year of the program focused on modifying the number of spinning machines and diversifying *ungkrung* products. While the third year of the program focused on the classification of spinning machines and marketing training for main products and derivative products.

This program is also carried out in collaboration with the Community Empowerment Council of Muhammadiyah Regional Leadership (MPM PWM) Yogyakarta and MPM Muhammadiyah Regional Leadership (MPM PDM) Gunungkidul. With this PkM program, it is expected that the Gunung Sewu group can increase its empowerment and economy through higher sales of main and derivative products of cassava silkworm cultivation.

METHODS

As is known, the Rongkop sub-district of Gunungkidul is a marginal area with difficult access to agriculture. Therefore, with advanced cassava silkworm cultivation, it is expected to improve the community's economy. On the other hand, the economic da'wah that has been carried out by the Gunung Sewu group is based on taklim assemblies, so Islamic values will always be instilled. Furthermore, this program will be run in collaboration with MPM PWM DIY and MPM PDM Gunungkidul which will focus on institutional strengthening through Jama'ah Tani Muhammadiyah (JATAM). Through JATAM Rongkop, which will be inaugurated, the community can get access to product expansion and other facilities so that universal values can also be instilled.

In the implementation of this program, the empowerment of the Gunung Sewu group is sought to increase. The application of silk yarn spinning machines can increase partners' knowledge of how to prepare cocoons and spin silk yarn correctly and improve partners' skills to spin yarn. On the other hand, the assistance of nutritional information, it can increase partners' knowledge in terms of nutritional information and improve partners' skills to market it with the added information. In addition, the application of yarn spinning machines can also improve the quality, quantity, and type of products from what was originally sold only in the form of cocoons, after the service program is implemented, it is expected to be able to sell silk yarn. With the silk yarn spinning machine, production capacity and assets are also expected to increase, thereby increasing sales turnover. After going through this program, partners are expected to be able to manage all matters related to silkworm cultivation from upstream to downstream, especially in the process of spinning and marketing products through

nutritional information. Finally, partner profits increase along with the increasing number of members as cassava silkworm cultivation entrepreneurs.

In its implementation, this program collaborates with MPM PWM DIY and MPM PDM Gunungkidul. All activities that have been carried out in the Gunung Sewu group will be evaluated by MPM PWM DIY and MPM PDM Gunungkidul. The service team also evaluated the program that had been carried out. The evaluation includes the performance of the spinning machine to spin silkworm cocoons. Evaluation of partner skills in operating the spinning machine. Evaluation of fried *ungkrung* products after testing the nutritional value content. The sustainability of the program will be further discussed with MPM PWM DIY and MPM PDM Gunungkidul. Initial discussions have been narrowed down to community empowerment which will be directed at edu-tourism and Rongkop sub-district becoming a center for cassava silk cloth.

RESULTS AND DISCUSSION

Community empowerment activities have been carried out by targeting the Gunung Sewu silkworm cultivation group in Pringombo Village, Rongkop District, Gunungkidul Regency. This activity was carried out with the focus of activities in the form of making spinning machines and assistance to determine the nutritional content of *ungkrung* products.

Implementation of Spinning Machine

The manufacture of spinning machines aims to increase the selling value of silk yarn materials. In this spinning machine manufacturing activity, spinning training was also conducted with trainers from KUB 3S. Documentation of the spinning machine manufacturing activity and spinning training is shown in Fig 1 to Fig 3.



Fig. 1. Silk yarn spinning machine



Fig. 2. Spinning training by instructors from KUB 3S



Fig. 3. Self-spinning process

The spinning training is conducted directly by KUB 3S so that the spun yarn meets the standards. The silk yarn spinning training was conducted over six full days. The participants of the spinning training are members of the Gunung Sewu silkworm cultivation group. The results of the silk yarn spinning will be purchased by KUB 3S. The calculation below shows the difference between the selling price of silk cocoons and silk thread.

The process of spinning cassava silk yarn is different from spinning mulberry silk yarn. Cassava silk yarn fibers do not have fibers that can be strung directly, so spinning must go through various processes. In the ongoing activity, the spinning training was carried out for 6 consecutive days by 6 participants and accompanied by 1 trainer from KUB 3S. The process of spinning cassava leaf silk yarn goes through stages such as boiling cocoons, cleaning the remaining dirt from cocoons, making cocoons into kapok, then spinning using a spinning machine.

The spinning training aims to improve the skills of the Gunung Sewu group in making silk yarn. The spun silk yarn must meet the factory's standard requirements of appropriate yarn thickness and neatness. Figure 4 shows the spinning training instructor's assessment of the 6 trainees.

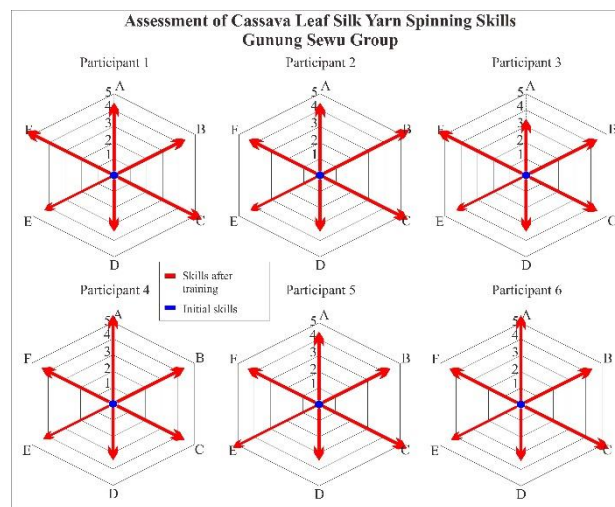


Fig. 4. Improved skills after receiving spinning training

Figure 4 shows the improvement of spinning skills of all participants in the cassava silk yarn spinning training. There are 6 assessment parameters, each of which has a scale of 1 to 5 points. The details of the 6 assessment parameters are

A. Tool operation proficiency

There are several important components in the spinning machine. This assessment is seen from the participant's skills in operating the tool from installing the yarn to handling the tool when the yarn being spun breaks.

B. Neatness of the yarn

A neat yarn is the main requirement for the yarn to be accepted by the factory. This assessment is seen from the participants' skills in untangling the yarn that will enter the yarn spinning hole.

C. Consistency of yarn continuity

During spinning, there are times when the spun yarn breaks. This assessment of the continuity of the yarn being spun is based on the lack of broken yarn.

D. Mastery of constraint handling

The spinning machine used in the Gunung Sewu spinning production house has a problem with the rotation of the electric motor, which sometimes slows down and speeds up in an instant. This is caused by the unstable utility network in the production house. This assessment is seen based on the participant's ability to handle the unstable rotation of the electric motor on spinning.

E. Spinning speed

Spinning speed will affect how much yarn is spun in one time. This assessment is seen from the average weight of silk yarn spun in one day.

F. Size uniformity

Size uniformity will affect the quality of the spun yarn and is used as a yarn quality standard. The uniformity of yarn size is influenced by the neatness of the yarn when spinning and how often the yarn breaks when spun. This assessment is based on the final result of the spun yarn.

It can be seen in Figure 4 that all participants received the same points in parameter D (mastery of obstacle handling), namely 3 points. This is understandable because there were unexpected obstacles during the implementation of the tool in the field. Unstable utility networks are caused by various factors. To handle this can be done in various ways. The first is to move the production house to a location with a stable utility network, the second is to check and repair the utility network in the production house, the third is to add a stabilizer to the main power line of the production house, and the fourth is to modify the spinning machine so that it is not distracted by the unstable electricity supply.

The final spinning result is shown in Figure 5. Each spun skein of yarn is marked with the name of each spinner. This aims to calculate the final weight of the spun yarn before it is sold. After 6 days of the training process, the spun yarn was judged to be of a standard that could be purchased by the factory.

After being spun into silk thread, the sales have increased. In comparison, direct cocoon sales amount to Rp 40,000 per ounce, while spun silk yarn sales amount to Rp 120,000 per ounce. The price is given with the following details: boiled cocoons Rp 50,000 per ounce, spinning labor Rp 65,000 per ounce of yarn, and gas, soap Rp 5,000 per ounce of yarn. Figure 6 shows a visualization of the increase in sales.



Fig. 5. Spun silk thread



Fig. 6. Comparison of selling price of cocoons and spun silk thread

Thus, the turnover of the Gunung Sewu silkworm cultivation group increased by 200%, which amounted to IDR 80,000 per ounce. Therefore, with the application of the silk yarn spinning machine, the direct benefits felt by partners are economic improvement and improvement of member skills.

Nutritional Content Assistance

The next activity is the identification of the nutritional content of *ungkrung* products has been carried out and the results have been obtained. Lab tests of fried *ungkrung* were conducted using three samples. The variables tested were liquid content, ash content, and fat content.

Testing the nutritional content of fried *ungkrung* with other variables, namely protein content, is still in the testing process. Testing the protein content in fried *ungkrung* is crucial because there may be allergens that can give side effects to some people who consume. These allergens usually cause itching on the skin. However, cases of such allergens occur in only a few people.

After the results of the nutritional content test were obtained, the next activity was to educate the Gunung Sewu group. Education is carried out by socializing the results of the fried *ungkrung* test to the group. To evaluate the knowledge of the Gunung Sewu group, pre-test and post-test tests were conducted. The parameters measured in this knowledge test are nutrition content knowledge and

diversification potential knowledge. Table 1 shows the results of the evaluation of the fried *ungkrung* nutrition content assistance through the Gunung Sewu group knowledge test. While Figure 7 shows a visualization of the increase in knowledge of the Gunung Sewu group after gaining knowledge of the nutritional content of fried *ungkrung*.

Table 1. Evaluation of nutritional content assistance

Criteria	Knowledge Score (%)		Increase (%)
	Before	After	
Nutrition content knowledge	25	83	58
Diversification potential knowledge	34	87	53

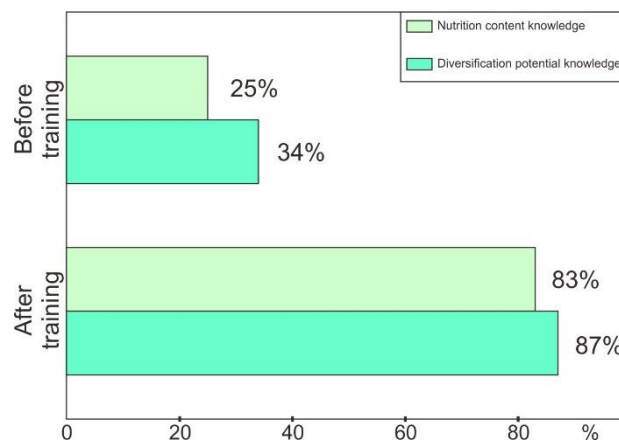


Fig. 7. Visualization of Gunung Sewu group knowledge improvement

CONCLUSION

The activity was carried out with the target of the Gunung Sewu silkworm cultivation group in Pringombo Village, Rongkop District, Gunung Kidul Regency. Although this activity carried out has provided positive results for the Gunung Sewu group. This activity is based on the limited processing of silkworm harvests from the Gunung Sewu silkworm cultivation group.

The team's response was to build a spinning machine and provide assistance to determine the nutritional content of the *ungkrung* product. The machine-making activity and continued with training on spinning silk yarn by members of the Gunung Sewu silkworm cultivation group were able to increase the selling price of the product. Before the implementation of this community empowerment activity, the Gunung Sewu group only sold the harvest in the form of raw cocoons which were sold at a price of IDR 40,000 per ounce. After implementing this activity, the Gunung Sewu group was able to sell silk thread and sold at a price of IDR 120,000 per ounce. Thus, the sales turnover of products from the Gunung Sewu silkworm cultivation group increased by IDR 80,000 per ounce or equivalent to 200%.

In the nutritional content activity, the product in the form of fried *ungkrung* has been identified at the UAD Food Chemistry laboratory. The results of this test were socialized to partners and provided direction on what derivative products might be developed from the fried *ungkrung*. Through the evaluation, the knowledge of the Gunung Sewu group regarding the nutritional content and the potential diversification of *ungkrung* increased dramatically. This shows the success of the community service program that has been carried out.

REFERENCES

- Barber, M., & Mourshed, M. (2007). How the world's best-performing school systems come out on top. Available from http://www.mckinsey.com/locations/UK_Ireland/~/_media/Reports/UKI/Education_report.as

- hx (accessed 16 September 2010)
- Yuniarti A, Nurwana A. Pengaruh Jumlah Konsumen dan Jumlah Meter Kain Terhadap Tingkat Penjualan Hasil Produksi Kain Sutra di Toko Sutra Indah. JPPI (Jurnal Pendidik Islam Pendekatan Interdisipliner). 2020;4(2):79–88.
- Rusdi R, Maru R, Nyompa S, Rasyid R, Arfandi A, Basram F. Persepsi dan Respon Masyarakat Terhadap Budidaya Ulat Sutra di Kabupatens Soppeng. In Universitas Negeri Makasar; 2021.
- Maru R, Badwi N, Abbas I, Sudirman S, Nurfadillah N, Nur MM, et al. Peluang dan Tantangan Pengembangan Budidaya Ulat Sutra dalam Perspektif Geografi. LaGeografia. 2021;19(2):201–10.
- Damayanti D, Sukirman AS, Fatmawati F. Penerapan Akuntansi Aset Biologis atas PSAK No. 69 pada Usaha Budidaya Ulat Sutra Petani Desa Salojampu. AKUNSIKA J Akunt dan Keuang. 2022;3(2):50–6.
- Winda W. Daya Tahan Hidup Larva dan Kualitas Kokon Dua Galur F1 Ulat Sutra Bombyx Mori L. Universitas Hasanuddin; 2022.
- Syam D. Analisis Pendapatan Pemelihara Ulat Sutra pada Pemeliharaan Konvensional di Desa Sering, Kecamatan Donri-Donri, Kabupaten Soppeng. Skripsi Fak Peternak Univ Hasanuddin. 2017;
- Djabar M, Utiahman N. Kelayakan Usaha Budidaya Ulat Sutra (Bombyx Mori L.) Berdasarkan Aspek Non Finansial Kabupaten Boalemo. J Penelit Kehutan BONITA. 2020;1(2):15–22.
- Fauziah R, Prihatin J, Suratno S. Pengaruh Pemberian Pupuk Za Pada Tanaman Murbei Terhadap Kokon Ulat Sutra Alam. Bioeksperimen J Penelit Biol. 2018;4(1):37–41.
- Faradilla F, Malaysia E, Kardika AJ, Rajab A. Budidaya ulat sutera dengan pemberian pakan daun murbei hasil kultur in vitro terhadap kualitas kokon dan benang sutera. ULIN J Hutan Trop. 2022;6(1):1–8.
- Diba F, Tavita GE. Kualitas Kokon Ulat Sutra (Bombyx Mori L.) Ras Cina, Ras Jepang, dan Jenis Hibrid dengan Pakan Daun Murbei. J HUTAN LESTARI. 7(2).
- Aprilia RD. Studi komparasi pakan daun singkong (Manihot utilissima) dengan daun singkong karet (Manihot glaziovii) terhadap pertumbuhan dan fertilisasi ulat sutera eri (Samia chyntia). Universitas Negeri Malang; 2019.
- Setiyawan AI, Fitasari E. Pengaruh Perbedaan Tiga Jenis Daun Ketela Pohon Terhadap Konsumsi dan Konversi Pakan Ulat Sutra Samia Cynthia. TERNAK Trop J Trop Anim Prod. 2018;19(1):32–7.