

Product Diversification Strategy in Agribusiness to Increase Farmers' Profits and Economic Stability

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Abstract

Product diversification in agribusiness is an important strategy in increasing farmers' profits and economic stability, especially amidst the challenges of commodity price fluctuations, climate change, and dependence on one type of product. This study aims to analyze the effectiveness of product diversification in agribusiness and identify the most appropriate strategy for farmers to increase their profitability and economic resilience. Using a descriptive qualitative approach, this study was conducted in Berastagi, North Sumatra, as one of the areas with a rapidly growing agribusiness sector. Data were collected through observation, interviews, surveys, and literature studies, then analyzed using a thematic approach to understand diversification patterns and their impacts on farmers' economy. The results of the study indicate that the diversification strategies implemented in Berastagi include horizontal diversification (planting various types of commodities), vertical diversification (processing agricultural products into value-added products), and lateral diversification (development of agrotourism and livestock businesses). Diversification has been shown to increase farmers' income, reduce business risks due to price fluctuations, and expand market access. The success of this strategy is influenced by several main factors, namely access to markets, availability of capital, application of technology, and support from the government and related institutions. However, challenges such as limited capital, lack of skills in product processing, market uncertainty, and complex regulations are still obstacles in implementing diversification. Therefore, a more targeted strategy is needed, such as strengthening sustainable agricultural systems, technological innovation in processing and marketing, and collaboration between farmers, the government, and the private sector. The results of this study are expected to provide insight for farmers, policy makers, and agribusiness actors in developing more effective and sustainable diversification strategies, so as to improve farmer welfare and the resilience of the agribusiness sector as a whole.

Keywords: *Product diversification, agribusiness, farmer profits, economic stability, agricultural innovation*

INTRODUCTION

The agribusiness sector plays a very important role in the economy, especially in countries that rely on the agricultural sector as their main source of income and employment. Agribusiness not only covers agricultural production, but also covers the entire value chain from upstream to downstream, including processing, distribution, and marketing of agricultural products. Thus, agribusiness is one of the strategic sectors that can drive economic growth, increase food security, and create business

opportunities for rural communities. In addition, this sector also contributes to state revenues through the export of agricultural commodities and the development of agricultural-based industries. Therefore, the sustainability of agribusiness is a crucial factor in maintaining the welfare of farmers and the economic stability of a country. (Food and Agriculture Organization (FAO). (2021)

Despite having great potential, farmers in various regions still face various challenges that hinder the development of agribusiness and their welfare. One of the main challenges is the fluctuation of agricultural commodity prices which are often unstable. The price of agricultural products is greatly influenced by global market factors, trade policies, and uncertain weather conditions. As a result, farmers often experience losses when the selling price of their products plummets while production costs remain high. Dependence on one type of product is also a serious problem, where farmers who only rely on one commodity will be very vulnerable to market changes and attacks by pests or plant diseases that can cause crop failure. (World Bank. (2020)

In addition, the risk of crop failure due to extreme weather factors, such as floods, droughts, and storms, is also a major threat to farmers. Increasingly unpredictable climate change exacerbates this situation, so that farmers often have difficulty maintaining stable harvests. Lack of access to modern agricultural technology and limited capital also worsen the situation, hindering innovation, and reducing farmers' competitiveness in the global market. In conditions like this, an effective strategy is needed to increase farmers' resilience to economic and environmental risks, one of which is through diversification of agribusiness products that can help increase income and reduce dependence on just one type of commodity. (Central Statistics Agency (BPS). (2022)

In the agribusiness sector, product diversification is an important strategy that can be used by farmers to increase profits while maintaining their economic stability. Product diversification refers to farmers' efforts to produce more than one type of product or develop agricultural products into other forms that have higher added value. This approach aims to reduce risks caused by price fluctuations, climate change, pest attacks, and other external factors that can threaten the sustainability of agricultural businesses. (Porter, ME (1985)

One of the main advantages of product diversification is increasing farmer income. By planting different types of crops or developing derivative products from agricultural products, farmers can create more sources of income. For example, a farmer who usually only grows rice can grow horticulture such as vegetables or fruits to sell in the local market. In addition, farmers can also process their crops into value-added products, such as turning cassava into flour or chips, so that the selling price is higher than selling raw products. (Ellis, F. (2000)

In addition to increasing income, product diversification also plays a role in increasing the economic resilience of farmers. When a farmer only relies on one type of commodity, they are more vulnerable to market price fluctuations. If the price of their main commodity falls, they can suffer huge losses. However, by having various types of products, farmers can offset the losses from one commodity with profits from other products. For example, if the price of rice falls, but the price of vegetables rises, then farmers can still profit from their vegetable harvest. (Pingali, PL (2012)

Product diversification also contributes to agricultural sustainability and natural resource conservation. By planting a variety of crops, the soil becomes healthier because it does not experience over-exploitation of one particular crop. Rotational cropping systems and varied cropping patterns can also reduce pest and plant disease attacks, so that farmers can reduce their dependence on excessive pesticides and chemical fertilizers. This not only reduces production costs but also helps maintain the balance of the ecosystem. (Reardon, T., Barrett, C.B., Berdegue, J.A., & Swinnen, J.F. (2009)

However, to achieve success in product diversification, farmers need to have sufficient knowledge and skills. Access to technology, markets, and assistance from the government or agricultural institutions are needed so that this strategy can be implemented effectively. In addition, sufficient initial capital is also an important factor in developing a more diverse business. Therefore, support from various parties, including the government, financial institutions, and the private sector, is needed to help farmers implement diversification strategies. (Chambers, R., & Conway, GR (1992)

Overall, product diversification in agribusiness is an effective solution to increase farmers' profits and economic stability. By having various sources of income, farmers can be more resilient in facing market challenges and uncertain environmental conditions. In addition, this strategy also helps create a more sustainable and environmentally friendly agricultural system, which will ultimately provide longterm benefits for the entire agribusiness ecosystem. (Ministry of Agriculture, Indonesia. (2021)

This study will discuss and emphasize on product diversification strategies in agribusiness as an effort to increase farmers' profits and reduce the economic risks they face. Specifically, this study will analyze how the application of product diversification can provide added value for farmers, either through increased income, business efficiency, or resilience to market price fluctuations and environmental conditions. In addition, this study will also explore the impact of diversification on farmers' economic stability, including in terms of business sustainability, reducing dependence on one type of commodity, and increasing competitiveness in the agribusiness market. (Swastika, DKS, & Supriyati, S. (2010)

This study aims to analyze the effectiveness of product diversification in agribusiness as a strategy to increase profits and economic stability of farmers. In facing various challenges such as commodity price fluctuations, climate change, and market uncertainty, diversification is one approach that can help farmers reduce risks and expand income opportunities. Therefore, this study will evaluate the extent to which product diversification can provide positive impacts for farmers, both in terms of increasing income, business efficiency, and long-term economic resilience. (Raharja, S. (2015)

In addition, this study also aims to identify the most appropriate strategy in implementing product diversification in the agribusiness sector. Not all diversification methods provide optimal results for every farmer, because various factors such as land type, climate, access to markets, and the level of farmer skills in managing agricultural businesses play a major role in determining the success of the strategy. By understanding the most effective strategy, farmers can adopt a diversification method that suits their conditions, so that they can increase profitability without increasing excessive production burdens. This study will also explore various approaches that have been applied in various regions to find the best pattern in implementing sustainable diversification. (Sunding, D., & Zilberman, D. (2001)

The results of this study are expected to provide useful insights for various parties, including farmers, policy makers, and agribusiness actors. For farmers, this study can be a guide in developing more effective diversification strategies, both in the form of crop diversification, post-harvest product processing, and new market development. With clearer and research-based information, farmers can make more appropriate decisions in running their businesses, so that they do not only rely on one type of commodity that is vulnerable to market fluctuations. (Swinnen, J. (2015)

For policy makers, this study can be a reference in formulating policies that support product diversification in the agribusiness sector. The government and related institutions can use the findings of this study to design training programs, capital assistance, and incentive policies for farmers who want to implement diversification. With the right policies, it is hoped that farmers can more easily access technology, information, and markets that support the success of their business diversification. (OECD. (2019)

Meanwhile, for agribusiness actors, this research can encourage innovation in the agricultural sector and the food industry. By understanding product diversification trends, business actors can develop new products with more added value, open wider markets, and create more efficient supply chains. For example, food processing companies can work with farmers to produce derivative products from agricultural products that are highly competitive in domestic and international markets. (Nugroho, A., & Wahyuni, S. (2020)

Overall, this research is expected to provide real contributions in encouraging the growth of a more sustainable agribusiness sector. With increasing knowledge and innovation in product diversification, not only farmers will benefit, but also the entire agribusiness ecosystem including government, industry, and consumers. Increasing the welfare of farmers that is more stable and sustainable will also have a positive impact on the economy as a whole, especially in rural areas that depend on the agricultural sector as their main source of livelihood.

LITERATURE REVIEW

1. The Concept of Product Diversification in Agribusiness

Product diversification in agribusiness is a strategy carried out by farmers or agribusiness actors to develop product variations to increase profits and reduce economic risks. This diversification can be done in various ways, depending on business conditions, available resources, and existing market opportunities. In general, diversification in agribusiness can be divided into three main types, namely horizontal, vertical, and lateral diversification. (Ellis, F. (2000)

Horizontal diversification occurs when farmers add new types of products that are still in the same category or sector. For example, a rice farmer who also starts growing vegetables or fruits on the same

land. In this way, farmers can increase the variety of products produced without having to significantly change their production system.

Vertical diversification, on the other hand, is concerned with the processing and processing of agricultural products into value-added products. For example, a cassava farmer not only sells his harvest in its raw form but also processes it into cassava flour or chips. This approach allows the farmer to earn higher profits because processed products generally have a higher selling value compared to raw products. (Reardon , T., Barrett , C.B., Berdegue , J.A., & Swinnen , J.F. (2009)

Meanwhile, lateral diversification refers to the development of products or services outside the main agricultural sector, but still related to the main business. An example is a farmer who opens an agrotourism on his farm, offers educational experiences for tourists about the farming process, or even opens a restaurant that serves his crops. Lateral diversification allows farmers to expand their sources of income through wider sectors.

The success of product diversification in agribusiness is influenced by various factors, including access to markets, availability of capital, farmer skills, and supportive environmental and infrastructure conditions. Farmers who have good market access will find it easier to sell their diversified products, while the availability of capital determines the extent to which they can invest in developing new businesses. In addition, farmer skills and knowledge in managing various types of products are also important factors in ensuring the success of diversification. (Pingali , P. (2004)

2. Impact of Diversification on Profit and Economic Stability

One of the main impacts of product diversification in agribusiness is increasing farmer income. By producing more than one type of product, farmers can reach a wider market and optimize the use of available resources. For example, a farmer who grows different types of crops can sell his products at different times of the year, avoiding the same harvest period and getting a better selling price. (FAO (Food and Agriculture Organization). (2018) In addition, if farmers are able to process their harvest into products with added value, the profits obtained can increase significantly.

Diversification also plays an important role in reducing the risk of dependence on one commodity. Farmers who only rely on one type of product are very vulnerable to market price fluctuations, climate change, and pest attacks that can cause crop failure. However, by having various types of products, farmers can balance their income. If one commodity experiences a price decrease or crop failure, other products can still provide benefits and support the continuity of their business. (Rahman, S. (2009)

In addition, the economic stability of farmers is also better maintained through diversification because this strategy allows them to survive in uncertain market conditions. For example, when there is a decrease in demand for one type of product, farmers who have diversified still have other alternatives to sell. Thus, diversification not only provides opportunities for increased profits but also creates better economic resilience for farmers in the long term. (Daryanto, A., & Hafizrianda , Y. (2010)

Overall, product diversification in agribusiness is an effective strategy to improve farmers' welfare while creating a more sustainable agricultural system. By understanding the concept of diversification and implementing the right strategy, farmers can maximize profits and reduce the risks faced in facing market dynamics and environmental challenges.

3. Effective Diversification Strategy

To achieve optimal profits and improve the economic stability of farmers, product diversification strategies in agribusiness must be implemented effectively. One of the main approaches is to process agricultural products into value-added products. Rather than just selling their crops in raw form, farmers can process them into processed products that have a higher selling value. (Ministry of Agriculture of the Republic of Indonesia. (2020) For example, cassava farmers can produce mocaf flour , chips, or other processed foods that are more durable and have wider market demand. Likewise, fruit farmers can make juice, jam, or other processed products that can increase profit margins compared to selling fresh fruit alone. Thus, diversification through processing agricultural products not only helps increase income but also reduces losses due to perishable crops. (Swastika, DKS, & Supriyati, H. (2016)

In addition to processing agricultural products, developing organic and sustainable products is also a very promising diversification strategy. Consumer awareness of healthy and environmentally friendly products is increasing, so that the market for organic products continues to grow. Farmers who implement organic farming systems can get higher selling prices and increase the competitiveness of

their products. In addition, sustainable farming methods such as agroforestry, crop rotation, and the use of natural fertilizers can help maintain ecosystem balance, increase soil fertility, and reduce dependence on synthetic chemicals. By implementing more environmentally friendly agricultural practices, farmers not only gain economic benefits but also contribute to maintaining environmental sustainability and long-term welfare. (Nugraha, I., & Yuliana, N. (2019)

Furthermore, the application of technology in product diversification also plays an important role in increasing the efficiency and quality of agricultural products. Modern technologies such as automatic irrigation systems, soil monitoring sensors, and drones for land mapping can help farmers optimize their productivity. In addition, the use of processing technologies such as drying machines, vacuum packaging tools, and fermentation technology can increase the durability and quality of processed products, making them more competitive in the market. Not only that, digitalization in marketing also allows farmers to reach consumers more widely through e-commerce and social media platforms, reducing dependence on traditional markets and expanding the reach of product distribution. (World Bank. (2021)

By implementing effective diversification strategies through value-added product processing, organic and sustainable product development, and the use of technology in agribusiness, farmers can significantly increase their profits. In addition, well-planned diversification will provide stronger economic stability, help farmers survive market fluctuations, and create a more competitive and sustainable agricultural ecosystem.

RESEARCH METHODOLOGY

In this study, a **descriptive qualitative approach** is used to analyze product diversification strategies in agribusiness aimed at increasing farmers' profits and economic stability. (Yin , RK (2018) This approach allows research to explore the phenomenon of diversification in depth through empirical studies in the field and analysis of various factors that influence its success. (Creswell , JW (2014)

This research will be conducted in **North Sumatra, specifically in Berastagi** , which is known as a plantation area and a center for value-added agricultural production. Berastagi has a growing agribusiness sector, with various types of commodities such as horticulture, vegetables, fruits, and processed products that have entered the domestic and international markets. (Central Bureau of Statistics (BPS). (2022) The selection of this location aims to understand how local farmers implement product diversification in their agribusiness and analyze its impact on profitability and economic resilience. (Patton , MQ (2002)

To obtain comprehensive data, this study will use several **data collection techniques** , namely:

1. **Observation** , to see firsthand the product diversification practices carried out by farmers and the challenges they face in the field.
2. **Interviews** , conducted with farmers, agribusiness actors, and other stakeholders to gain perspectives on successes and barriers to implementing diversification.
3. **Survey** , which aims to collect quantitative and qualitative data on the level of success of diversification, the economic impact felt by farmers, and market preferences for diversified products.
4. **Literature study** , to strengthen research findings with references from scientific journals, books, and reports related to product diversification in agribusiness. (

In **the data analysis method** , this study will use a **thematic analysis approach** , where the data obtained will be categorized based on patterns and themes that emerge from interviews, observations, and surveys. (FAO (Food and Agriculture Organization). (2020) This analysis will help in understanding how product diversification affects farmers' income and their economic stability. In addition, data triangulation will be applied to ensure the validity and accuracy of the research results by comparing data from various sources and methods used. (Porter , ME (1985) Through this methodological approach, the study is expected to provide a clear picture of product diversification strategies in agribusiness and how these strategies can be implemented effectively to improve the welfare of farmers in North Sumatra, especially in Berastagi .

RESULTS AND DISCUSSION

In this study, the results obtained will be examined through two main aspects, namely the analysis of product diversification carried out by farmers and the impact of diversification on their profits. These

two aspects are interrelated because the diversification strategy implemented will greatly affect the level of income, economic resilience, and competitiveness of farmers in the agribusiness market.

1. Analysis of Product Diversification Carried Out by Farmers

Product diversification in agribusiness is a strategy widely applied by farmers, especially in areas with dynamic agricultural sectors such as Berastagi, North Sumatra. Based on the research results, there are several forms of diversification carried out by farmers, which can be categorized as follows:

a. Horizontal Diversification

Horizontal diversification refers to the practice of farmers growing more than one type of crop in a single farming cycle. For example, farmers in Berastagi do not only rely on one type of commodity, but also grow various vegetables such as potatoes, carrots, cabbage, and fruits such as strawberries and passion fruit. This strategy aims to reduce the risk of crop failure and market price fluctuations that can occur in a particular commodity. By planting various types of crops, farmers can ensure that they still get income even if one of their products experiences a price decrease or growth disruption due to environmental factors.

b. Vertical Diversification

Vertical diversification occurs when farmers not only produce raw materials but also process their crops into value-added products. For example, some farmers in Berastagi have started processing their crops into processed products such as potato chips, passion fruit juice, and strawberry products such as jam and fermented drinks. By doing post-harvest processing, farmers can increase the selling value of their products and expand the market, including reaching modern markets such as supermarkets and exports.

c. Lateral Diversification

Lateral diversification includes expanding agricultural businesses into other related fields, such as agrotourism, livestock farming, or the production of organic fertilizer from agricultural waste. In Berastagi, several farmers have begun opening their land for agrotourism activities, such as picking fruit directly from the garden or educational tours about organic farming techniques. In addition, several farmers have also developed small farms as an additional source of income, such as raising chickens or cows to produce organic fertilizer that is reused in their farms.

d. Factors Influencing Diversification Success

The success of diversification strategies implemented by farmers is highly dependent on various factors that influence their ability to develop value-added products and expand agribusiness. In implementing diversification, farmers face different challenges depending on their access to markets, capital, technology, and external support from the government and related institutions. These factors are key in determining the extent to which diversification can provide significant and sustainable economic benefits for farmers, including:

1) Access to Market

One of the main factors determining the success of agribusiness diversification is farmers' access to markets. Farmers who have good distribution channels, such as access to modern markets, large retail networks, or export opportunities, tend to be more successful in selling value-added products. For example, farmers who can sell their agricultural products to supermarkets or the food industry will have more advantages than those who only rely on traditional markets with prices that tend to fluctuate. In addition, partnerships with exporters or large agribusiness companies allow farmers to reach international consumers, increase product competitiveness, and obtain more stable and profitable prices. Therefore, a good marketing strategy, as well as cooperation with distributors and retailers, are important elements in sustainable product diversification.

2) Availability of Capital

Product diversification in agribusiness often requires a significant initial investment. The process of processing agricultural products, packaging, and marketing value-added products requires capital to purchase equipment, additional raw materials, and other operational costs. Farmers who have access to funding sources, whether from personal savings, cooperatives, financial institutions, or government assistance programs, have a greater opportunity to develop their businesses than those who are

financially limited. The availability of capital also allows farmers to adopt new technologies, increase production capacity, and expand distribution networks. Therefore, financial support in the form of micro-business credit, low-interest loans, or subsidies for agribusiness investment is one of the key factors in driving successful diversification.

3) Technology and Innovation

The use of technology and innovation in the diversification of agribusiness products can increase production efficiency and improve the quality of agricultural products. The application of modern irrigation systems, for example, can help farmers optimize water use and increase crop yields. In addition, the use of processing tools such as drying machines, vacuum packaging equipment, and fermentation technology can help create value-added products that are more durable and have higher selling power. In terms of marketing, digitalization and e-commerce also play an important role in expanding the market for agricultural products. Online platforms such as marketplaces, social media, and agribusiness websites allow farmers to reach consumers more widely without relying entirely on conventional distribution channels. Thus, access to technology and innovation capabilities are important factors in determining the success of a diversification strategy.

4) Support from Government and Related Institutions

The role of government and agribusiness organizations in supporting product diversification is very important to increase farmer success. Assistance provided can be in the form of training and counseling on diversification techniques, agribusiness management, and access to wider markets. In addition, incentives such as agricultural equipment subsidies, people's business credit (KUR) programs, and business assistance can help farmers reduce risks and increase their production scale. The government can also play a role in encouraging policies that support the development of organic products, protect farmers' rights, and facilitate the export of agricultural products to international markets. In addition to the government, non-governmental organizations, cooperatives, and universities also have an important role in providing technical guidance and research to support innovation in agribusiness.

The success of agribusiness diversification strategies does not only depend on farmers' initiatives, but also on various external factors that influence the implementation process. Access to wider markets, availability of capital for investment, application of technology and innovation, and support from the government and related institutions are the main factors that determine the effectiveness of diversification in increasing farmers' profits and economic stability. With the synergy between farmers, industry players, government, and financial institutions, diversification strategies can be implemented optimally to create a more productive, innovative, and sustainable agribusiness sector.

2. Impact of Diversification on Farmers' Profits

Product diversification strategies have been proven to have a positive impact on increasing farmer profits. This impact can be analyzed from several main aspects, namely increasing income, economic stability, reducing business risks, and expanding market access, which include:

a. Increase in Income

One of the main impacts of product diversification is increasing farmer income. By having more than one source of income, farmers can profit from the various products they produce. For example, farmers who not only grow potatoes but also process them into chips or flour can sell their products at a higher price than selling raw potatoes. In addition, processed products also have a longer shelf life, allowing farmers to sell them when market prices are favorable.

b. Economic Stability and Risk Reduction

Diversification also plays an important role in increasing the economic stability of farmers. When farmers rely on only one type of commodity, they are more vulnerable to price fluctuations that often occur in the agribusiness market. For example, if the price of cabbage drops drastically, farmers who only grow cabbage will suffer huge losses. However, farmers who also grow carrots, strawberries, or have an agritourism business can still earn income from other sources. This makes diversification a very effective risk mitigation strategy in the face of market uncertainty and unpredictable weather conditions.

c. Efficient Utilization of Resources

Diversification also helps farmers to utilize their resources more optimally. For example, agricultural waste can be used to produce organic fertilizer, or unproductive land can be diverted to small farms or cultivation of other crops that are more adaptive to certain land conditions. Thus, diversification not only increases profits but also reduces waste and improves overall production efficiency.

d. Expansion of Market Access and Competitiveness

Farmers who implement product diversification also tend to have wider market access than those who only rely on one type of commodity. Processed products have the potential to enter larger markets, including modern retail, e-commerce, and exports. In addition, diversification into organic and sustainable products also allows farmers to reach premium market segments that are willing to pay more for high-quality and environmentally friendly products.

Based on the analysis of diversification carried out by farmers and its impact on their profits, it can be concluded that diversification is an effective strategy in improving farmer welfare. By adopting the right approach, farmers can maximize their agricultural potential, reduce economic risks, and create more sustainable businesses. However, the success of diversification is highly dependent on various factors such as market access, technological support, capital, and supportive policies. Therefore, synergy is needed between farmers, the government, and agribusiness actors to ensure that the diversification strategy can run optimally and provide long-term benefits for the entire agricultural ecosystem.

3. The Effect of Diversification on Economic Stability

Product diversification in agribusiness has proven to be an effective strategy in improving the economic stability of farmers. By implementing diversification, farmers do not only depend on one type of commodity, but have various sources of income that can help them deal with price fluctuations and production risks. One of the main impacts of diversification is reducing the volatility of farmers' income. For example, when the price of a commodity drops drastically due to oversupply or changes in market demand, farmers who have alternative products can still earn income from other products, so that losses can be minimized.

In addition, product diversification also allows farmers to adapt to climate change and uncertain environmental conditions. For example, farmers in the Berastagi area, North Sumatra, who usually plant potatoes can develop other horticultural crops such as carrots, cabbage, and strawberries. With a diverse planting pattern, the risk of crop failure due to pest attacks or extreme weather can be reduced, because not all plants have the same level of resistance to certain environmental conditions.

Another impact of diversification is increased access to a wider market. Diversified products, especially those with added value such as processed or organic products, tend to be more competitive in both domestic and international markets. Farmers who previously only sold their agricultural products in raw form can increase their income by processing their products into higher-value goods, such as vegetable chips, fresh fruit juices, or processed spice-based products. This not only increases profits but also opens up opportunities for farmers to partner with the food industry, restaurants, or exporters.

In addition to the economic aspect, diversification also contributes to the social welfare of farmers. With business diversification, farmers can create more jobs for the surrounding community, both in production, processing, and product distribution. This can improve the standard of living of rural communities and reduce economic inequality between urban and rural areas.

Overall, the product diversification strategy in agribusiness has a very positive influence on the economic stability of farmers. By having various sources of income, farmers are better prepared to face market uncertainty and environmental challenges, and have a greater opportunity to improve their welfare in the long term.

4. Obstacles and Challenges in Implementing Diversification

Although product diversification in agribusiness offers various benefits, its implementation is not always easy and faces various obstacles and challenges. One of the main challenges is the lack of capital and access to financing. Diversification often requires a significant initial investment, whether in the form of procurement of new seeds, processing technology, or post-harvest infrastructure. Many farmers, especially in rural areas, still experience limitations in accessing credit or financial assistance from financial institutions, making it difficult for them to start or expand diversification efforts.

In addition to capital issues, lack of knowledge and skills in product processing is also an obstacle for farmers in implementing diversification. Most farmers are accustomed to conventional farming patterns and do not yet have the skills to process their crops into value-added products. For example, a fruit farmer may understand how to plant and harvest strawberries, but does not yet have the skills or equipment to process them into jam or juice that has a longer shelf life and higher selling value. Therefore, ongoing training and mentoring are needed so that farmers can increase their capacity in developing derivative products that are more competitive in the market.

Another challenge often faced is market uncertainty and product distribution. Although diversification can increase market opportunities, farmers often face obstacles in marketing their products widely. Fierce competition, price fluctuations, and demand instability are factors that can affect the success of diversification. Processed and organic products, for example, require different marketing strategies compared to raw products, such as digital marketing, strong branding, and collaboration with distributors or retailers. If farmers do not have access to or a good understanding of marketing strategies, their diversified products may not be able to reach the desired target market.

In addition to economic and marketing factors, regulatory and government policy aspects are also challenges in implementing agribusiness diversification. Some processed agricultural products require certain permits or certifications, such as organic, halal certification, or distribution permits from the food and drug regulatory agency. This licensing process is often considered complicated and requires additional costs, which is an obstacle for small-scale farmers. In addition, unsupportive government policies, such as the lack of incentives for farmers who want to develop value-added products, can hinder their motivation to diversify.

Equally important, changes in the mindset and culture of traditional farming are also challenges in agribusiness diversification. Many farmers are still accustomed to conventional farming methods that they have been practicing for years, so they tend to be reluctant to innovate or try new business patterns. Concerns about the risk of failure, lack of experience in developing new products, and limited information about diversification potential often make farmers choose to stick with a single commodity, even though they face price fluctuations and income instability. Therefore, educational approaches and socialization about the importance of diversification need to be improved so that farmers are more open to change and innovation in agribusiness.

To overcome these obstacles, support is needed from various parties, including the government, research institutions, academics, and the private sector. Capital assistance programs, processing technology training, market infrastructure development, and policies that support diversification can help farmers overcome the challenges they face. In addition, collaboration between farmers, industry players, and digital marketing platforms can be a solution in expanding the reach of diversified products, so that they can be more competitive in the growing market.

Overall, although the implementation of product diversification in agribusiness faces various obstacles, with the right strategy and adequate support, diversification can be an effective solution to improve farmers' welfare and strengthen their economic stability in the long term.

5. Recommended Strategies for Sustainability

Sustainability in agribusiness is highly dependent on diversification strategies that not only increase short-term profits but are also able to provide positive impacts in the long term. Sustainable diversification must consider economic, social, and environmental aspects so that farmers can continue to grow without damaging existing resources. Based on the research results, several recommended strategies for sustainability in agribusiness product diversification include:

a. Continuous Value Added Product Development

One of the main ways to ensure sustainability in diversifying agribusiness products is by processing agricultural products into value-added products. Processed products have a number of advantages compared to crops sold in raw form, especially in terms of longer shelf life, higher selling prices, and better competitiveness in the market. With processing, farmers can reduce the risk of losses due to perishable products and increase their economic value. In addition, diversification in the form of processing also opens up opportunities for farmers to expand their market reach, both locally, nationally, and internationally.

One form of product diversification that can be developed is processed horticultural products. Commodities such as fresh fruits and vegetables often experience price decreases when there is a production surplus. Therefore, processing them into value-added products can be a solution to overcome price fluctuations. For example, fruits such as strawberries, mangoes, and pineapples can be processed into jams, packaged juices, or dried fruits that have a longer shelf life and are easier to distribute to various regions. In addition, vegetables such as tomatoes can be processed into sauces, tomato paste, or fermented products that are more stable in storage. With this processing, farmers not only gain higher profits, but also reduce waste from unsold crops.

In addition to horticultural products, diversification can also be done through fermented products or functional foods. These products have added value not only in terms of economy but also from the health benefits offered to consumers. For example, organic tempeh is a source of vegetable protein that has a wide market, especially among consumers who prioritize a healthy diet. Yogurt based on local fruit is also an attractive product choice, combining the benefits of probiotics with the natural flavors of fruits grown by farmers. In addition, herbal products such as jamu and herbal tea from natural ingredients such as ginger, turmeric, and lemongrass are increasingly in demand due to the healthy lifestyle trend. By developing these products, farmers can increase their competitiveness and adapt to changes in market demand that increasingly prioritize health and sustainability aspects.

Sustainable diversification strategies also include the use of agricultural waste as an additional source of income. Agricultural waste that is usually thrown away can be processed into products with high economic value, thereby reducing the negative impact on the environment while creating new business opportunities. Examples of the use of this waste include processing coffee skins into herbal tea that is rich in antioxidants or using crop residues for the production of organic fertilizers. In addition, rice husks, sugarcane bagasse, and corn stalks can be processed into alternative fuels or planting media for hydroponic farming. By utilizing agricultural waste, farmers not only increase production efficiency but also create a more environmentally friendly business model.

In order for this processing-based diversification strategy to be sustainable, support is needed in the form of training for farmers in agricultural product processing techniques, so that they can produce high-quality products that meet market standards. In addition, product quality standardization is very important to ensure that processed products meet health and food safety requirements, both at the national and international levels. Certification such as halal, organic, and distribution permits from the Food and Drug Supervisory Agency (BPOM) can increase product selling power, especially if farmers are targeting a wider market. With good training and standardization, processed products from agricultural products will have a greater chance of competing in the global market, thereby improving farmers' welfare and strengthening their economic stability in the long term.

By implementing this strategy, farmers can reduce their dependence on selling raw products that are vulnerable to price fluctuations and climate change. Processing-based diversification not only increases the added value of agricultural products, but also creates a more sustainable, innovative, and adaptive agribusiness system to changing market trends. Therefore, processing agricultural products into value-added products is a strategic step that must continue to be developed to support the economic resilience of farmers and the sustainability of the agribusiness sector as a whole.

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In implementing agribusiness product diversification strategies, it is important for farmers to ensure that the practices carried out are not only oriented towards short-term economic benefits, but also pay attention to environmental sustainability and long-term land productivity. If diversification is carried out uncontrollably, such as excessive land expansion or unwise use of chemicals, this can damage the ecosystem and reduce soil fertility. Therefore, a sustainable agricultural approach must be applied in the diversification process so that farmers can continue to produce optimally without damaging the environment. Some effective methods in supporting sustainable diversification include crop rotation and polyculture, agroforestry, and the use of organic fertilizers and botanical pesticides , which include:

1) Crop Rotation and Polyculture: Increasing Soil Fertility and Plant Resistance

One of the main methods in sustainable agriculture is crop rotation, which is a system of changing types of crops on the same land from one season to the next. With this method, soil fertility can be maintained because different plants have varying nutrient needs and have different impacts on soil

structure. For example, after planting crops that require a lot of nitrogen such as corn, farmers can replace them with legumes that are able to fix nitrogen into the soil, thereby reducing the need for chemical fertilizers.

In addition to crop rotation, polyculture or a system of planting several types of plants in one area is also an effective method in supporting sustainable diversification. Unlike monoculture which only plants one type of plant and is often vulnerable to pests and diseases, polyculture creates a more balanced ecosystem. For example, planting vegetables together with herbs such as basil or marigolds can help repel pests naturally, reduce dependence on chemical pesticides, and increase overall yields. In addition, polyculture also contributes to increasing the efficiency of land use, because different types of plants can grow side by side with complementary benefits.

2) Agroforestry: Integration of Trees and Crops for Environmental Resilience

In addition to crop rotation and polyculture, agroforestry is a diversification strategy that is increasingly being applied in sustainable agriculture. Agroforestry is a system that combines trees with agricultural crops or livestock on one land, creating a more diverse and resilient ecosystem. With the presence of trees in agricultural systems, various ecological benefits can be obtained, such as increasing carbon stocks, protection against soil erosion, and increasing soil moisture that helps plants survive drought conditions.

In areas with high rainfall, trees can act as rainwater retainers, reducing the risk of flooding and increasing water infiltration into the soil. Conversely, in drier areas, trees can provide shade and reduce water evaporation from the soil, helping crops survive in extreme conditions. In addition, the deep roots of trees help improve soil structure and increase the availability of nutrients for nearby crops.

Agroforestry also plays an important role in diversifying agribusiness products. Farmers can combine fruit trees such as avocado, durian, or coffee with food crops such as vegetables and spices. In this way, they can earn income from various sources on one plot of land, increase economic resilience, and reduce the risk of losing the entire crop due to weather or disease.

3) Use of Organic Fertilizers and Botanical Pesticides: Reducing Dependence on Synthetic Chemicals

Sustainability in diversification also depends heavily on how farmers maintain soil and environmental quality without disrupting the balance of the ecosystem. One important step in this regard is to reduce dependence on chemical fertilizers and pesticides by switching to organic fertilizers and botanical pesticides. Organic fertilizers such as compost, manure, and green manure have various benefits compared to chemical fertilizers. In addition to providing nutrients for plants, organic fertilizers also help improve soil structure and increase the soil's capacity to retain water. Regular use of organic fertilizers can increase the population of soil microorganisms that play a role in the natural nutrient cycle, so that soil fertility is maintained in the long term.

On the other hand, the use of botanical pesticides is a solution to control pests and plant diseases in a more environmentally friendly way. Natural pesticides derived from ingredients such as neem, garlic, chili, or soursop leaves can help reduce pest attacks without damaging the balance of the soil ecosystem and without causing harmful residues in the harvest. The use of botanical pesticides is not only safer for human health, but also helps preserve the population of beneficial insects such as bees and pollinating beetles that are very important for agriculture.

4) Sustainable Diversification to Address Climate Change

In addition to economic and environmental benefits, this sustainable diversification strategy also helps farmers face the increasingly real challenges of climate change. Changing rainfall patterns, extreme temperatures, and increasing frequency of natural disasters can have negative impacts on the agricultural sector. However, by implementing crop rotation, polyculture, agroforestry, and the use of natural inputs, farmers can increase their resilience to climate change.

For example, plants with deeper root systems can survive better in drought conditions, while combining different types of crops in one field can reduce the impact of crop failure due to extreme weather conditions. In addition, sustainable agricultural practices such as the use of organic fertilizers and agroforestry also contribute to climate change mitigation by increasing carbon sequestration in the soil and reducing greenhouse gas emissions produced by the agricultural sector.

To ensure that agribusiness diversification remains sustainable, the strategies implemented must consider the balance between agricultural productivity and environmental sustainability. Crop rotation and polyculture can improve soil fertility and plant resilience, while agroforestry provides broader ecological benefits by protecting soil and water resources. The use of organic fertilizers and botanical pesticides is an important step in reducing the negative impacts of synthetic chemicals on agricultural ecosystems. By implementing these strategies, farmers can not only increase yields and economic profits but also build a more resilient and sustainable agricultural system in the face of global challenges such as climate change.

c. Application of Technology in Diversification

Technology plays a very important role in improving the efficiency and sustainability of agribusiness, especially in supporting more effective product diversification. With the development of innovation in agriculture and digitalization, farmers now have more opportunities to increase productivity, reduce crop waste, and expand their market access. Technology not only helps in the production process, but also in the processing, storage, distribution, and marketing of agricultural products, allowing farmers to get more optimal profits and increase their competitiveness in an increasingly competitive market.

One of the technological innovations that supports sustainable diversification is processing and storage technology. In the agribusiness sector, one of the main challenges often faced by farmers is the relatively short shelf life of agricultural products, especially for horticultural products such as vegetables and fruits that are easily damaged. To overcome this problem, the use of processing technology such as drying machines can help extend the shelf life of products without reducing their quality. For example, fruit that is not sold out in fresh condition can be dried into fruit chips or made into extract powder which has a higher selling value. In addition, vacuum packaging is a solution to extend the shelf life of products by reducing oxidation and microbial growth. With this technique, products such as coffee beans, organic rice, and other processed products can last longer without losing quality, thus increasing export opportunities to the global market.

In addition to processing and storage, digitalization of marketing and e-commerce are also key factors in supporting the sustainability of agribusiness. With the increasing development of digital technology, farmers no longer have to rely entirely on middlemen or traditional markets to sell their crops. Various digital platforms such as marketplaces, social media, and agribusiness applications provide opportunities for farmers to reach wider consumers, both domestically and internationally. Through the agribusiness marketplace, farmers can sell their products directly to consumers without intermediaries, so they can get more profitable prices. In addition, social media such as Instagram, Facebook, and TikTok can also be used to promote agricultural products in a creative and attractive way. With an effective digital marketing strategy, farmers can not only increase sales but also build their product brands so that they are better known by the wider community.

Furthermore, the application of the Internet of Things (IoT) in agriculture is also an innovation that can increase the efficiency of resource use and support the sustainability of agribusiness. IoT allows farmers to utilize sensors and smart devices in managing their farms more precisely. For example, soil sensors can be used to monitor soil moisture and nutrient levels in real-time, so farmers can adjust fertilizer and irrigation more accurately. In this way, fertilizer and water use can be optimized, reducing waste, and increasing yields. In addition, an IoT-based automatic irrigation system can help regulate water flow according to plant needs, saving resources, and preventing drought or excess water that can damage crops. This technology is very useful especially in dealing with increasingly uncertain climate change.

Overall, technological innovations in processing and storage, digitalization of marketing, and the application of IoT in agriculture have a huge impact on sustainable agribusiness diversification. By utilizing technology optimally, farmers can not only increase productivity and efficiency, but also have wider market access and be highly competitive. The sustainability of agribusiness in the future depends heavily on the ability of farmers to adapt to technology and implement innovations that can improve their economic welfare, while preserving natural resources.

d. Collaboration with Government, Private Sector, and Financial Institutions

The sustainability of agribusiness diversification cannot fully depend on the efforts of individual farmers, but requires support from various parties that play a role in the agribusiness ecosystem. The government, agricultural institutions, industry, and financial institutions have a strategic role in creating a conducive environment for farmers to develop their businesses sustainably. Close collaboration between farmers and other stakeholders will accelerate the adoption of innovation, increase access to markets, and ensure long-term economic stability.

One important step in supporting the sustainability of agribusiness diversification is through mentoring and training programs. The government and agricultural institutions have the responsibility to provide comprehensive education on product diversification, the application of modern agricultural techniques, and effective agribusiness management. This training can cover various aspects, such as the use of precision agricultural technology, agricultural processing techniques, and digital marketing strategies. With ongoing mentoring, farmers can improve their skills in managing agribusiness businesses that are more efficient and competitive. In addition, training can also help farmers understand the importance of product certification, quality standards, and export regulations that allow them to reach wider markets.

In addition to training, partnerships between farmers and industry and Micro, Small, and Medium Enterprises (MSMEs) are crucial factors in strengthening the agribusiness value chain. The food processing industry, distributors, and retailers can work with farmers to absorb the harvest and process it into value-added products. For example, food companies can partner with farmers to produce healthy snacks based on local raw materials, such as organic banana chips or fresh fruit juice. This partnership not only opens up greater market opportunities for farmers but also guarantees more stable prices and reduces the risk of losses due to commodity price fluctuations. On the other hand, MSMEs engaged in the culinary and home industry sectors can also be strategic partners in creating agricultural-based processed products that can compete in domestic and international markets.

In addition to training and partnership aspects, financial support and microcredit are also needed so that farmers have sufficient capital to develop their diversified businesses. Financial institutions, whether in the form of banks, cooperatives, or agribusiness fintech, can provide access to low-interest financing for investment in agricultural technology, processing equipment, and new product development. For example, farmers who want to develop organic farming need initial investment to obtain organic certification and appropriate infrastructure, such as natural fertilizers and more efficient irrigation systems. With easily accessible microcredit, farmers do not need to worry about limited capital in developing their product diversification. In addition, group-based or cooperative financing schemes can also be implemented to reduce the risk of bad debt and encourage a spirit of mutual cooperation in the farming community.

With solid collaboration between farmers, government, industry, and financial institutions, the sustainability of agribusiness diversification can be more assured. Farmers will get easier access to modern technology, adequate capital, and certainty of a more stable market. This not only improves the welfare of farmers individually but also has a positive impact on national food security and strengthening the agribusiness sector as a more resilient pillar of the economy. Therefore, synergy between various parties must continue to be strengthened to ensure that agribusiness diversification is not only a short-term strategy but also becomes the foundation for more sustainable and inclusive agriculture.

e. Market Strengthening and Product Branding Development

In order for product diversification in agribusiness to be sustainable, one of the main factors that must be considered is the existence of a clear market and a strong marketing strategy. Without a stable market and an effective promotional strategy, diversified products will be difficult for consumers to accept, so that farmers cannot feel the optimal benefits of the diversification that has been carried out. Therefore, strategic steps need to be implemented to ensure that agribusiness products have high competitiveness, both in local and international markets.

One step that can be taken is the creation of a strong local brand. Agribusiness products need to have a distinctive identity in order to attract consumers and have more value compared to similar products on the market. One way to strengthen a local brand is to obtain organic certification which guarantees that the product is produced through an environmentally friendly process and is free from synthetic chemicals. In addition, geographic labels (Geographical Indication (GI) can also provide a competitive advantage for agricultural products that have certain characteristics based on their

production location, such as Gayo coffee from Aceh or Berastagi oranges from North Sumatra. Branding based on farmer communities is also an effective strategy, where products are not only sold as ordinary commodities, but also reflect the social and cultural values of the community that produces them. With a strong brand, consumers will more easily recognize and trust the agribusiness products produced.

In addition to having a clear brand, developing a distribution network is an important aspect in expanding the market reach of diversified products. Farmers and agribusiness actors need to collaborate with various parties to ensure that their products can reach consumers more effectively. One form of cooperation that can be done is with agricultural cooperatives, which function as a forum for farmers to manage production and marketing collectively, thereby increasing their bargaining power in the market. In addition, partnerships with supermarkets and modern retailers allow agricultural products to be sold on a wider scale, with quality and standards that have been adjusted to market demand. Not only in the domestic market, exports abroad are also a great opportunity for Indonesian agricultural products that have unique and competitive advantages. With the right distribution strategy, diversified products will not only survive in the local market, but will also be competitive in the global market.

In today's digital era, promotion through digital media is a crucial factor in increasing the appeal of agribusiness products. Utilizing social media such as Instagram, Facebook, and TikTok can help introduce products more widely and directly to consumers. In addition, websites and marketplaces can also be used as a means of sales, so that farmers do not only rely on traditional markets but can also sell their products online. Collaborating with influencers or food bloggers who have a wide audience can also be an effective strategy in introducing agricultural products to a larger number of potential buyers. With a good digital marketing strategy, agribusiness products can have a wider reach, increase brand awareness, and attract consumer interest in a more interactive and modern way.

By implementing a market strengthening strategy that includes strong branding, extensive distribution networks, and effective digital promotions, diversified products in agribusiness can not only survive in the local market but also have a great opportunity to enter the international market. These steps will help farmers and agribusiness actors in increasing the selling value of their products, strengthening competitiveness, and creating a more sustainable agribusiness system that is oriented towards long-term growth.

Product diversification strategies in agribusiness must be designed with sustainability aspects in mind to provide long-term benefits for farmers. Development of value-added products, implementation of sustainable agricultural systems, utilization of technology, collaboration with various parties, and strengthening product markets and branding are steps that can ensure diversification not only increases profits but also provides better economic and ecological stability. With the implementation of the right strategy, farmers can build a more resilient, innovative, and highly competitive agribusiness in this modern era.

CONCLUSION

Based on the results and discussion of this study, it can be concluded that the product diversification strategy in agribusiness is an effective step to increase farmers' profits and economic stability. Diversification implemented by farmers in Berastagi, North Sumatra, includes horizontal diversification (planting various types of crops), vertical (processing of value-added products), and lateral (development of related businesses, such as agrotourism and livestock). This strategy has been proven to be able to increase farmers' income, reduce business risks due to price fluctuations, and expand market access.

The success of diversification is greatly influenced by several main factors, such as access to markets, availability of capital, application of technology, and support from the government and related institutions. Farmers who have good distribution channels, access to credit or financial assistance, and utilize modern technology tend to be more successful in developing value-added agribusiness products. In addition, support in the form of training, supportive policies, and partnerships with the private sector also play a role in ensuring that diversification can run optimally and sustainably.

However, the implementation of diversification also faces various challenges, such as limited capital, lack of skills in product processing, market uncertainty, and complex regulations. Therefore, a comprehensive strategy is needed to overcome these obstacles, such as strengthening sustainable agricultural systems, implementing technological innovations, and collaborating with various parties in building a more inclusive and competitive agribusiness ecosystem.

As a recommendation, farmers need to increase their capacity in processing agricultural products into value-added products, adopt modern agricultural technology, and strengthen digital marketing strategies in order to compete in a wider market. The government and related institutions are expected to provide greater support in the form of mentoring, access to capital, and policies that support the growth of the agribusiness sector. By implementing appropriate and sustainable diversification strategies, farmers can not only improve their welfare but also contribute to strengthening national food security and the development of a more advanced agricultural sector in the future.

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