Nanotechnology Perceptions
ISSN 1660-6795
www.nano-ntp.com

Development of an Agroindustrial System to Increase Added Value and Farmers' Welfare

Yuni Arba'atun, Indah Prihartini, Bambang Yudi Ariadi, Anas Tain

Universitas Muhammadiyah Malang, Indonesia
Email: yunisoedirman77@gmail.com

Indonesia, with its vast territory, still faces challenges in improving the welfare of farmers. To overcome this, the use of agro-industry is important as a strategy to provide added value to agricultural products, so as to increase farmers' income and their overall welfare. Agro-industrial integration helps in the production, processing and marketing processes, as well as expanding market access, which in turn has the potential to improve farmers' welfare. The aim of this research is to improve market access, increase farmer income, and ensure the sustainability of the agro-industrial system while considering economic and environmental impacts. The research method used is descriptive qualitative with documentation data collection techniques, which involve collecting, examining and analyzing existing documents or records as a source of research data. Meanwhile, the data analysis technique uses triangulation. The research results show that agro-industry development is an important strategy to increase the added value and welfare of farmers by processing agricultural products into higher value goods. Through agro-industry, farmers can reduce losses during the main harvest and expand the market with processed products that are more durable and competitive. Institutional, technological and infrastructure support from the government as well as improving the quality of human resources is very necessary so that the agro-industry can develop optimally.
Keywords: agro-industry, welfare, added value, farmers.

1. Introduction

Indonesia, as an agricultural country with a large territory, has great potential for agro-industry development which can improve farmers' welfare and strengthen the national economy. By utilizing the vast amount of agricultural land, Indonesia can develop various types of agro-industry, from processing agricultural products to horticultural products, which in turn can create added value and open up new jobs. Large agricultural land should provide opportunities for village residents and farmers to live prosperously (Kusumaningrum, 2019).

However, many farmers face challenges such as lack of access to modern technology, poor infrastructure, and limited information about efficient farming practices. Plus market price fluctuations, the risk of natural disasters, and inadequate government support make it difficult for them to optimize the potential of existing land. As a result, even though they have large areas of land, many farmers and villagers still experience economic difficulties and a quality of life that does not meet expectations (Yacoub & Mutiaradina, 2020.

The poverty level in Indonesia is still a big challenge, although there has been some improvement. According to data from the Central Statistics Agency (BPS), the main factors that contribute to poverty include income inequality, unemployment, and limited access to basic services such as education and health (Ferezagia, 2018).

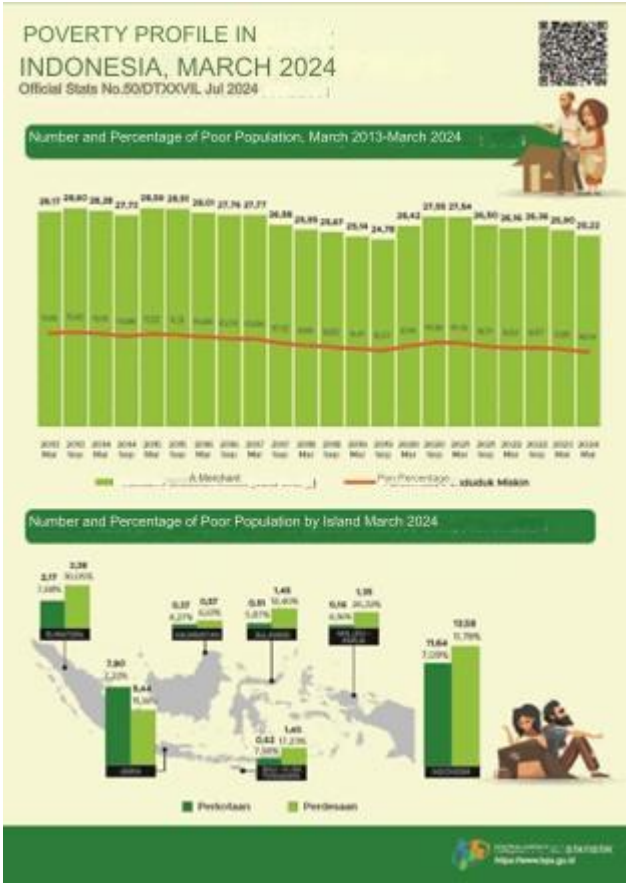

Figure 1. Poverty Profile in Indonesia

Source: Central Statistics Agency

Based on the data from the picture above, poverty in Indonesia is still high. The development of an agro-industrial system can be an effective strategy for improving the welfare of farmers and reducing poverty rates in Indonesia. By increasing the added value of agricultural products through better processing and marketing, farmers can earn higher incomes. Infrastructure support, government policies and the application of modern technology are

very important to increase productivity and competitiveness, as well as reduce post-harvest losses. In addition, a sustainable and environmentally friendly approach must be considered to maintain the balance of ecosystems and natural resources (Ferina et al., 2019).

Previous research conducted by Elizabeth (2019) explains that farmer participation is very important in building a sustainable agricultural system and developing a competitive processed product agro-industry, because it can increase the added value of agricultural products, support farmers' income and welfare, and reduce price losses during the big harvest. Agro-industry functions as the main strategy to reduce farmers' losses by converting agricultural products into processed goods of higher value, while creating employment opportunities. To support this, it is important to improve technology, develop infrastructure, education and develop the skills of agricultural workers in order to improve the quality of human resources.

This research is novel by integrating smart technology and innovation in the agro-industrial system to increase the added value of agricultural products and the welfare of farmers. The aim is to evaluate the application of the latest technology in processing and distribution, optimize supply chains to reduce post-harvest costs and losses, and develop effective partnership models between farmers and industry. Thus, the research aims to improve market access, increase farmer incomes, and ensure the sustainability of the agro-industrial system while considering economic and environmental impacts.

2. Research Methodology

Qualitative descriptive is the method used in research. Descriptive qualitative is a research method that focuses on understanding and explaining social or cultural phenomena through in-depth description and analysis of qualitative data. Data collection techniques use documentation techniques (Yuliani, 2018). Documentation data collection techniques are methods that involve collecting, examining, and analyzing existing documents or records as a source of research data. This document can be a report, archive, statistical data, article, book, or other record that is relevant to the research topic. This technique helps researchers collect detailed and valid information without having to collect primary data directly (Azhar et al., 2022). The data analysis technique uses triangulation. Triangulation is a data analysis technique that increases the accuracy and credibility of research by using multiple methods, sources, or perspectives to verify findings. This involves using multiple data collection methods, information sources, researchers, or theoretical frameworks to ensure more objective and comprehensive research results. By combining various approaches, triangulation helps reduce bias and provides a deeper and more valid understanding of the phenomenon under study (Alfansur & Mariyani, 2020).

3. Results and Discussion

Increasing the added value and welfare of farmers is an important aspect to be realized, this is because farmers have a central role in maintaining food availability in Indonesia. President Joko Widodo highlighted this issue in his meeting with the Qaryah Thayyibah Farmers' Association (SPPQT) in Salatiga, Central Java, on 25 September 2017 (Jatengprov, 2017).

According to the President, improving farmers' welfare should not only focus on production aspects, but the biggest profits in agriculture actually come from business processes, or agribusiness, which involve post-harvest activities. Farmers can gain greater profits from post-harvest activities compared to just planting, looking for seeds, or fertilizing. Therefore, with consolidation in organizational form, post-harvest management will be more effective and provide more benefits.

Agroindustry, as a direct derivative of agribusiness, is a strategic approach that can increase welfare and add value for farmers. Agro-industry combines agricultural activities with the processing industry, where this sector functions to increase production capacity, process agricultural products into products with higher added value, are competitive, and have various benefits (Elizabeth, 2019). Agro-industry aims to change the view that agriculture only focuses on the production of raw consumption materials, to a sector that produces processed products that are more ready to be consumed or used as raw materials for other industries. In addition, this processing process not only increases the selling price of the product but also extends the shelf life and expands marketing opportunities.

Agro-industry includes both semi-finished products (intermediate products) and finished products (final products), such as post-harvest handling and the food and beverage processing industry. Processing processes can vary, from simple processing such as cleaning, grading, and packing, to more complex processing such as milling, flour making, extraction, refining, frying, spinning, canning, and other manufacturing processes (Simatupang et al., 2022). According to Abbas and Suhaeti (2016), agro-industry has a significant impact on global economic development and can help reduce poverty, both in rural and urban areas.

There are several reasons why agro-industry development is important for farmers. One of them is that agro-industry can increase the added value of agricultural products. Processed products tend to have a higher selling value than raw products because the processing process adds value to the product, both in terms of quality and usefulness. Agro-industrial activities are an integral part of the development of the agricultural sector, playing an important role in this process. Agroindustry changes primary products such as agricultural products into processed products with higher added value. Apart from increasing the economic value of products, agro-industry also changes work culture from one that initially had low added value to a modern industrial work culture that is more efficient and productive (Timisela et al., 2021). This means that farmers can get greater income through processing processes carried out by agro-industry.

The added value generated from processed agro-industrial products helps increase farmers' income and welfare, as well as overcome the problem of falling prices of agricultural products during the harvest season. Agro-industry reduces the impact of price drops that often occur during harvest time, when product supplies are abundant and prices usually fall. By immediately processing the harvest, damage or spoilage can be minimized, thereby reducing losses that may arise (Elizabeth, 2019). During harvest times, the supply of agricultural products often exceeds demand, causing prices to fall. Agroindustry helps overcome this problem by processing agricultural products into goods that are more durable and easier to market.

Agro-industrial products offer great opportunities to expand the market. Agro-industry is an

industrial sector that focuses on processing agricultural products, both plants and animals. This process involves the physical and chemical transformation of raw materials, as well as activities such as storage, packaging, and distribution (Fadhil et al., 2017). Because of this processing process, agricultural products that initially only have a short shelf life and little innovation can be transformed into processed goods that are more durable and have many variations. For example, fresh fruit can be processed into juice, jam or other food products. As a result of processed products being more durable and diverse, these products can be marketed to areas that were previously difficult to reach, including export markets. So this agro-industrial process not only extends the shelf life of the product, but also increases its ability to reach a wider market.

Furthermore, another reason why agro-industry is very important for farmers is because of its ability to open up new job opportunities. According to (Fadhil et al., 2017), the processing of agricultural products requires quite a large workforce, from the production to distribution stages. This means that the implementation of agro-industry can open up significant employment opportunities in rural areas, help reduce unemployment and increase the income of local communities. Furthermore, agro-industry development can encourage more stable and profitable agriculture. Due to the existence of agro-industry, the production process does not only stop at the harvest stage but extends to product processing and marketing. This creates job opportunities in various sectors, including processing plants, logistics, distribution and marketing.

Apart from that, agro-industry also plays a role in product diversification. Improvements in processing support product diversification and better agricultural commercialization, which ultimately contribute to increased income and welfare of farmers (Fadhil et al., 2017). Through agro-industry, more types of products are produced, farmers do not only depend on one type of commodity, reducing risks and increasing their economic stability. Relevant as the need for food, feed, energy and fiber increases, as well as fast food consumption patterns which are in line with the increase in human living standards, agro-industry is becoming increasingly relevant. Increasing healthy lifestyles and lifestyle changes that encourage consumption of various types of processed products strengthen the urgency of agro-industry development (Elizabeth, 2019).

For these reasons, the development of an agro-industrial system is very crucial for increasing added value and farmer welfare. As an effort to develop agro-industry, farmers can start with the first step in the form of institutional strengthening. The problems faced by farmers should not be overcome alone because support from various parties or other institutions in the agricultural sector is very necessary (Murtiningrum & Bantacut, 2016). One way to achieve this is through efficiency and business scale management at the farmer group level. Farmer groups help farmers to share knowledge and technology with each other, as well as jointly procure production inputs. In this case, farmer groups form subgroups that focus on various aspects such as post-harvest handling, infrastructure, quality control and product marketing. These activities are integrated under one management roof, so that the process from post-harvest handling to marketing of agricultural products can be carried out effectively and efficiently.

Institutional strengthening can also be achieved by establishing farmer cooperatives. This

cooperative plays an important role in strengthening farmers' bargaining position, especially in terms of price negotiations and access to markets. Farmers can join cooperatives, thereby having greater bargaining power than if they operated individually. Cooperatives facilitate farmers to unite in dealing with other parties, such as buyers or suppliers, which can further increase farmers' ability to obtain better prices. This is also reinforced by (Murtiningrum & Bantacut, 2016), explaining that good farming business management through institutional strengthening is expected to make the supply of raw materials for downstream industries smoother and of better quality, which will have an impact on increasing the growth of downstream agro-industry as a whole.

Furthermore, agro-industry development requires improving the quality of human resources as a second step. According to Murtiningrum & Bantacut (2016), improving education relevant to agro-industry is very necessary to produce skilled workers. Farmers' knowledge and skills are the main key to the success and development of agro-industry in a region. Currently, not all farmers have sufficient knowledge to manage plantations effectively. To overcome this deficiency, there needs to be policy support that focuses on improving or revitalizing institutions and farmer extension programs.

Improving and developing human resources can be done in various ways, such as providing guidance and training on the processing of agricultural products. Relevant agencies or educational institutions that are competent in processing agricultural products can play an important role in this matter. Wardanu & Anhar (2014) suggest that training should cover product processing, packaging and marketing techniques. In this way, farmers and agro-industrial business actors will be better prepared to face challenges and take advantage of opportunities in the market.

Third, improving technology is also a crucial strategy for developing farmers' agro-industry. The development of the processing industry can be improved by implementing agricultural processing processes that are simpler but use appropriate technology. The use of technology helps farmers to produce downstream agricultural products that have higher economic value. The initial step needed is to prepare facilities and technology that can increase the added value of secondary agricultural products (Murtiningrum & Bantacut, 2016).

Technological improvements include several important aspects, especially in terms of machines and equipment. The use of modern machinery and equipment can significantly increase the efficiency of the processing process and the quality of the products produced. Due to better efficiency, the production process becomes faster and more effective, while product quality becomes more consistent and higher (Fatimah et al., 2023). Apart from that, technology also drives product innovation. The development of new processed products with the latest technology can produce products with higher added value. This innovation includes not only improvements in processing methods, but also in product design and marketing processes, so as to better meet market needs and increase the competitiveness of agricultural products.

Furthermore, agro-industry development requires adequate infrastructure to develop optimally. Good infrastructure is very important to support the processing and distribution of agricultural products. According to Rusydiana (2018), so that agro-industry potential can be utilized optimally, adequate infrastructure is needed. This is especially important considering

Indonesia's varied geographic conditions, with some areas being difficult to reach and shortages of resources such as water in some urban and rural areas. Therefore, improving infrastructure, both provided by the government and the private sector, is very necessary.

Infrastructure development includes several key elements. First, good roads make it easier to transport agricultural products and processed products, thereby reducing the costs and time required for distribution. Second, the availability of stable electricity is very important for processing processes, because many production processes require a reliable energy source. Third, a good irrigation system supports sustainable agricultural production by ensuring sufficient water supply for crops. In (Wardanu & Anhar, 2014), infrastructure such as roads, telecommunications networks and good electricity supplies will facilitate the processing and distribution of agro-industrial products.

However, efforts to develop agro-industry cannot be done by farmers alone, support from the government is also very important. Government support covers several aspects. First, the government can formulate policies that support agro-industry development, such as providing incentives, simplifying the licensing process, and providing access to capital. So far, the government has tried to maintain price stability during the harvest season through programs such as assistance with shipping costs for farmer groups (Gapoktan). This assistance includes providing free seeds, which helps farmers in Gapoktan to immediately start the planting season while there is still rain. In addition, the government provides post-harvest assistance, including facilities such as rice milling units (RMU), to prevent crop losses. This policy aims to keep prices from falling below the Government Purchase Price (HPP), which ultimately affects farmers' exchange rates (Ministry of Agriculture, 2020).

Meanwhile, when prices drop during the main harvest season, the government buys agricultural products above market prices or in accordance with the predetermined HPP, and enters into partnerships with the private sector to process the harvest into semi-finished or downstream products. Reported in the Cabinet Secretariat, (2021) one of the government's movements, namely "absorbing farmers' grain", has been initiated by the Ministry of Agriculture to reduce the price contraction of grain or rice during the main harvest season. Post-harvest facilities such as dryers and RMUs are provided to ensure that the rice produced is of high quality and easy to sell at profitable prices.

The existence of this government policy must be utilized by farmers as much as possible so that it can have a positive impact on the welfare of the farmers themselves. However, the role of the government does not stop at just policy, the government also needs to encourage further research and development of technology related to agro-industry. This is important so that farmers and business people can use the latest innovations to increase their efficiency and productivity. With this support, the development of the agro-industrial sector will not only benefit farmers, but also have a positive impact on the country's economy.

There are various types of agro-industrial development that have shown the potential to improve the local economy and farmers' welfare. As in the following examples, the first is the development of the coconut sugar agro-industry in Sukanagara Village, Lakbok District, Ciamis Regency, as found in Hardiyanto's (2020) research. This agro-industry has proven promising because it is able to generate profits of 29.18 percent of the capital spent in one production process. In addition, although labor absorption from the coconut sugar agro-

industry in the village is only 2.47 percent of the total labor force, its contribution to labor absorption remains significant for the local community.

Another example of ground coffee processing at UD. Lapang, Laembulan Hamlet, Pardomuan Village, Sitellu Tali Urang Julu District, Pakpak Bharat Regency. The results from processing Arabica ground coffee show an added value of IDR 1,220,601.38 with a value added ratio of 33.56%. The R/C ratio of 1.36 indicates that this coffee processing agro-industry is feasible to implement, because this ratio is greater than 1, which indicates that the benefits exceed the costs.

Third, the people's tea agro-industry in Cianjur and Garut Regencies, as stated by Trimo & Hidayat (2023). The development of the smallholder tea agro-industry shows excellent opportunities, driven by several factors such as increasing demand for tea-based processed products, growth in global tea demand, government policy support, the existence of a market niche for premium quality tea, and the opportunity to enter export markets to other countries. with high economic growth. In these three examples, it can be seen that agro-industry development has the potential to provide significant economic benefits, increase the added value of products, and absorb labor, which ultimately contributes to the welfare of farmers and local communities.

However, although agro-industry offers many benefits, its development also faces various challenges. Some obstacles that are often encountered in the development of the agro-industrial sector include:

1. Capital

Access to capital is the main obstacle for farmers in developing agro-industrial businesses. Limited capital often prevents farmers from managing their plantations optimally, which has an impact on the quality and quantity of production. This lack of capital also affects farmers' ability to provide sufficient raw materials for agro-industry (Trimo & Hidayat, 2023). Hardiyanto (2020) notes that limited capital makes planning and managing production difficult, especially in the household agro-industry sector in developing countries such as Indonesia.

2. Technology

Many farmers do not have access to the modern technology needed for product processing and packaging (Trimo & Hidayat, 2023). Developing technology that can produce premium quality products from upstream to downstream is a big challenge. Developing innovation and creativity in processed products is very important to meet growing market needs.

3. Market

Finding the right market for processed products is a significant challenge (Trimo & Hidayat (2023). This shows that product placement in the appropriate market requires a good strategy, considering that the right market can influence the success of the product in reaching relevant consumers.

4. Product Quality

Ensuring consistent product quality is very important to build a good reputation (Fitriana &

Setiawan, 2023). Products that consistently maintain product quality not only influence customer satisfaction but can also determine the long-term success of an agro-industrial business. Consistent quality helps build customer trust and creates a positive image in the market.

So, to overcome challenges in agro-industry development, solid cooperation is needed between the government, business actors and other related parties. According to the findings of Timisela et al. (2021), an effective strategy in developing agro-industry requires government intervention to overcome obstacles such as limited capital, low product quality and lack of technology. By anticipating and dealing with these challenges, agro-industry can be developed optimally, providing significant benefits in increasing the added value of agricultural products, as well as improving the welfare of farmers.

4. Conclusion

Increasing the added value and welfare of farmers is very important because farmers have a central role in maintaining food availability in Indonesia. One prominent strategy to achieve this is agro-industry development, which combines the agricultural sector with the processing industry. Through agro-industry, agricultural products can be processed into products with higher added value, thereby providing greater profits for farmers than just focusing on raw production. Agro-industry not only helps extend the shelf life of products, but also expands markets, including export markets, and creates new job opportunities in rural areas. In addition, with strong institutional support, improving the quality of human resources, the use of appropriate technology, and adequate infrastructure, agro-industry can develop optimally and contribute significantly to poverty alleviation and improving farmers' welfare. Government support in the form of policies, incentives and research is also very important to encourage progress in this sector.

References

1. Abbas, A., & Suhaeti, R. N. (2016). Pemanfaatan teknologi pascapanen untuk pengembangan agroindustri perdesaan di Indonesia. In Forum Penelitian Agro Ekonomi. 34(1), 21-34.
2. Azhar, H., Sadar, M., Van FC, L. L., & Putra, P. P. (2022). Penerapan metode dokumentasi untuk monitoring logbook dan presensi mahasiswa kerja praktek di Politeknik Negeri Bengkalis. Jurnal Inovec Polbeng, 7(2), 218-228.
3. Elizabet, R. (2019). Akselerasi pemberdayaan partisipasi petani meraih nilai tambah produk, mendukung agroindustri dan kesejahteraan petani. UNES Journal of Scientech Research, 4(1), 34-51.
4. Fadhil, R., Maarif, M. S., Bantacut, T., & Hermawan, A. (2017). A review on the development strategies of agro-industrial institutions in Indonesia. Asian Journal of Applied Sciences, 5(4).
5. Fatimah, U., Sukma, A. F., Saputra, A. B. M., & Mahmudi, K. (2024). Analisis Konsep Mekanika Pada Mesin Combine Harvester Dalam Pemrosesan Padi Untuk Peningkatan Efisiensi Dan Kualitas Hasil Panen. Jurnal Agro Indragiri, 9(2), 78-84.
6. Ferezagia, D. V. (2018). Analisis tingkat kemiskinan di Indonesia. Jurnal Sosial Humaniora Terapan, 1(1), 1-6.
7. Ferina, Z. I., Kresnawati, Susanti, N., Wagini, & Fitriano, Y. (2019). Peningkatan

kesejahteraan masyarakat melalui pengembangan potensi lokal di Desa Sukasari Kecamatan Periukan Kabupaten Seluma Provinsi Bengkulu. Jurnal Pengabdian Masyarakat Bumi Raflesia, 2(1), 110-116.

8. Fitriana, N. H. I., & Setiawan, R. F. (2023). Analisis nilai tambah dan strategi pengembangan usaha keripik wader pada usaha mikro, kecil, dan menengah (UMKM) di Kecamatan Wonorejo Kota Surabaya. Agridevina: Berkala Ilmiah Agribisnis, 12(2), 76-87.
9. Hardiyanto, T. (2020). Profitabilitas dan Peluang Pengembangan Agroindustri Gula Kelapa dalam Sistem Agribisnis Kelapa (Cocos nucifera L.): Suatu Kasus Di Desa Sukanagara Kecamatan Lakbok Kabupaten Ciamis. Agritekh (Jurnal Agribisnis Dan Teknologi Pangan), 1(01), 46-58.
10. Kementerian Pertanian Republik Indonesia, (2020). Panen Raya Padi Berlangsung, Pemerintah Jaga Stabilisasi Harga. https://pertanian.go.id/home/index.php/page/read/www.spmabanjarbaru.sch.id/?show=news&act=view&id=4289 diunggah tanggal 7 April 2020.
11. Murtiningrum, M., & Bantacut, T. (2016). Potensi Dan Arah Pengembangan Agroindustri Berbasis Kakao Di Provinsi Papua Barat. Agrointek: Jurnal Teknologi Industri Pertanian, 10(1), 1-11.
12. Provinsi Jateng, (2017). Kesejahteraan Petani Perhatian Utama Pemerintah. https://jatengprov.go.id/rilis/kesejahteraan-petani-perhatian-utama-pemerintah/ diunggah tanggal 25 September 2017.
13. Rusydiana, A. S. (2018). Mengembangkan Agroindustri Jawa Timur: Pendekatan Metode Analytic Network Procces. JIET (Jurnal Ilmu Ekonomi Terapan), 3(1).
14. Sekertariat Kabinet Republik Indonesia, (2021). Panen Raya, Pemerintah Terus Lakukan Gerakan Serap Gabah Petani. https://setkab.go.id/panen-raya-pemerintah-terus-lakukan-gerakan-serap-gabah-petani/ diunggah tanggal 4 April 2021
15. Simatupang, A. E. C., Simatupang, J. T., & Berutu, P. T. S. S. (2022). Analisis nilai tambah dan strategi pengembangan agroindustri kopi bubuk robusta. Jurnal Methodagro, 8(1), 67-76.
16. Timisela, N. R., Masyhuri, M., & Darwanto, D. H. (2021). Development strategy of sago local food agroindustry using analytical hierarchy process method. AGRARIS: Journal of Agribusiness and Rural Development Research, 7(1), 36-52.
17. Trimo, L., & Hidayat, S. (2023). Peluang Dan Tantangan Agroindustri Teh Rakyat Di Jawa Barat. Mimbar Agribisnis: Jurnal Pemikiran Masyarakat Ilmiah Berwawasan Agribisnis, 9(1), 1058-1074.
18. Wardanu, A. P., & Anhar, M. (2014). Strategi pengembangan agroindustri kelapa sebagai upaya percepatan ekonomi masyarakat di Kabupaten Ketapang. Industria: Jurnal Teknologi dan Manajemen Agroindustri, 3(1), 13-26.
19. Yacoub, Y., & Mutiaradina, H. (2020). Analisis kesejahteraan petani dan kemiskinan perdesaan di Indonesia. In Prosiding Seminar Akademik Tahunan Ilmu Ekonomi dan Studi Pembangunan 2020 (pp. 92-102).
20. Yuliani, W. (2018). Metode Penelitian Deskriptif Kualitatif Dalam Perspektif Bimbingan Dan Konseling. Quanta : Jurnal Kajian Bimbingan Dan Konseling Dalam Pendidikan, 2(2), 83–91. https://doi.org/10.22460/q.v2i2p83-91.1641