

Sustainable Clove Development Strategies in Pemalang, Central Java

Tri Wahyu Cahyono¹ and Ranny Mutiara Chaidirsyah²

¹Politeknik Pembangunan Pertanian Bogor

²Rural Advisory Services for Southeast Asia (RASSEA)

Jl. Surialaga No.1 Pasiraja, Kota Bogor, 16119, Indonesia

Email: tri.cahyono@pertanian.go.id

ABSTRACT

Cultivating cloves (*Syzygium aromaticum*) shows great potential as an additional income source for farmers in Pemalang. However, farmers face several challenges that hinder productivity and long-term sustainability. To address these issues, a study was conducted to identify the main challenges in clove farming and analyze their effects on agricultural productivity and sustainability using a SWOT analysis. The research used a qualitative approach, with data collected through Focus Group Discussions (FGD), observations, and in-depth interviews from July to September 2024. The findings highlighted weaknesses in technology adoption, threats from pests, and opportunities for market diversification and institutional strengthening as key challenges. Improving productivity and sustainability involves increasing knowledge and technology through training, investing in infrastructure, diversifying products, and establishing long-term contracts to manage risks. These strategies aim to boost clove development in Pemalang, enhance farmers' welfare, and improve competitiveness in the global market.

INTRODUCTION

Agriculture, particularly clove cultivation (*Syzygium aromaticum* (L.) Merr & Perr.), offers numerous employment opportunities for local residents and plays a pivotal role in the economy, society, and environment. Cloves play a significant role in the regional economy, particularly in areas suitable for cultivating this plant. They are a valuable agricultural commodity, providing local farmers with a substantial source of income that improves their living standards. Nonetheless, farmers encounter various challenges that impede productivity and sustainability (Haryana et al., 2021). Without effective solutions, these challenges can adversely affect farmers' incomes, the quality of life of local communities, and regional economic stability. Therefore, a comprehensive analysis is essential to identify

and comprehend these challenges and devise effective strategies to enhance the productivity and sustainability of clove farming in Pemalang.

In Indonesia, clove is widely used as the main ingredient in kretek cigarettes, one of cigarette type made by combining tobacco, cloves, and various other flavors (Sihotang et al., 2018). Additionally, cloves are used as raw materials in various industries, including food, beverage, cosmetics, and pharmaceuticals, promoting the growth of local industries that rely on cloves as a key ingredient (Nurhayati et al., 2018). Clove cultivation also helps diversify the regional economy, reducing reliance on a single crop or economic sector.

The global clove market is dominated by Indonesia and Madagascar, which control over 40% of the market share (Zuhdi

& Rambe, 2021). To enhance the competitiveness of Indonesian clove exports, it is important to focus on increasing domestic clove productivity (Hasibuan & Novianti, 2022). Fluctuations in global clove prices directly impact farmers' incomes and the regional economy. Although agricultural sector exports grew during the Covid-19 pandemic in 2020, the plantation sector experienced a decline in early 2021 due to disruptions in the distribution system locally, domestically, and internationally. This disruption led to a decline in clove prices (Wahdiana et al., 2023).

Clove cultivation encounters several challenges that can impact productivity and sustainability. Clove plants are vulnerable to pests and diseases, including bacterial wilt and borer attacks (Kulendeng et al., 2023), which can cause significant damage and reduce productivity



Figure 1. Observation, Interviews, and FGD

(Patty, 2023). The availability of high-quality clove seedlings is often an issue, as unhealthy or non-superior seedlings can result in poor growth and low yields. Many clove farmers still rely on traditional cultivation methods due to limited access to modern technology such as tissue culture for propagating superior seedlings, the application of the plant growth regulator Paclobutrazol, NPK fertilizer based on recommendations, digital extension media, and knowledge of good agricultural practices (Setiyowati et al., 2022). Additionally, clove prices in the market are often unstable, influenced by factors such as global production, market demand, and speculation, which can impact farmers' income and economic stability. Farmers also encounter challenges in accessing wider markets and obtaining fair prices for their produce (Laman & Mudatsir, 2022; Yakup et al., 2023). Infrastructure limitations, such as poor roads and lack of storage facilities, can also pose barriers.

The annual productivity of clove plants varies due to plant genetics and climate factors. When plants are not properly cared for, especially when prices are low, many clove trees become old, damaged, and have low productivity. Clove farmer institutions are still weak, both in terms of marketing and pest control. The large number of plants attacked by pests causes production and productivity to decline, leading to

a decrease in farmers' incomes (Sujianto et al., 2023).

The main objective of this study is to identify the primary challenges and create effective strategies for developing clove cultivation in Pemalang. The study will focus on conducting a SWOT analysis to address these challenges. The ultimate goal of this study is to offer practical and strategic recommendations to stakeholders, including farmers, local governments, and industry players, to improve clove productivity, sustainability, and competitiveness.

RESULT AND DISCUSSION

We conducted interviews with 15 respondents: 5 clove farmers, 5

agricultural extension workers, 2 village officials/farmer groups, and 3 officials from the District Agriculture Office. Field observations were conducted in clove fields owned by 5 farmers, and FGD with various stakeholders to understand the challenges and strategies for developing clove commodities (Figure 2). The results of these discussions are expected to form the basis for formulating policies that support increasing clove productivity and competitiveness in the related areas.

In the process of SWOT identification, internal and external factors that impact the sector under study are assessed. Identifying challenges and strategies for the development of clove in Pemalang

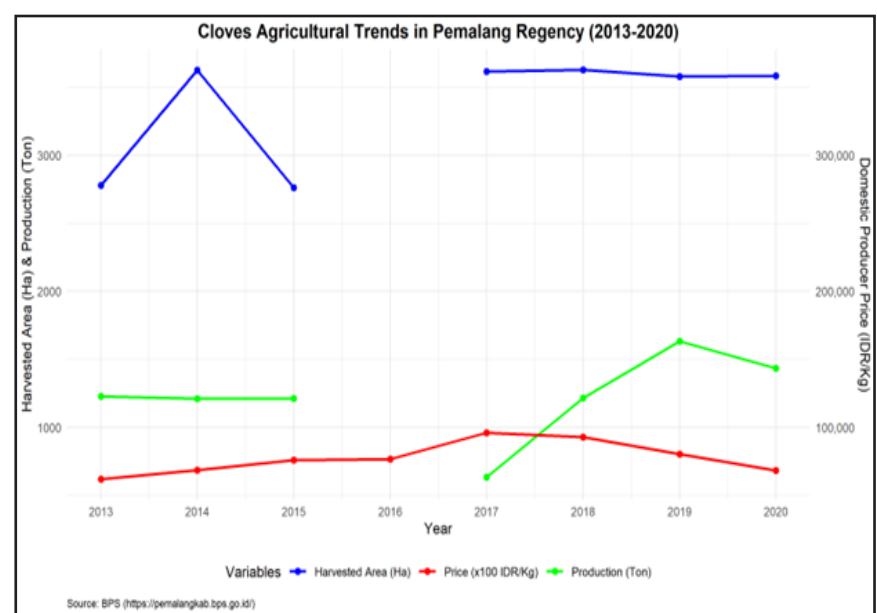


Figure 2. Harvested Area, Production, and Producer Price of Cloves in Pemalang Regency (2013–2020)
Note: Data for Harvested Area and Production in 2016 are not available (n.a.).

involves evaluating internal strengths and weaknesses, as well as external opportunities and threats. The resulting analysis provides a comprehensive view of the strategic position of clove commodities, serving as a foundation for devising the most suitable strategy to leverage existing potential while tackling the encountered challenges.

The figure (Figure 2) illustrates the temporal dynamics of clove cultivation in Pemalang Regency from 2013 to 2020. The harvested area exhibited fluctuations, notably declining in 2015, before achieving relative stability from 2017 onwards. In contrast, production trends demonstrated higher volatility, marked by a significant contraction in 2017, followed by a recovery in subsequent years. Regarding the market valuation, the producer price of cloves in Indonesia recorded an average annual growth rate of 5.21% between 2013 and 2020. Prices ranged from IDR 61,897 per kg in 2013 to IDR 68,443 per kg in 2020, peaking at IDR 95,996 per kg in 2017. Throughout this period, the average price at the producer level was recorded at IDR 77,560 per kg (Pusdatin Kementan, 2023). These price fluctuations are a critical determinant of production stability. Sharp declines in market prices can disincentivize farmers, potentially leading to suboptimal plant maintenance or a reduction in harvested area, which in turn diminishes yields. Conversely, a stable or gradually increasing price trend creates a favorable environment that supports consistent production capacity.

Challenges

One of the most pressing challenges in our area is the outbreak of clove disease, which is causing many plants to wither and cannot be revitalized. As a result, cloves, once

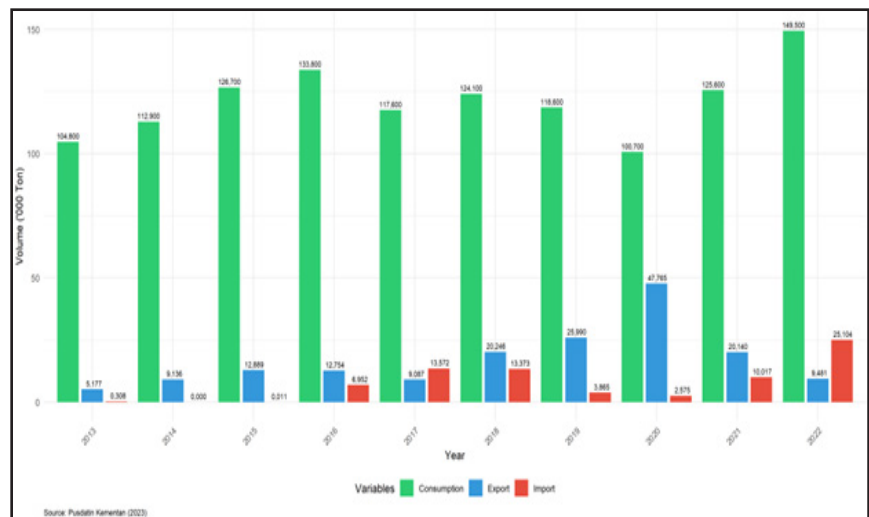


Figure 3. Consumption, Export, and Import of Cloves in Indonesia (2013–2022)

Sources: Pusdatin Kementan (2023)

a prized commodity, are now being supplanted by other crops such as pineapple. A local extension worker from Pulosari District remarked, "The inability to determine the cause of death in 2-3 year old clove plants is a major issue in our region." The recurring deaths of clove seedlings in the rejuvenation program remain an unsolved problem, leading to financial losses for farmers and waning interest in continuing cultivation. The demise of these seedlings suggests potential disease, nutritional deficiencies, or unidentified issues. The lack of clear information regarding the cause of seedling death complicates the ability of farmers to implement effective preventive and corrective measures.

A clove farmer in Belik District explained, "A drop in clove prices reduces our motivation to maintain and expand clove cultivation. Conversely, when prices improve, our interest increases. Currently, the price of wet cloves at the farmer level ranges from IDR 22,000 to IDR 35,000 per kilogram, while the price of dry cloves in the market can reach IDR 70,000 to IDR 120,000 per kilogram." These fluctuations create income instability for farmers and influence their decisions regarding plant maintenance.

Overall, these challenges require a comprehensive approach and further research to pinpoint the exact causes and find effective solutions to enhance the sustainability and productivity of clove cultivation in Pemalang.

Potential and Opportunities

Farmers in Pemalang are expressing interest in expanding and increasing clove cultivation. This desire reflects the potential for enhanced clove production, particularly due to the straightforward care requirements and relatively low costs associated with clove plants. An Agriculture Service officer explained, "Considering an average land ownership of around 0.3 hectares, or approximately 30 clove trees per farmer, there is still ample opportunity to expand cultivated land and capitalize on the potential for increased production."

The straightforward care of clove plants and reliance on rainwater irrigation make clove cultivation an appealing choice for farmers. The profits earned from each harvest provide an additional incentive to continue and expand clove farming, as the harvest can generate a stable income. Clove fields can be intercropped with other crops such

as bananas, corn, and pineapples, allowing farmers to maximize land use and increase economic output from a single area. Intercropping can also aid in risk management and help maintain soil fertility.

The stable and growing demand for cloves presents an attractive business opportunity. The expanding market potential for processed products, such as cigarettes, creates opportunities for farmers and producers to grow their businesses.

Figure 3 illustrates the dynamics of cloves trade and consumption in Indonesia from 2013 to 2022. Domestic consumption exhibited an overall upward trajectory despite periodic fluctuations, growing

from 104,825 tons in 2013 to a peak of 149,578 tons in 2022. This surge in 2022 signals a robust recovery in demand, driven largely by the expansion of the clove-based cigarette (kretek) and food processing industries. Conversely, a sharp contraction occurred in 2020, where consumption plummeted to 100,794 tons. This decline is attributed to the economic slowdown caused by the COVID-19 pandemic, although the market demonstrated resilience by rebounding to 125,630 tons in the subsequent year.

The trade balance (exports and imports) shows a strong inverse relationship with domestic consumption. In 2020, when

domestic consumption was at its lowest, exports surged to a record high of 47,765 tons, suggesting that surplus production was diverted to the international market. However, by 2022, as domestic consumption peaked, exports contracted significantly to 9,481 tons, and imports rose to their highest level of 25,104 tons. This pattern indicates that while Indonesia is a major producer, the domestic market prioritizes local demand; when local industries require more raw materials, exports are restricted, and imports are utilized to bridge the supply gap.

A farmer who is also a clove trader explained, *"Historically, cloves from Pemalang have been distributed to areas such as Purwakarta and Purbalingga before reaching cigarette factories or other industries. With further business development and investment in storage infrastructure, such as warehouses, we can capitalize on increasing demand more effectively."* This infrastructure development can aid in stock management, preserving product quality, and enhancing competitiveness in the market. By harnessing this potential and addressing current challenges, clove development in Pemalang has the potential to yield significant economic benefits, while also contributing to the welfare of farmers and the overall growth of the region.

Strengths

In Pemalang, many farmers have extensive experience in clove cultivation, with some plants being more than 20 years old. This experience reflects a deep knowledge of successful clove cultivation practices. One extension worker in Pemalang explained, "There is a term 'Clove Hajj' among farmers, indicating that cloves have become a significant and

Table 1. SWOT Analysis of Clove Cultivation in Pemalang

Strengths (S)	Weaknesses (W)
Farmers in Pemalang have extensive experience and in-depth knowledge in clove cultivation passed down from generation to generation, with some plants being more than 30 years old.	Many farmers have limited knowledge of good clove cultivation practices and latest technologies, affecting productivity.
Cloves have become an important source of income for farmers, as evidenced by the term "Clove Hajj" which indicates the significant profits from this cultivation.	Inadequate maintenance and lack of anticipation of pests and diseases result in crop losses and reduced efficiency.
Clove fields can be intercropped with other crops such as bananas, corn, and pineapples, increasing land use efficiency and income diversification.	Farmers often use conventional methods and do not have strong farmer groups, limiting the ability to adapt to change and innovation.
Stable and increasing demand for cloves provides promising business opportunities.	Limited adoption of new technologies hampers increased productivity and efficiency of clove cultivation.
Opportunities (O)	Threats (T)
The increasing demand for cloves in the market, both for domestic consumption and export, opens up opportunities for business expansion.	Significant fluctuations in clove prices can affect farmers' income and create uncertainty in cultivation efforts.
Investment in storage infrastructure, such as warehouses, can help in managing stock and increasing selling prices.	Climate change and extreme weather can affect plant growth and cause damage to crop yields.
Application of modern technology in clove cultivation can increase efficiency, productivity, and crop management.	Increasing pest and disease attacks can reduce clove harvests and quality.
Support from the government in the form of policies, training and financing can increase farmer capacity and business sustainability.	The uncertainty of the cause of clove seedling death adds to the difficulty in management and reduces production yields.

stable source of income. Cloves make a significant contribution to household income, enabling many farmers to afford the hajj pilgrimage from the profits of clove cultivation. The long experience of farmers shows their ability to adapt to local conditions and previous experience in managing clove plants, which can be a strength in facing changes and challenges.

Weaknesses

The Agriculture Service Officer explained *"The main weakness is the lack of knowledge among farmers about good clove cultivation practices and the latest technology. Lack of understanding about proper care and prevention of pests and diseases can reduce crop productivity and quality. Having an integrated pest and disease management field school greatly helps farmers increase production. Lack of adequate care and inability to anticipate pests and diseases*

can cause losses in crop yields and reduce production efficiency."

An agricultural extension worker in Watukumpul District stated, *"Clove farmers in Pemalang often rely on traditional management methods without the support of robust farmer organizations or groups. Where farmer groups are present, they are often led by senior farmers who may be less receptive to adopting new technologies and innovations."* This situation impedes the growth of clove businesses on a larger scale and diminishes the potential for improved efficiency and productivity. Limitations in clove cultivation due to the lack of adoption of new technologies and innovations can hinder farmers' ability to increase productivity and effectively manage crops.

SWOT Analysis

From the results of FGD, observations, and interviews conducted, the SWOT analysis for clove development in

Pemalang can be detailed in Table 1.

The SWOT analysis aids in developing effective strategies to address weaknesses, leverage strengths, seize opportunities, and mitigate threats in the advancement of clove cultivation in Pemalang. By identifying the clove SWOT in Pemalang, strategies can be organized in a SWOT matrix, as illustrated in Table 2. The table presents a comprehensive strategic framework for clove development, organized into four strategy types.

Implementing strategies to strengthen and capitalize on pportunities (SO) involves increasing production capacity, improving land management, and diversifying products and markets. To boost production capacity, it's crucial to provide training and education programs for farmers on modern cultivation practices and the latest technology to enhance their knowledge and skills. Education is also vital for implementing intercropping methods and efficient

Table 2. Clove Development Strategy Based on SWOT ResultsCultivation in Pemalang

Strategy Type	Focus Area	Key Activities
SO Strategy (Strengths - Opportunities)	a. Increasing Production Capacity and Land Management	• Training and Education Programs • Investment in Storage Infrastructure
	b. Clove Cluster Growth	• Product Innovation • New Market Exploration
WO Strategy (Weaknesses - Opportunities)	a. Increased Knowledge and Technology Adoption	• Implementation of Modern Technology • Replanting using superior seeds • Government and Institutional Support • Facilitate access to business financing
	b. Strengthening Organization and Management	• Formation of Strong Farmer Groups/Commodity-based Business Institutions • A More Modern Managerial Approach
ST Strategy (Strengths - Threats)	a. Weather and Disease Risk Management	• Risk Diversification • Pest and Disease Monitoring System
	b. Price and Market Stabilization	• Long Term Contract • Supply Chain Development • Development of pricing mechanisms
WT Strategy (Weaknesses - Threats)	a. Plant Care and Quality Management	• Improvement of Plant Care Practices • Agricultural Extension and Technical Support
	b. Research and Development	• Research into the Causes of Seedling Death • Innovation and Standardization in Cultivation

land management to maximize land potential (Ainun et al., 2022; Setiyowati et al., 2022). Furthermore, investing in storage infrastructure is necessary to manage stock and maintain clove quality, while meeting the rising market demand. In terms of product diversification, innovation can be achieved by developing derivative products from cloves, expanding the market, and adding value, such as creating processed products for the food or pharmaceutical industry (Budi et al., 2018). It is also essential to explore new markets, both domestically and internationally, to increase export opportunities and accommodate the growing clove production (Hasibuan & Novianti, 2022; Wahdiana et al., 2023).

To address weaknesses and leverage opportunities (WO) in the clove industry, it is essential to enhance knowledge and embrace technology. The adoption of modern technology in clove cultivation, including technology-based pest monitoring and management systems, is crucial for increasing productivity and efficiency (Umar & Yuliady, 2023). Furthermore, government and related institutions can provide support programs to facilitate farmers' access to technology, training, and financing. It is crucial to enhance organizational and management capabilities to improve competitiveness. Establishing robust farmer groups with proactive leadership in embracing technology and innovation is a pivotal step in fostering collective farming enterprises (Goansu et al., 2019). Providing training for farmer group leaders to effectively manage and develop their businesses is essential. Furthermore, introducing a more modern and efficient managerial approach is necessary to elevate the scale and performance of farmer groups in the long run.

Strategies to capitalize on strengths to overcome threats (ST) in the clove industry involve managing weather and disease risks, as well as stabilizing prices and markets. To effectively manage risks, it is crucial to diversify clove cultivation practices to mitigate the impact of climate change. This can be achieved by using clove varieties that are more resistant to extreme weather conditions. Additionally, the establishment of a monitoring system and rapid response to pests and diseases is essential to safeguard crops from potential damage that could jeopardize production (Luanmasa et al., 2023; Nanja & Kamaruddin, 2023; Triatmoko et al., 2022).

To ensure price and market stability, it is advisable to establish long-term contracts with buyers to secure selling prices and mitigate the impact of clove price fluctuations. Furthermore, enhancing supply chain efficiency from the production stage to marketing can lead to reduced operational costs, ultimately boosting price competitiveness in the market (Yakup et al., 2023).

Strategies to address weaknesses and threats (WT) in the clove industry involve prioritizing plant care, quality management, and research and development. Enhancing plant care guidelines and procedures is crucial to reducing seedling mortality and promoting overall plant health. Ongoing extension services and technical support should be provided to farmers to help them effectively manage plant care issues (Patty, 2023).

To effectively address the challenges, it is imperative to prioritize research and development. A comprehensive research effort is essential to identify the causes of seedling mortality and to devise effective solutions. Additionally, it is vital to promote innovative clove cultivation practices through

experimentation and research in order to discover more efficient methods to overcome the challenges and substantially increase production yields. Implementing these strategies will enable farmers in the Pemalang area to optimize their existing potential, mitigate weaknesses, and proactively address threats, thereby enhancing the sustainability and productivity of clove cultivation

CONCLUSION AND RECOMMENDATION

To address the identified challenges and unlock the potential of the clove sector in Pemalang, several strategic interventions are proposed. Primarily, emphasis should be placed on enhancing human capital and technology adoption through training programs focused on modern cultivation techniques and integrated pest and disease management. Concurrently, investment in storage infrastructure and the institutional strengthening of farmer groups are essential to improve supply chain efficiency and professionalism. In terms of market development, diversifying clove derivatives for the food and pharmaceutical industries, alongside pursuing export opportunities, can significantly broaden market access and enhance added value. Furthermore, to mitigate risks and price volatility, establishing long-term contracts with buyers and implementing climate-adaptive cultivation practices are highly recommended. Supporting this, continuous research to identify the causes of seedling mortality and foster innovation will ensure long-term business sustainability.

However, as this research did not employ a quantitative weighting method to rank the urgency of each intervention, these strategies are presented as a comprehensive set of options. Consequently, further

analysis is required to determine the specific hierarchy and prioritization of these strategies to guide effective policy implementation in the future. By addressing these areas, the objective of optimizing clove development in Pemalang can be achieved.

REFERENCES

- Ainun., Natsir, M., & Mudatsir, R.(2022). Perilaku Tunda Jual Petani Cengkeh Terhadap Perubahan Harga di Desa Tibussan Kecamatan Latimojong Kabupaten Luwu. *Jurnal Agribisnis Unisi*, 11(2).
- Budi, V., Sihotang, L., Yang, G., Chi, X., & Huang, L.(2018). The Ethnobotanical Survey of Clove, Pepper, and Nutmeg and Their Utilization by Chinese and Indonesian People. *Journal of Tropical Biology and Conservation*, 15,15–27.
- Goansu, G., Mustakim, M., & Idrus, S. H. I.(2019). Manajemen Usahatani Cengkeh di Desa Balohang Kecamatan Lede Kabupaten Pulau Taliabu Provinsi Maluku Utara. *Business UHO: Jurnal Administrasi Bisnis*, 4(2).
- Haryana, S., Usman, M., Fajri, & Kasimin, S.(2021). The strategy to improve Indonesian clove production. *IOP Conference Series: Earth and Environmental Science*, 644(1), 1-8.
- Hasibuan, A. I., & Novianti, T.(2022). Analisis Faktor-Faktor yang Memengaruhi Ekspor Cengkih Indonesia ke Negara Tujuan Ekspor Cengkih Utama. *JURNAL MANAJEMEN AGRIBISNIS (Journal of Agribusiness Management)*, 10(2), 762-772.
- Kulendeng, J., Basir, M., & Asrul, A.(2023). Kerusakan Pohon Cengkeh Akibat Serangan Hama Penggerek Batang (*Nothopeus hemipterus*) di Kecamatan Peling Tengah Kabupaten Banggai Kepulauan. *Mitra Sains*, 9(2), 71-79.
- Laman, A., & Mudatsir, R.(2022). Perilaku Tunda Jual Petani Cengkeh Terhadap Perubahan Harga di Desa Tibussan Kecamatan Latimojong Kabupaten Luwu. *JURNAL AGRIBISNIS*, 11(2), 13-18.
- Luanmasa, S. P., Leatemia, J. A., & Uruilal, C.(2023). Intensitas Kerusakan Tanaman Cengkeh (*Syzygium aromaticum* L.) Akibat Serangan Hama dan Penyakit di Negeri Hitu Lama, Kecamatan Leihitu Kabupaten Maluku Tengah. *Jurnal Agrosilvopasture-Tech*, 2(2), 412–420
- Nanja, M., & Kamaruddin, A.(2023). Sistem Cerdas Diagnosa Organisme Pengganggu Tanaman Cengkeh Menggunakan Metode Bayes. *Jurnal Restikom : Riset Teknik Informatika Dan Komputer*, 5(3), 446–458.
- Nurhayati, E., Hartoyo, S., & Mulatsih, S.(2018). Analisis Pengembangan Ekspor Cengkeh Indonesia. *JURNAL EKONOMI DAN KEBIJAKAN PEMBANGUNAN*, 7(1).
- Patty, J. A.(2023). Pengenalan Hama Penyakit Utama Tanaman Pala dan Cengkeh Serta Teknik Pengendaliannya di Desa Morekau, Kecamatan Seram Barat, Kabupaten Seram Bagian Barat. *JURNAL HIRONO*, 3(1), 38-44.
- Pusdatin Kementan. (2023). *Outlook Komoditas Pertanian Cengkeh 2023*. https://satudata.pertanian.go.id/assets/docs/publikasi/OUTLOOK_CENGKEH_TAHUN_2023.pdf
- Setiyowati, T., Fatchiya, A., & Amanah, S.(2022). Pengaruh Karakteristik Petani terhadap Pengetahuan Inovasi Budidaya Cengkeh di Kabupaten Halmahera Timur. *Jurnal Penyuluhan*, 18(02).
- Sihotang, V. B. L., Yang, G., Chi, X., & Huang, L.(2018). Ethnobotanical Survey of Clove, Pepper, and Nutmeg and Their Utilization by Chinese and Indonesian People. *Journal of Tropical Biology & Conservation (JTBC)*, 15(2018), 15-27.
- Sujianto, Ermianti, & Wahyudi, A.(2023). Economic Feasibility of Certified Seed Business Performance for Supporting a Sustainable Clove Production: An Analysis of High-Production Block of Zanzibar Variety. *BIO Web of Conferences*, 69,1-13.
- Triatmoko, N., Paranita, K., Riyanti, K., & Febrinita, F.(2022). Diagnosa Penyakit Dan Hama Pada Tanaman Cengkeh Dengan Metode Certainty Factor (Studi Kasus Kantor Kebun Branggah Banaran). *Jurnal Mahasiswa Teknik Informatika*, 6(2).
- Umar, N., & Yuliady, F.(2023). Sistem Pendukung Keputusan untuk Prediksi Produksi Cengkeh Menggunakan Metode Naïve Bayes. *JURNAL UNITEK*, 16(1): 52-60.
- Wahdiana, E., Tinaprilla, N., & Harmini.(2023). Dampak Pandemi Covid-19 Terhadap Kinerja Ekspor Cengkeh Indonesia. *Forum Agribisnis*, 13(2).
- Yakup, M., Sujarwo, S., & Fahriyah, F.(2023). Financial Feasibility Analysis of Clove Business in Latambaga District, Kolaka Regency, Southeast Sulawesi Province. *Jurnal Ekonomi Pertanian Dan Agribisnis (JEPA)*, 7(1), 186–196.
- Zuhdi, F., & Rambe, K. R.(2021). Daya Saing Ekspor Cengkeh Indonesia di Pasar Global. *SEPA: Jurnal Sosial Ekonomi Pertanian Dan Agribisnis*, 17(2): 165–173.