Open Access
J. Glob. Innov. Agric. Sci., 2024, 12(4):1099-1107
ISSN (Online): 2788-4546; ISSN (Print):2788-4538
DOI: https://doi.org/10.22194/JGIAS/24.1435
http://www.jgiass.com

Factors Affecting Traditional Spinning Silk Yarn Quality in the Soppeng Regency, Indonesia, and Optimisation Strategies

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Since 1964, one of the livelihoods of the inhabitants of Soppeng Regency has been the cultivation of natural silk for the production of silk yarn products. Currently, the silk yarn production industry is dealing with challenges connected to the low quality of the yarn produced, which can only be utilized as weft yarn in creating silk garments. Soppeng Regency in South Sulawesi, Indonesia, has a rich history of silk production, traditionally serving as a significant source of income for its residents. This natural silk industry has played a vital role in the region's economy in the Donri-Donri District area. This study investigates the factors influencing silk yarn quality in Soppeng Regency's traditional production system, aiming to revitalize the industry. Employing the Analytical Hierarchy Process (AHP), we identified the two most critical leverage factors: silkworm seedling quality (weight: 0.303) and the silkworm rearing process (weight: 0.290). A SWOT analysis positioned the industry in a promising quadrant (I), indicating strengths outweigh weaknesses and opportunities exceed threats (strengths: 0.284, opportunities: 0.139). These findings suggest that improving silkworm seedling quality and rearing methods presents a significant opportunity to enhance yarn quality, potentially leading to increased production and profitability for Soppeng's silk producers. This study shows that improving the quality of silkworm seedlings and rearing methods can significantly enhance the silk industry in Soppeng Regency. This will result in higher quality yarn, increased production and sales, and greater profitability for silk producers. This will benefit the entire industry, creating a positive ripple effect for the local economy. Future research implies comparing the most suitable silkworm breed and the most appropriate rearing method to produce high-quality silk thread in Soppeng Regency.

Keywords: Natural silk, silk cultivation, silkworm seedlings, silk production, local economy.

INTRODUCTION

Soppeng Regency is one of the regions that rely on the economic potential of its natural resources, particularly commodities from the agricultural, fishery, and forestry sectors. One of the numerous commodities that have achieved glory in the past and have become one of the primary sources of financial income is sericulture, which produces silk yarn. Through the South Sulawesi Provincial Government Program, the Soppeng Regency Government has launched a plan to restore the glory of natural silk as a lever for the regional economy, with various policy instruments applied from upstream to downstream silk yarn products.

The Natural Silk Development Program is one of the priority programs in the Regional Medium Term Development Plan (RPJMD) 2016-2021 Soppeng Regency. Several activities are related to natural silk development from upstream to downstream, including providing quality imported silkworm seeds, rearing facilities, and training to improve silkworm cultivators' human resources (Sadapotto, 2012). Consistently carried out and continued in the RPJMD 2021-2026 Soppeng Regency, the establishment of "Kampung Sabbeta" in the shape of a village area has made the natural silk process an attraction for tourists. Natural silk is already a part of the culture of South Sulawesi, which is currently the most prominent silk-producing location in Indonesia. However, practically all-natural silk business systems are managed traditionally, locally, and in subsystems (Nunuh, 2012). According to the Ministry of Industry's Director of Chemical, Clothing, Miscellaneous and Handicraft Small and Medium Industries, the contribution of silk products from South Sulawesi is substantial; in 2015, it reached 8 tons of silk production, with a 90% share; The production in 2016 and 2017 are not much different. Until now, South Sulawesi has

Batara, A.W., Mahyuddin and A. Sadapotto. 2024. Factors Affecting Traditional Spinning Silk Yarn Quality in the Soppeng Regency, Indonesia, and Optimisation Strategies. Journal of Global Innovations in Agricultural Sciences 12:1099-1107.
[Received 15 Jul 2024; Accepted 7 Aug 2024; Published 17 Nov 2024]

been the largest supplier of silk in the country. Soppeng is one of South Sulawesi's regencies, and some people still rely on the livelihood of the natural silk business.

Silk yarn production in Soppeng Regency tent will increase from 984.20 kg in 2016 to 1,708.55 kilograms in 2020 (Statistik, 2020). This depicts the importance of reviving the glory of silk in the Soppeng Regency. Increasing the volume of silk yarn production is essential to regaining silk's glory. However, to make silk yarn products an economic lever, aspects of silk yarn quality and market access must be emphasized from upstream to downstream of silk yarn production.

In the middle of the Soppeng Regency Government's efforts to revive silk's glory, the quality of silk yarn produced has emerged as one of the critical factors instigating the low price of yarn obtained by farmers. Because the quality of the yarn made by traditional spinners in Soppeng Regency is relatively low, it can only be used as weft yarn to produce silk garments. It cannot be used as warp yarn, resulting in a lower price. Many factors influence the quality of silkworm cocoons as a raw material for making silk thread, including weather, availability of silkworm feed, quality of silkworm seeds, labor, and cultivation space (Muin and Isnan, 2019).

Based on these various explanations, in-depth research must be conducted to determine the influential factors determining the quality of yarn produced from traditional spinning in Soppeng Regency and the degree of importance of these factors. The result of the study will be the basis for farmers, business actors, the government, and other relevant stakeholders according to their respective roles in achieving the glory of silk to improve the leveraging factors that influence the yarn quality (Andikarya, 2019).

The traditional silk industry in Soppeng Regency faces several challenges, including low thread quality, limited market access, and knowledge gaps. Factors contributing to low quality include unpredictable weather, limited access to high-quality mulberry leaves, poor-quality silkworm seedlings, labor skills, and limited cultivation space. Traditional management systems may lack standardization and efficiency for large-scale production. Limited market access may prevent local production from reaching a wider market. The lack of in-depth research on thread quality factors hinders targeted improvements (Basri *et al*., 2009).

This research addresses gaps in knowledge and practices in Soppeng's traditional silk industry. It aims to bridge the quality gap by identifying the factors affecting yarn quality, which can be used to improve farmer income and revitalize the industry. The research will also inform targeted interventions to improve the industry, such as improved silkworm seeds and training programs. It will also optimize resource allocation, ensuring the maximum impact of interventions on improving yarn quality. The research will also build on the industry's cultural significance, preserving its traditional practices and potentially attracting premium markets (Muin and Isnan. 2018).

MATERIALS AND METHODS

The research was conducted at Soppeng Regency, South Sulawesi Province, from August to September 2022. The following is a map of the research location of the Soppeng Regency area, precisely in the Donri-Donri District area.

Data and information were collected through interviews involving farmers, natural silk cultivation business actors, and silk yarn spinners. Subsequently, to determine the leverage factors in silk yarn production, the first stage identified the elements impacting the silk yarn production process with traditional spinning. The Analytical Hierarchy Process (AHP) method is then used to determine which components are prioritized as leverage factors. Next, a SWOT analysis was done to design strategies, emphasizing tactics to optimize the performance of the determined leverage factors. Data was gathered by observation and direct interviews with numerous expert respondents from the Food Crops, Horticulture, Plantation, and Food Security Offices, Silk Farmer Extension Assistants, Farmer Extension Assistants, Farmer Representatives/Silk Cultivation and Spinning Business Players using a questionnaire. The total number of respondents was six, and they were selected purposively (purposive sampling) considering the respondents' expertise/knowledge related to the silk yarn production process in Soppeng Regency.

This research aims to identify leverage factors that influence yarn quality. The study ensures deep insight into the production process by selecting highly knowledgeable individuals such as extension workers, farmer representatives, and officials. In-depth interviews with experts can provide richer data than broader, shallower surveys. Studies with limited resources may prioritize smaller, select groups over larger, less targeted samples.

***Preliminary Data Collection*:** The first stage of the research was initial data collection, which includes both primary and secondary data, which will be used as the primary input for the subsequent stage. Surveys using questionnaires, in-depth interviews, and direct observation were conducted to obtain primary data. The questionnaire covers the entire silk yarn production process, from mulberry cultivation to caterpillar rearing to spinning to produce raw silk yarn.

***Identify Influential Factors*:** Data was collected from the beginning to the end of the silk yarn production process to identify the factors influencing silk yarn production. Then, data will be classified and processed to determine the factors affecting the quality of the silk yarn produced, using literature studies and expert opinions juxtaposed with the data obtained.

***Determination of Silk Yarn Quality Leverage Factors*:** Data analysis using the Analytical Hierarchy Process (AHP) is examined to determine the leverage factors. The numerous

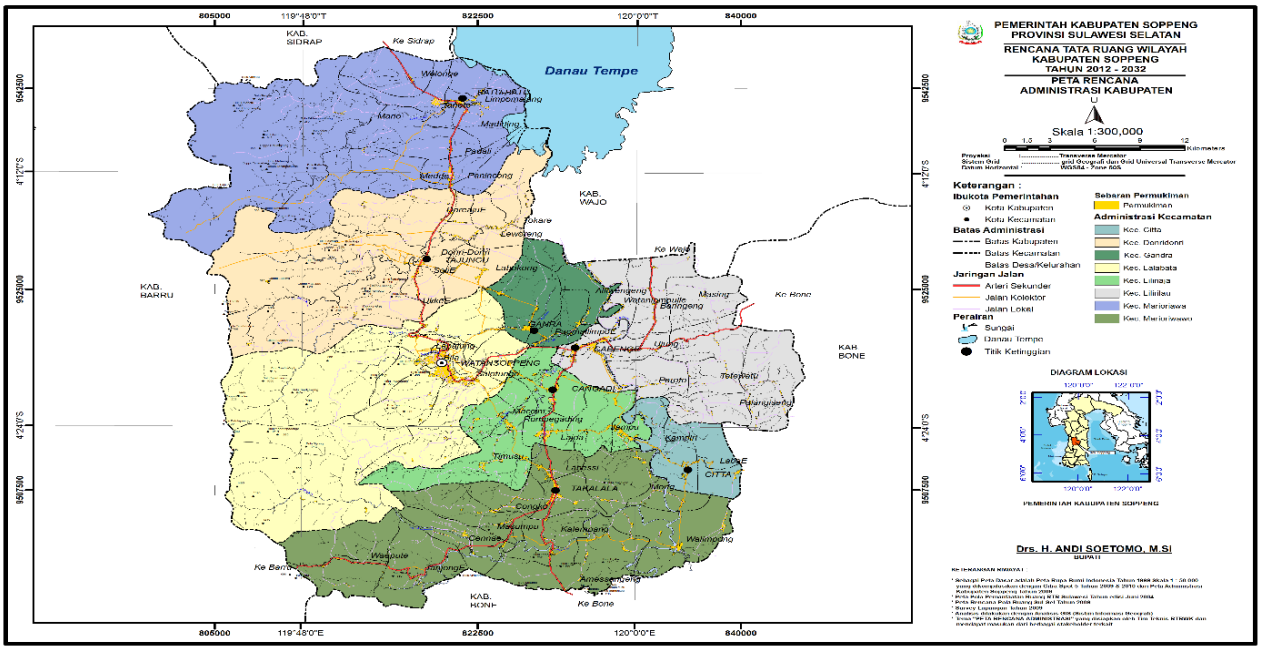

Figure 1. Administrative Map of Soppeng Regency.

factors collected in the preceding step will be considered priority factors with the most significant impact among other influential factors. They will be regarded as leverage factors.

***Formulation of a Lever Factor Optimization Strategy*:** The final stage of the research is formulating strategies to optimize the performance of the identified leverage factors. Data analysis is carried out using the SWOT analysis method by identifying internal (strengths and weaknesses) and external (challenges and opportunities) factors to formulate strategies that must be implemented.

RESULTS AND DISCUSSION

Analytic Hierarchy Process (AHP) is a structured method for making complex decisions. It involves organizing the problem into a hierarchy, comparing elements based on their importance, performing mathematical calculations, and checking for consistency. AHP helps break down complex decisions into manageable parts, evaluating and ranking them systematically to guide the final choice.

SWOT analysis is a strategic planning framework that evaluates a project, business, or industry by identifying strengths, weaknesses, opportunities, and threats. This analysis helps identify internal strengths, external weaknesses, and external threats, thus enabling the development of strategies to capitalize on strengths and mitigate weaknesses.

In the context of the Soppeng silk industry, AHP identified the most important factors for improving yarn quality, while SWOT analysis highlighted the growth potential of this industry.

***Natural Silk Overview in Soppeng Regency*:** Soppeng Regency is one of the regions where people still raise silkworms for a living. In its heyday, silkworm cultivation was the primary source of income for the community, especially in the rural areas in the Donri-Donri Sub-district and its surroundings. Sharma and Kapoor (2020) stated that sericulture, an agro-based enterprise, plays a predominant role in shaping the economic destiny of rural people. It holds promise as an employment-generating industry, especially in rural and semi-urban areas. Chanotra *et al*. (2019) stated that sericulture is an important labor-intensive sector globally, and the Indian economy combines agriculture and industry. It provides livelihood to a large section of the rural and semi-urban population, i.e., mulberry cultivators, co-operative rearers, silkworm seed producers, farmer- cum- rearer, reelers, twistors, weavers, hand spinners of silk waste, traders, etc.

Silk yarn manufacturing has fluctuated with low production volume throughout the last ten years, with the highest in the previous ten years in 2020 being 1,708.6 kilograms and the weakest in 2013 being 845.1 kilograms. The availability of silkworm eggs developed by the community, including hatchability and a suitable maintenance procedure, will determine yarn production. Table 1 shows data on egg distribution, cocoon production, and silk thread production from 2013 to 2022:

Table 1. Number of silkworm seed distributed, cocoon and silk yarn production in the Soppeng regency from 2013 to 2022.

Year	The number of silkworm seeds distributed (box)	Cocoon Production (kg)	Yarn Production (kg)
2013	451,00	6.587,00	845,10
2014	845,00	11.523,00	1.235,00
2015	554,00	8.361,00	962,20
2016	555,00	8.372,00	984,20
2017	556,00	8.388,00	992,11
2018	500,00	9.372,02	1.271,36
2019	694,25	7.961,33	942,38
2020	560,75	15.011,52	1.708,55
2021	408,25	11.217,14	1.270,15
2022	413,00	7.389,97	892,07

* Source: Statistik, 2020

Table 1 shows that silkworm seeds distributed to farmers fluctuate. The highest distribution in 2014 was 845 boxes, and the lowest in 2021 was 408.25 boxes. The number of silkworm seeds distributed does not align with the high yarn production. 2014, the silkworm seeds distributed were the largest, but the production of cocoons and yarn was more significant in 2018, 2020, and 2021. In those years, the number of silkworm seeds distributed was smaller than in 2014. This indicates that silkworm seed hatchability and good rearing processes are the main factors determining yarn production and the number of silkworm seeds cultivated. This is to the research results of Nursita (2011), which states that several factors affect the quality and quality of cocoons for silk yarn production: hereditary traits, types of silkworms, conditions during maintenance, environment and feed quality, and silkworm feeding methods.

***Identification of Silk Thread Production Factors*:** The identification of silk yarn production factors is carried out through field observation and interviews with silkworm farmers. The results of the identification of the silk yarn production process obtained can be seen Figure 2.

The results of the identification of silk yarn production factors, as shown in Figure 2, found three main activities directly interconnected in producing silk yarn: mulberry cultivation activities, silkworm rearing activities, and cocoon handling and processing activities to become silk yarn. Altman and Farrell (2022) mentioned that the sericulture industry comprises three main activities: mulberry tree cultivation, silkworm rearing, and silk harvesting, each of which can be performed concerning these insects, their handlers, and the environment.

Mulberry cultivation is the initial stage of silkworm rearing. The availability of silkworm feed and the quality of mulberry leaves are essential to ensure healthy silkworm growth. Faradillah and Alias (2017) in their study found that the success of the natural silk business is mainly determined by the excellent quantity and quality of mulberry leaves (*Morus Spp*.) as silkworm feed (*Bombyx mori L*.).

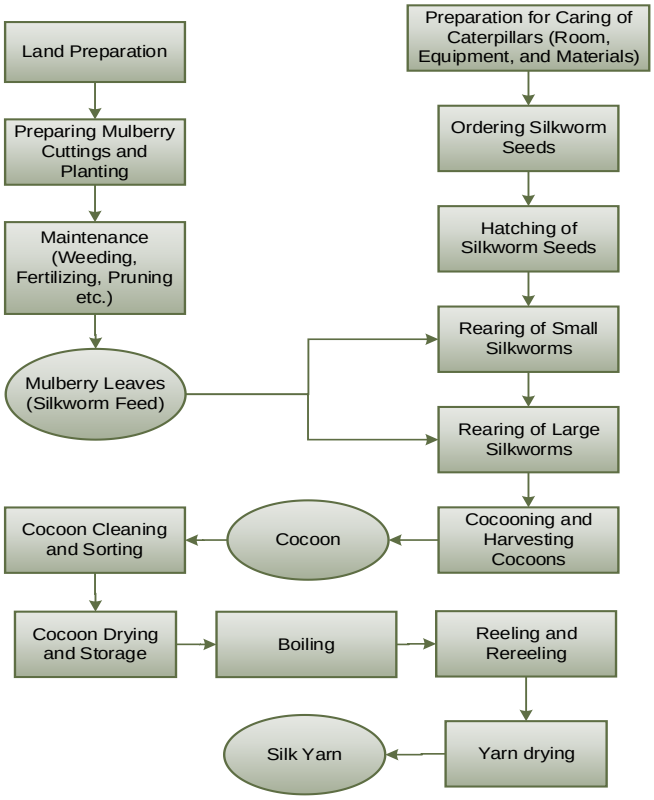

Figure 2. Flowchart of the Silk Yarn Production Process in Soppeng Regency.

The procedure for raising silkworms is the second stage. Many factors must be addressed before the silkworm-rearing business can produce high-quality cocoons as a material for making silk yarn, starting from the preparation of the location, equipment, and materials for breeding silkworms. One of the most important factors is the quality of the silkworm eggs. Quality silk eggs hatch quickly, producing healthy silkworm growth and suitable cocoons. Furthermore, those raising silkworms must have the essential abilities and expertise for cultivation. Another critical maintenance factor is the rearing environment's temperature conditions, as stated by Altman and Farrell (2022), the lifecycle of Bombyx mori ranges from 6 to 8 weeks, mainly depending on ambient temperatures. Sharma and Kapoor (2020) stated that silk production begins with raising silkworms in a controlled environment. Subsequently, Sharma and Kapoor (2020) explained the spinning process in brief as follows: the cocoons are boiled in water, killing the pupae and softening the sericin. The silk filaments are unbound from the cocoon and carefully wound onto a reel. Filaments from several cocoons are wound together to create a single raw silk thread.

The final stage is the transformation of cocoons into silk yarn once harvested. The management of cocoons after harvest goes through various steps in preparation for spinning. Cleaning, sorting, drying, and storing are among them. If cocoons are adequately handled before spinning, they will be of higher quality. Besides that, spinners need unique skills and experience to turn cocoons into excellent yarn once they reach the spinning stage. According to Abubakar *et al*. (2020), suitable expertise from farmers and silk yarn stakeholders is tremendously needed due to the many procedures involved in the silk yarn production process.

***Priority Factors For Leveraging Silk Yarn Quality*:** The method used in determining the priority factors for leveraging silk yarn quality is the Analysis of Hierarchical Process (AHP). The stages of the Hierarchical Analysis Process (AHP) method, according to Basak and Saaty (1993), start with system identification and compiling a hierarchy. The following is a hierarchical model for determining the priority factors for leveraging silk yarn quality in Soppeng Regency:

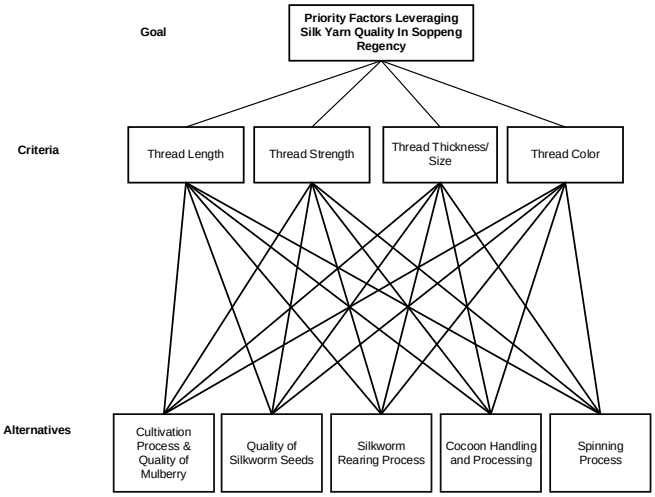

Figure 3. Hierarchical Model for Determining Priority Factors Leveraging Silk Yarn Quality in Soppeng Regency.

Figure 3 depicts a hierarchical framework with three primary elements: objectives, criteria, and options. The goal is to identify the most important characteristics that can be used as levers to improve the quality of traditional spinning silk yarn in Soppeng Regency. The criteria for high-quality silk yarn are determined by yarn length (fiber), yarn strength, yarn thickness/size, and yarn color. Meanwhile, alternatives are obtained by identifying the stages of the silk yarn manufacturing process in Soppeng Regency that are thought to significantly impact the quality of the yarn produced by silk business actors. The next phase in the Analysis of the Hierarchical Process (AHP) approach is a pairwise comparison of each element in the hierarchy, which starts with comparing criteria to assess their level of relevance. The following table shows the outcomes of data processing for the priority weight value of each criterion:

Table 2. Degree of Importance of Criteria for Determining Priority Factors for Leveraging Silk Yarn Quality in Soppeng Regency.

No.	Criteria	Weight value	Priority
1.	Thread Strength	0,440	1
2.	Thread Thickness/Size	0,278	2
3.	Thread Length	0,178	3
4.	Thread Color	0,104	4

Consistency Ratio = 0.0258

Table 2 shows the results of the yarn strength criteria being the criteria with the highest weight value of 0.440 and yarn color being the criteria with the lowest weight value of 0.104, while the consistency ratio value is 0.0258, indicating the respondent's opinion is entirely consistent (CR < 0.10). Furthermore, the results of the comparison of alternative factors that influence each quality yarn criteria with the results of data recapture can be seen in the following figure:

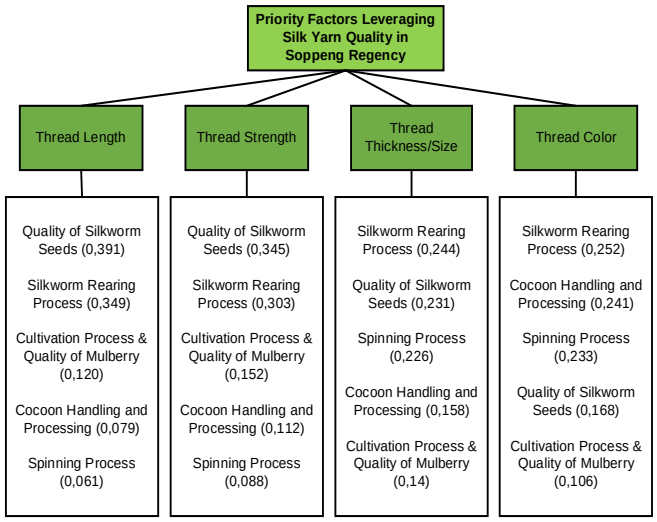

Figure 4. Hierarchical Process Analysis Results, Priority Factors in Soppeng Regency Based on Silk Yarn Quality.

Figure 4 shows that each criterion produces different weight values and priority levels for each alternative. For the yarn length and strength criteria, the quality factor of silkworm seedlings is the most influential. In contrast, the silkworm-rearing process is the most influential factor for the thickness/size and yarn color criteria. The conclusion of the results of determining the priority factors based on a combination of the opinions of the respondents and the results of the super-decision software can be seen in Figure 5.

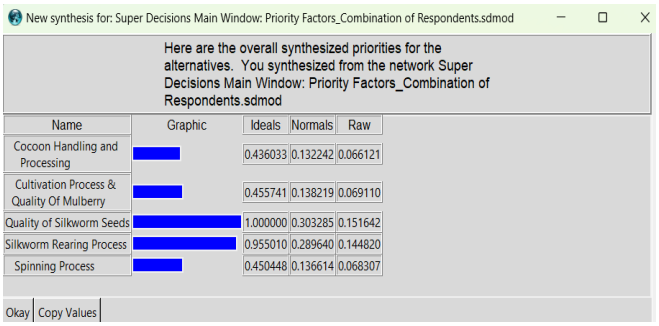

Figure 5. Conclusion of the Results of the Determination of Priority Factors for Leveraging Silk Yarn Quality in Soppeng Regency.

Figure 5 shows the results of processing the respondents' combined data to determine each factor's priority level. The normalized data is utilized as the priority weight value for each factor. The findings of these conclusions are presented in the following order of priority weight value for each criterion:

Table 3. Prioritized List of Leveraging Factors for Silk Yarn Quality in Soppeng Regency.

No.	Criteria	Weight value	Priority
1.	Quality of Silkworm Seeds	0,303	1
2.	Silkworm Rearing process	0,290	2
3.	Cultivation Process and Quality of Mulberry	0,138	3
4.	Spinning Process	0,137	4
5.	Cocoon Handling and Processing	0,132	5

Consistency Ratio = 0.0258

The results of prioritizing the leverage factors of silk yarn quality in Soppeng Regency in Table 3 showed the priority factor, namely the quality of silkworm seeds with a weight value of 0.303, followed by the silkworm rearing process as the second priority factor with a weight value of 0.290. The other three factors, namely the cultivation process and mulberry quality, the spinning process, and cocoon handling and processing have weight values of 0.138, 0.137, and 0.132, respectively. All three have weight values that are not significantly different. Based on these results, it is concluded that the two main priority factors that leverage the quality of silk yarn are the quality of silkworm seeds and the silkworm-rearing process. The two priority factors selected became the levers of silk yarn quality from traditional spinning in Soppeng Regency. This became the basis for preparing optimization strategies in the following research stage.

***Strategy for Optimizing Leverage Factors in Silk Yarn Quality*:** The preparation of strategies for optimizing the leverage factors of silk yarn quality in Soppeng Regency is intended so that efforts to improve yarn quality can be more focused and directed. Strategy formulation is carried out using the SWOT analysis method. The results of the identification of internal and external factors with the SWOT analysis method can be seen in Table 4.

Furthermore, a quantitative SWOT analysis is carried out based on the results of this identification. Quantitative analysis with SWOT is essential to know precisely the condition of natural silk development in Soppeng Regency. The following are the results of the calculation of scores for internal factors to obtain IFAS values and also external factors to obtain EFAS values (Table 5 and Table 6):

Table 5 shows the total IFAS value of 0.284, while Table 6 shows the total EFAS value of 0.139. So, the strategic position of natural silk development in Soppeng Regency is in quadrant I (positive, favorable). The image of the quantitative SWOT results diagram showing the position of natural silk development in Soppeng Regency can be seen Figure 6.

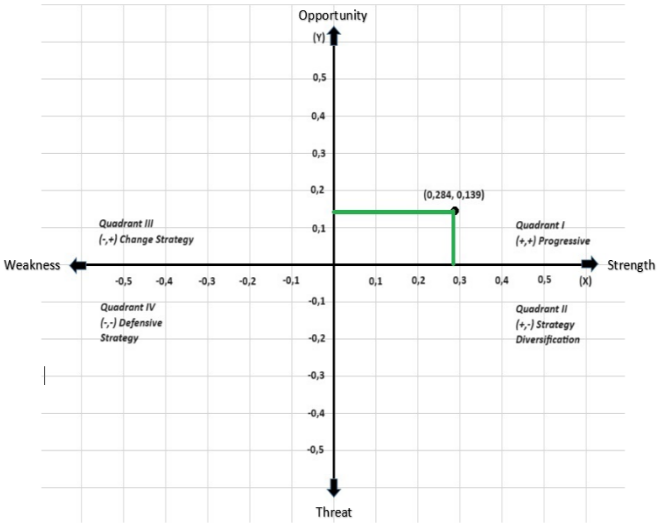

Figure 6. Graph of the Strategic Position of Natural Silk in Soppeng Regency.

The SWOT analysis results show that natural silk development has good opportunities and strengths, especially related to silkworm rearing. Thus, the strategy for optimizing the levers of silk yarn quality that should be applied in the development of natural silk in Soppeng Regency is to support an aggressive growth policy (growth-oriented strategy) or to use a combination of strengths-opportunities strategy (S-O strategy). Considering that the strength factor (0.284) is more significant than the opportunity factor (0.139), the plan should be implemented by maximizing the strength factors owned to take maximum advantage or capture existing opportunities.

A SWOT matrix is used to develop strategy recommendations for optimizing the leverage factors of silk yarn quality in Soppeng Regency. The following strategy recommendations are proposed to optimize the leverage factors:

Table 4. Results of Identification of Internal and External Factors Related to Natural Silk Cultivation in Soppeng Regency Using the SWOT Analysis Method.

Internal Factors	**Strength:** • Local government commitment to provide silkworm egg budget every year • The existence of officially licensed silkworm seed importers in Soppeng Regency • Availability of mulberry cultivation land to support silkworm rearing • Silkworm rearing business that has become a hereditary tradition • natural environment that supports the optimization of mulberry cultivation and silkworm rearing	**Weakness:** • Dependence on imported silkworm seeds • Decreasing public interest in silkworm cultivation • Lack of regeneration among silkworm farmers • Limited standardized silkworm rearing facilities • The absence of innovation and technology developed in silkworm cultivation
External Factors	**Opportunities:** • Potential for natural silk-based tourism development • Natural silk products are luxurious and have high economic value • Development of diversified silk yarn-based products • Growing export market opportunities • Increased government support for the development of natural silk in Soppeng Regency	**Threat:** • Land use competition for other commodities (maize, cocoa, vegetables, etc.) • The abundance of more affordable synthetic fiber products • Competition with cheaper and higher-quality imported silk yarn products • Lack of interest from the younger generation to engage in natural silk cultivation • Land degradation and the global climate change phenomenon

Table 5. Quantitative SWOT Analysis of Internal Factors of Natural Silk in Soppeng Regency.

Internal Factors	Weight	Average rating	Score
Strength			**2,198**
Local government commitment to provide a silkworm egg budget every year	0,102	5,0	0,510
The existence of officially licensed silkworm seed importers in Soppeng Regency	0,071	3,5	0,248
Availability of mulberry cultivation land to support silkworm rearing	0,088	3,0	0,264
Silkworm rearing business that has become a hereditary tradition	0,241	4,5	1,084
Natural environment that supports the optimization of mulberry cultivation and silkworm rearing	0,023	4,0	0,092
Weakness			**1,914**
Dependence on imported silkworm seed products	0,250	4,0	1,000
Decreasing public interest in silkworm cultivation	0,077	4,5	0,346
Lack of regeneration among silkworm farmers	0,083	4,5	0,373
Limited standardized silkworm-rearing facilities	0,038	3,0	0,114
The absence of innovation and technology developed in silkworm cultivation	0,027	3,0	0,081
Total IFAS Score (S-W)	**1,00**		**0,284**

Table 6. Quantitative SWOT Analysis of External Factors of Natural Silk in Soppeng Regency.

External Factors	Weight	Average rating	Score
Opportunities			**2,042**
Potential for natural silk-based tourism development	0,249	4,0	0,996
Natural silk products are luxurious and have high economic value	0,030	4,0	0,120
Development of diversified silk yarn-based products	0,071	3,5	0,248
Growing export market opportunities	0,024	3,5	0,084
Increased government support for the development of natural silk in Soppeng Regency	0,132	4,5	0,594
Threat			**1,903**
Land use competition for other commodities (maize, cocoa, vegetables, etc.)	0,171	4,5	0,769
The abundance of more affordable synthetic fiber products	0,051	2,5	0,127
Competition with cheaper and higher-quality imported silk yarn products	0,083	3,5	0,290
Lack of interest from the younger generation to pursue natural silk cultivation	0,163	4,0	0,652
Land degradation and the global climate change phenomenon	0,026	2,5	0,065
Total IFAS Score (S-W)	**1,00**		**0,139**

***Improve the governance of the supply of government-assisted imported silkworm seeds (SO 1)*:** This strategy is carried out to ensure that the quality of imported silkworm seeds can match the quality expected by the farmers. Based

on the results of interviews with the recipients of silkworm seed assistance, it was found that the quality of the seeds received from year to year has decreased, so the recommendation of this strategy is critical. The improvement of governance in question is to ensure that the types of seeds procured by the government are of high quality. The supply process pays attention to the risk of quality decline, such as storage treatment and distribution to silkworm farmers.

***Increase the capacity of the human resources of silkworm farmers to optimize maintenance according to standards, develop innovation and appropriate technology, and develop various product diversifications (SO 2 and WO 3)*:** This strategy is meant to ensure that the silkworm-rearing process can be carried out properly, by silkworm cultivation standards, and more efficiently to make it more profitable. In addition, it is expected to diversify the products of silkworm cultivation. In addition to producing silk yarn products, there is the potential to utilize other materials in various products, such as damaged cocoon waste, mulberry fruit, and mulberry leaves, that have economic value. This strategy aims to improve the quality of silk yarn products while increasing the income potential of silkworm farmers. This strategy can be implemented through training and guidance, as well as intensive assistance to business actors and study visits to research centers and other silk development sites.

***Encourage the government to facilitate/provide stimulant assistance for other production facilities and infrastructure according to standards so that silkworm cultivation is more efficient and attractive to the public (ST 2 and WO 1)*:** This strategy is similar to the second strategy, which is to ensure that the silkworm rearing process can be done correctly, by silkworm cultivation standards, and more efficiently so that it is more profitable through government intervention. It is expected that the production facilities assisted by the government as stimulant assistance, not only in the form of eggs or silkworm seeds but also other production facilities such as superior mulberry cuttings, fertilizer for mulberry according to technological recommendations, as well as supporting equipment such as cocooning tools. Moreover, the central supporting infrastructure for optimizing cultivation, such as small and large silkworm rearing units for each group of cultivators, cocoon processing units, and other required infrastructure, should also be provided. This strategy needs the commitment of the government to give the budget and is carried out with a careful planning process based on the needs of silkworm farmers.

The implication of the research results for future studies should also be presented at the end of the discussion, not only in the abstract section.

***Conclusion*:** The conclusions of this research are as follows:

1. The main factors affecting the quality of traditional spinning silkworm yarn in Soppeng Regency are the cultivation process and quality of mulberry, the quality of silkworm seedlings, the silkworm rearing process, cocoon handling and processing, and the spinning process.
2. Among the influential factors, the quality of silkworm seedlings and the silkworm rearing process are the most influential priority factors. They become the leverage factors for improving the quality of traditional spinning silk yarn in Soppeng Regency.
3. The results of the SWOT analysis of natural silk in Soppeng Regency are in the first quadrant (progressive), indicating that the condition of natural silk in Soppeng Regency has good strengths and opportunities.
4. Recommendations for strategies to optimize the levers of silk yarn quality in Soppeng Regency include 1) improving the governance of the provision of imported silkworm seeds with government assistance, 2) increasing the capacity of human resources of silkworm cultivators so that maintenance is more optimal according to standards, developing innovation and appropriate technology, and developing diversification of various products, and 3) encouraging the government to facilitate/provide stimulant assistance for other production facilities and infrastructure according to standards so that silkworm cultivation is more efficient and attracts public interest.

***Authors' contributions statement*:** A. W Batara, Mahyuddin, A. Sadapotto, A. W Batara designed and completed the experiments; A. W Batara, Mahyuddin, A. Sadapotto prepared the draft; A. W Batara, Mahyuddin, and A. Sadapotto reviewed and finalized the draft.

***Conflict of interest*:** The authors declare no conflict of interest.

***Acknowledgment*:** The authors are very grateful to Hasanuddin University.

***Funding*:** No Funding

***Ethical statement*:** This article does not contain any studies regarding humans or Animals.

***Availability of data and material*:** We declare that the submitted manuscript is our work, which has not been published before and is not currently being considered for publication elsewhere.

***Informed consent*:** N/A.

***Consent to participate*:** All authors participated in this research study.

***Consent for publication*:** All authors submitted consent to publish this research. article in JGIAS.

***SDG's Addressed*:** No Poverty,Decent Work and Economic Growth,Responsible Consumption and Production,Reduced Inequality.

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