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# Reformulation of Persimmon Value-Added Model: Product Downstream Development Strategy for Farmers in East Java, Indonesia

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**Abstract:** This research aims to reformulate the value-added model of persimmon fruit as an instrument to increase farmers' income by developing a product downstream strategy. This research was conducted in Malang and Tulungagung in East Java through observation and interviews. Then, we used SWOT analysis technique (strengths, weaknesses, opportunities, and threats) to identify various factors in reformulating and developing strategies systematically. The results show that farmers must consider product diversification, improved quality and packaging, certification and label, increased nutritional value, marketing and promotion, network and partnership development, training and capacity building, access to capital and financing, research and innovation, and farmer empowerment. Then, in downstream development, it is necessary to carry out strategies in the form of increased production quality, sustainable agricultural practices, processed product development, preparation of partnerships with private parties, effective marketing and promotion, intelligent packaging, product diversification, logistics and distribution optimization, business and financial management, and organic and sustainable certification. This research also identified that persimmon fruit production has great potential, with a large amount land and a high amount of production. In addition, various downstream persimmon products in the form of processed food and beverages can provide significant added value and have the potential to increase farmers' incomes.

**Keywords:** value added; downstream; persimmon; SWOT analysis



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## 1. Introduction

Persimmon fruit, or *Diospyros kaki* L. which isits scientific name [1], has experienced an increase in demand due to the spread of COVID-19, which has killed millions of people throughout the world, because the ingredients contained in persimmons are thought to be able to kill virus activity in the body [2,3]. Research shows that the tannins in persimmons can function as drugs to eradicate the COVID-19 virus [4,5]. There are many other options, but persimmons are effective in fighting COVID-19. Persimmon fruit juice is said to have the ability to weaken coronavirus, and persimmon juice even makes the coronavirus safe. Persimmons are easy to find and contain various nutritional contents that benefit life, including bioactive compounds that function as medicine. Persimmon fruit is one of the most useful fruit plants.

Persimmon fruit contains water, protein, fat, carbohydrates, vitamins A and C, potassium, potassium, phenol, and tannins. Apart from that, persimmons can function as a medicine to prevent cancer and heart disease and even function as a medicine to lower high blood pressure [6–8]. Also, persimmons can be used as a basic ingredient for food, feed, medicine, organic fertilizer, botanical pesticide, and in chemical industries. Persimmons contain tannins to stimulate the growth and development of active microbes, which play a role in organically compounding various chemical elements [9,10]. Persimmon is a subtropical plant, so it is only adapted to an altitude of ±1400 m above sea level in Indonesia [11]. In addition, persimmons contain various nutrients such as vitamins and minerals, antioxidants such as β-carotene, β-cryptoxanthin, lutein, zeaxanthin and lycopene, as well as provitamin A [12,13]. In addition, persimmons can also be processed into various types of food and drinks, including sweets, juices, cake mixes, and jams [14–16]. The coarse dregs can be processed into organic fertilizers and pesticides [17]. Meanwhile, fine dregs can be used as ruminant feed [18].

Globally, people know of persimmons as oriental persimmons or Chinese persimmons, so they are often thought to come from China [19,20]. However, persimmons that grow in Indonesia are native plants that grow wildly, so they are different from plants in other countries. This is based on its characteristics, species, and nature. Currently, the commercialization of persimmon production has expanded to New Zealand, Australia, and Israel [21,22]. Meanwhile, most people in the Association of Southeast Asian Nations (ASEAN) region, such as Indonesia, Malaysia, and Thailand, only use it for local consumption purposes. Even though farmers in the Berastagi region in Indonesia once exported to Singapore, this stopped because the quality was competitive with other countries. Persimmon fruit can be found in several regions on the islands of Java and Sumatra, but fruit grown in the East Java region is of better quality and produced in greater quantity than other regions, especially in the Bumiaji, Ampelgading, and Tirtoyudo regions [23]. Farmers usually soak persimmons in a lime solution or use alcohol, carbon dioxide, and hot water to produce a higher-quality taste [24,25]. This is because persimmons have an astringent taste [26].

Indonesia has natural wealth in agricultural and forestry products [27,28]. Currently, Indonesia has implemented agricultural cultivation technology, such as food crops, horticulture, and plantations [29–31]. This has succeeded in increasing agricultural productivity at the farmer level, although this increase in productivity has not been able to increase farmers' income and welfare significantly [32–34]. Farmers' income is influenced by various factors that are interrelated with each other. These factors include farming capital, continuous availability of raw materials, knowledge, development of technological innovation, skills regarding agribusiness, investment, marketing, and others, including the low added value of agricultural products produced by farmers [35–37].

The agricultural sector has contributed to employment but has yet to be able to play a role in increasing overall economic growth, only contributing 13.52% to the economy [38]. Contributions that have not been maximized indicate that there is potential for agricultural productivity to be run better or that the agricultural sector needs to be able to provide added value to agricultural products [39,40]. In essence, agricultural products are only limited to upstream products, while their development at the downstream level has yet to be systematically connected, even though downstream products are a need for every consumer [41]. At the downstream level, this can increase farmers' income because raw materials can be transformed into industrial products [42,43]. Increasing the added value of agricultural products can be achieved through product downstream and post-harvest processing, especially at the farmer level, so that persimmon fruit, which is a multi-benefit fruit crop, can be utilized in industrial production such as pharmaceuticals or health medicines, and food and health drinks [44,45]. This transformation process at the farmer level will increase the price of persimmons. Thus, the existence of persimmons will be an exciting prospect. Developing a downstream industry is an opportunity to bridge the

processing industry and the agricultural sector. Downstream is predicted to be able to become a powerful engine for economic progress in developing agriculture [46].

The researchers put forward several partnership patterns in horticultural commodity agribusiness, including the Agribusiness Operational Cooperation Pattern, the Core-Plasma Pattern, the STA Development Cooperation Pattern, the cooperation pattern in providing capital through multi-business cooperatives (KSU) and the Village Credit Institutions (LPD), and the procurement contract system of horticultural products through suppliers and general trading patterns. A win–win solution system for profit sharing by both parties working together based on an agreed agreement has a positive impact [47,48]. On the other hand, cooperation that has the potential to be detrimental, with minimal involvement of farmers in assessing the results of their products resulting in the purchase of partner farmers' harvests at the same price even though the quality produced is better [49].

Most researchers have conducted studies on persimmon with the aim of revealing the characteristics, cultivation patterns, and health benefits in different countries [50–53]. However, this research aims to reformulate the downstream pattern of persimmons with an appropriate approach by implementing strategies that are suitable for field conditions, so as to increase selling prices through increased value added, which will also contribute to the income of persimmon farmers through various strategy patterns.

One concrete step that can be taken to increase farmers' income is to increase the added value of agricultural products through downstream persimmon products and to develop upstream-to-downstream industries. Apart from that, increasing added value can be achieved by creating derivative products so that the price level will be higher and can be enjoyed by farmers as raw material providers. This research aims to reveal a model for increasing added value in farmers' income through downstream persimmon fruit products. Apart from that, this research includes reformulating downstream implementation strategies.

## 2. Materials and Methods

Persimmons usually grow in Indonesia at an altitude of 1000–1500 m above sea level with an average daily air temperature of 16–22 °C [54]. Persimmons have the potential to be developed in areas with an elevation of more than 700 m above sea level with cool temperatures and slightly dry humidity using an alley cultivation system, namely, placing persimmons as a protective plant [11,55,56]. Persimmons can be found in the highlands in various regions of Indonesia, such as Malang, Majalengka, Garut, Kuningan, Karo, Toba, Solok, and Central Aceh. Persimmons have been developed in some districts in Indonesia like Cisurupan, Garut, Ciloto, Boyolali, Temanggung, Magelang, and Magetan. This means that persimmons can be widely cultivated in the Indonesian highlands. However, farmers need to improve the quality of the plants and fruit production, so it is necessary to initiate value-added and downstream activities in order to ensure the sustainability of farmers' income [56].

Value-added and downstream processing in persimmon fruit are related to processing, packaging, and product innovation [57,58]. In industry, added value refers to increasing the quality or economic value of a product through additional processes such as processing, packaging, or innovation. Downstream processing is an economic strategy used to build a series of added values by combining economic activities, such as changing raw materials into finished products with higher economic value. Value added and downstream are closely related to the processing process and increasing the economic value of raw materials by transforming them into finished products. Added value can occur through various means, such as advanced processing, packaging, shipping, marketing, and product innovation. Increasing the added value of products can also be achieved by changing raw materials into more valuable finished products. Apart from that, advanced processing is also known as downstream, which is a method of increasing the added value of agricultural products by converting raw materials into more valuable finished products. One example

is turning raw persimmons into processed foods such as jam, sweets, or drinks, which have a higher economic value than fruit.

The added value of production and efficiency are often considered in business expansion programs and policy formulation in the agricultural sector so that they can be applied to persimmon cultivation [59]. Agricultural businesses with high-added production value supported by downstream products will encourage business expansion. Business expansion is rational because it can reduce average costs. If a reduction follows the increase in added value in costs, then agricultural businesses will achieve the scope of efficiency. Agricultural businesses with a scope of efficiency can produce output at various levels with the lowest costs so that farmers can increase their income and improve their standard of living [60].

The development of downstream agriculture in rural areas has the potential to create jobs for community members. Job opportunities in rural areas provide guarantees to reduce unemployment and prevent urbanization. Apart from that, the rural economy will also run smoothly and be able to grow well. The downstream concept can be implemented directly at the farmer or farmer group level or with other agricultural business actors to guarantee increased income. The agricultural industry or agroindustry must be built in an integrated manner, both vertically and horizontally, with other agribusiness subsystems, such as the subsystem for providing production facilities and machinery, the marketing subsystem, and the cultivation subsystem, as well as supporting subsystems [61].

This research focuses on strategies to increase the added value of farmers' income through the downstream process of persimmon fruit products in the East Java region. The data used in this research were obtained through interviews and direct observation. This research uses a social paradigm and a qualitative approach to enable a deeper understanding of social reality, as well as to explore the deeper understanding behind the social phenomena studied. This research was conducted in the Malang Regency area, which includes Tirtoyudo and Ampelgading districts, based on observations of cultivation and production systems and the implementation of downstream industries for persimmon fruit products in Tulungagung.

The first stage of this research includes entering the field by interacting with farmers and related stakeholders. The second stage involves collecting data through direct observation and interviews with farmers, community leaders, and government officials related to persimmon farming. The third stage includes processing and analyzing the data using the SWOT analysis technique (strengths, weaknesses, opportunities, and threats), which aims to systematically identify various factors to formulate strategies [62–64]. This analysis is based on logic that can maximize strengths and opportunities. However, it can simultaneously minimize weaknesses and threats. This data analysis process also involves creating a SWOT matrix and mapping through identifying favorable situations, situations with threats and internal strengths, situations with opportunities and internal strengths, and unfavorable situations. Apart from that, SWOT analysis also includes internal and external factors through the Internal Strategic Factors Analysis Summary (IFAS) and External Strategic Factors Analysis (EFAS) matrices [65,66] based on the situations identified in the following framework (Figure 1).

This research uses data collection techniques through field surveys, observations, and interviews at various sources. Research data sources include persimmon farmers and entrepreneurs related to cultivation systems, marketing systems, downstream persimmon fruit products, and the socioeconomics of farmers with the following targets (Table 1).

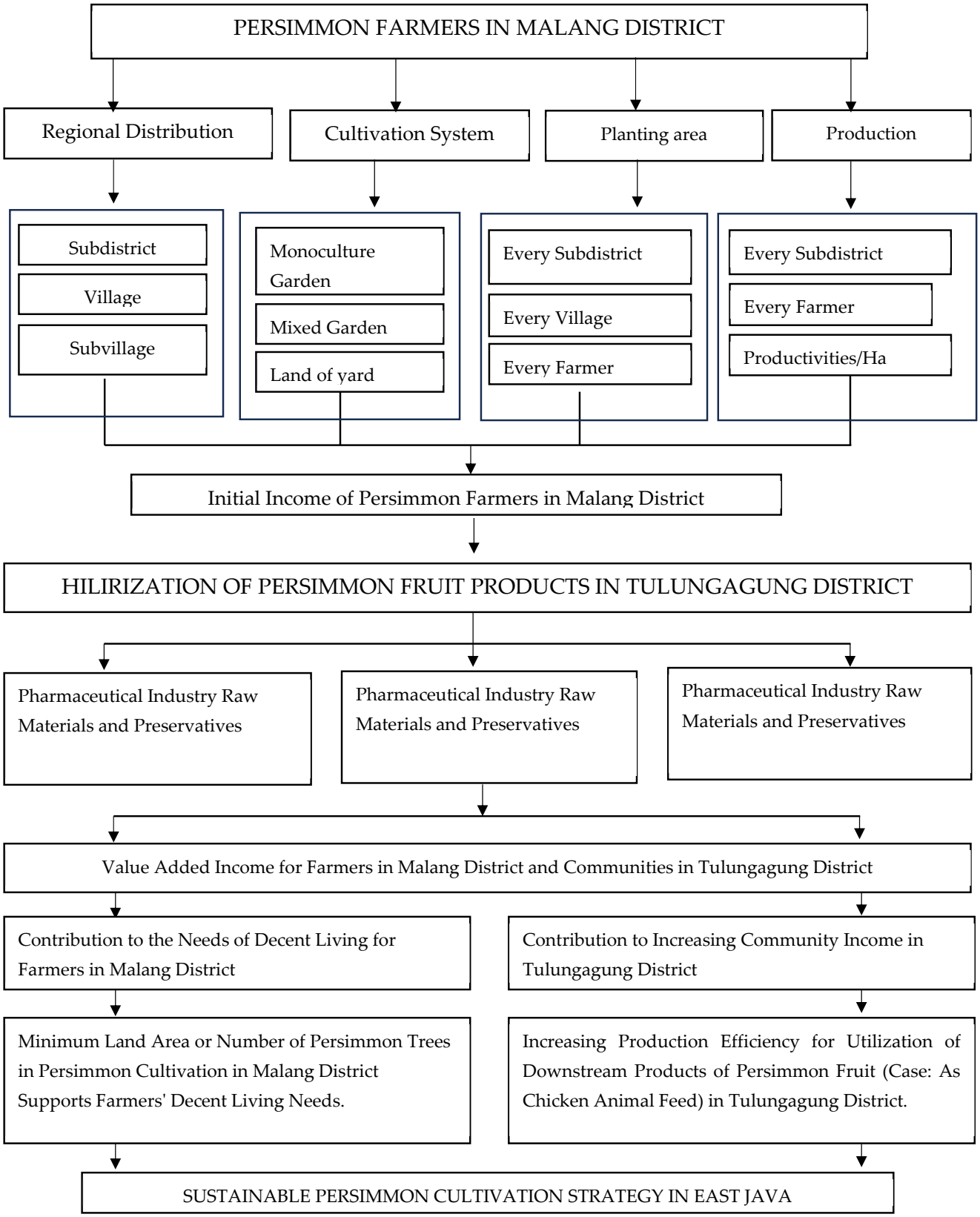


**Figure 1.** Research framework.

**Table 1.** Data collection and techniques for downstream development strategy of persimmon products for farmers in East Java, Indonesia.

| | Data Collection Goals | | Data Collection Technique | Location |
|---|---|---|---|---|
| 1 | Farmers cultivating persimmon trees | 1 | Field survey | Malang district |
| 2 | Persimmon tree cultivation system | 2 | Descriptive Analysis | Malang district |
| 3 | Input (capital input/financing) in persimmon cultivation | 3 | Interviews | Malang district |
| 4 | Output (output/result) from persimmon cultivation at the producer–farmer level | 4 | Interviews | Malang district |
| 5 | Persimmon fruit marketing system at the producer–farmer level | 5 | Interviews and descriptive analysis | Malang district |
| 6 | Product downstream system (post-harvest industry) for persimmon fruit | 6 | Interviews and descriptive analysis | Tulungagung district |
| 7 | Input and output downstream of persimmon fruit products | 7 | Interviews and descriptive analysis | Tulungagung district |

Primary and secondary data consist of surveys, interviews, and field observations. Secondary data come from various sources, including administrative maps of research locations, topographic maps, soil-type maps, climate data, population data, and other sources. The analysis was carried out descriptively to observe the profile of sample persimmon farmers, cultivation systems, and social, economic, and cultural variables. The quantitative analysis looks at the amount of added value obtained by farmers due to downstream persimmon fruit products.

## 3. Results

### *3.1. Model of Increasing the Added Value of Farmers' Income through Downstream Persimmon Fruit Products*

One of the models used in the downstream process of persimmon fruit products is the partnership pattern. This partnership can be carried out between horticultural farmers and/or with financial institutions as a source of capital. The aim of this partnership is to encourage village economic growth so that it can increase money circulation and purchasing power in the village.

Furthermore, farmers complain about the sale and distribution of persimmons. One of the problems faced is the price game of persimmons on the market during the main harvest. In this case, the researchers created guidelines for developing a persimmon agroindustry that is sustainable and benefits all parties (Table 2).

**Table 2.** Sales price guide in the development of downstream persimmon fruit products.

| No. | Variable | Value |
|---|---|---|
| **1** | Selling price of persimmon fruit at the farmer level | IDR 1000–IDR 3000/kg |
| **2** | Selling price of persimmons at the site level | IDR 5000/kg |
| **3** | Potential increase in selling price | IDR 4000/kg |
| **4** | Downstream products produced | Jam, cake, juice, health drink, etc. |
| **5** | Improved product processing | The value of the product from the processing process |
| **6** | Opportunities to increase market demand | Increased market interest in downstream persimmon products |
| **7** | Increased market access | Wider market access, including domestic, national, and international markets |

However, this pattern does not arise without problems. Several obstacles need to be overcome in agribusiness partnerships: limited human resources of farmers and tools in contemporary horticultural cultivation techniques, weak harvest systems and technology, the lack of information technology support, expensive investment costs, the lack of marketing guarantees, slow payment systems, unhealthy competition between farmers and producers, consolidation of weak institutions, and limited agricultural companies as affiliates and cores of agribusiness partnerships. Thus, researchers noted several other models that could increase the added value of farmers' income (Table 3). Then, to achieve optimal results, farmers are involved in planning and implementing strategies, as well as collaborating with other stakeholders. SWOT analysis is one way to find out internal and external factors that influence a project or strategy. In this context, the authors present several SWOT components and their interactions in Figure 2.

| Internal / External | **Strengths** | **Weakness** |
|---|---|---|
| | 1. High Potency of Persimmon Fruit<br>2. Skilled Human Resources (farmers) and a good workforce with practical experience of farmers in adjusting planting and production of persimmons.<br>3. Government support | 1. Technological Limitations<br>2. Capital constraints that cause minimal product development<br>3. Lack of Business Knowledge |
| **Opportunities**<br>1. Growing Market<br>2. Collaboration with Private Parties<br>3. Innovative Product Development | **Strengths - Opportunities Strategy**<br>1. The abundant number of persimmons means that market needs are met. This needs to be supported by good and broader marketing techniques.<br>2. Collaboration with private industry needs to be carried out to overcome the abundance of persimmons among farmers so that persimmons continue to have a high selling value. Furthermore, this process will produce product variants that can increase the quantity and value of persimmons. | **Weakness - Opportunities Strategy**<br>Collaboration with external parties provides various benefits for farmers, both in agricultural technology, capital, and marketing persimmons. Furthermore, persimmons can be processed into various products and are accepted by the global market. |
| **Threats**<br>1. Competition with Similar Products<br>2. Climate Change and Natural Disasters | **Strengths - Threats Strategy**<br>1. Government support in maintaining and developing the uniqueness and content of persimmon fruit so that it can suppress similar market competition.<br>2. Practical experience that farmers have in dealing with various seasons, as well as support from the government and citizens to maintain the ecosystem. | **Weakness - Threats Strategy**<br>1. Farmers need a strong risk management plan to deal with unpredictable threats, such as climate change and natural disasters.<br>2. Farmers need support in the development of the agricultural industry, regulations that support downstream, and financial assistance if needed. |

**Figure 2.** SWOT analysis for model for increasing the added value of farmers' income through downstream processes.

**Table 3.** Model for increasing the added value of farmers' income through downstream process.

| No. | Element | Description |
|---|---|---|
| 1 | Product Diversification | Developing derivative products from persimmons, such as drinks, processed foods, cosmetic products, or health supplements. |
| 2 | Improved Quality and Packaging | Focusing on improving the quality of the persimmons and creating attractive and functional packaging. |
| 3 | Certification and Label | Obtaining a recognized certification or label for downstream persimmon products, such as organic certification or a sustainability label. |
| 4 | Increased Nutritional Value | Developing persimmon derivative products rich in nutrients, such as juice with added fiber or supplement products with nutritional content. |
| 5 | Marketing and Promotion | Carrying out effective marketing and promotion for downstream persimmon products through digital strategies, collaboration, or online sales. |
| 6 | Network and Partnership Development | They are building networks and partnerships with food producers, distributors, or retailers to expand market access. |
| 7 | Training and Capacity Building | They train farmers on cultivation techniques, business management, and product processing and ordering. |
| 8 | Access to Capital and Financing | They are helping farmers access capital and financing through government programs, financial institutions, or company partnerships. |
| 9 | Research and Innovation | Carrying out continuous research and innovation to improve downstream product production, processing, and packaging. |
| 10 | Farmer Empowerment | They are actively involving farmers in the downstream process and empowering them to manage their business better. |

### *3.2. Strategy for Obtaining Added Value for Persimmon Farmers*

Increasing the income and welfare of persimmon farmers requires an approach to obtain added value through various methods and innovations. The strategies used to obtain added value for persimmon farmers are shown in Table 4. Furthermore, Figure 3 shows a SWOT analysis to evaluate the strengths, threats, opportunities, and weaknesses related to increasing the added value of farmers through downstream persimmon fruit products.

| Internal / External | **Strengths**<br>1. Significant Persimmon Production<br>2. Supportive Environment and Climate<br>3. Best Local Market Possibility<br>4. Partnerships and Networking | **Weakness**<br>1. Infrastructure and Market Access<br>2. The Limitations of Technology<br>3. Downstream techniques |
|---|---|---|
| **Opportunities**<br>1. Export Request<br>2. Government support<br>3. Supply and Demand Gap demand. assistance to farmers to | **Strengths - Opportunities Strategy**<br>1. Increase downstream product production to meet export demand.<br>2. Participate in government programs and initiatives that support downstream,<br>3. Building partnerships with the government and related government agencies. | **Weakness - Opportunities Strategy**<br>1. Provide training and assistance to farmers to increase knowledge of downstream techniques.<br>2. Encourage long-term knowledge and strategic planning. |
| **Threats**<br>1. Competition<br>2. Climate Change and Natural Disasters | **Strengths - Threats Strategy**<br>Improve product quality and marketing to compete in local and international markets. | **Weakness - Threats Strategy**<br>Develop a risk management plan to deal with climate change and natural disasters. |

**Figure 3.** SWOT analysis for strategy to increase added value for persimmon farmers.

**Table 4.** Strategy to increase added value for persimmon farmers.

| No. | Strategy | Information |
|---|---|---|
| 1. | Increased Production Quality | Encourage farmers to improve the quality of persimmons through selecting superior seeds, good plant care, and effective pest control. |
| 2. | Sustainable Agricultural Practices | Farmers should carry out sustainable agricultural practices such as using organic fertilizer, efficient irrigation, and agricultural waste management. This reduces production costs and attracts environmentally conscious consumers. |
| 3. | Processed Product Development | Encourage farmers to process persimmons into value-added products such as juice, jam, or snacks. This processed product has added value and greater appeal than fresh fruit. |
| 4. | Preparation of Partnerships with Private Parties | Encourage farmers to partner with food processing industries or retail stores to gain wider market access. |
| 5. | Effective Marketing and Promotion | They are providing knowledge to farmers on effective marketing and promotion techniques, including online sales strategies and product branding. |
| 6. | Intelligent Packaging | Encourage the use of attractive and quality packaging for persimmon fruit products, which can increase consumer appeal and differentiate products in the market. |
| 7. | Product Diversification | Encourage the diversification of products produced from persimmons, such as functional drinks, baby food, or other innovations. |
| 8. | Logistics and Distribution Optimization | Helping farmers understand and optimize the supply and distribution of their products for better efficiency and delivery. |
| 9. | Business and Financial Management | The follow-up plan (RTL) requires business and financial management training for farmers to help them manage their finances well, create budgets, and track income and expenses. |
| 10. | Organic and Sustainable Certification | Encourage farmers to obtain organic or sustainable certification, which can increase the attractiveness and selling value of products on the market. |

## 4. Discussion

This research was conducted in Malang and Tulungagung district, located in East Java province, Indonesia. This research observed the cultural system, production, and socioeconomic factors of persimmon farmers. In addition, this research also observed the product downstream process and the cooperation system between entrepreneurs and farmer groups, contributing to added value for farmers' income.

The downstream development model for farmers can increase income through a partnership pattern between farmers and financial institutions, thus procuring business capital [67–69]. This partnership aims to encourage village economic growth, help farmers who have difficulty obtaining sources of capital, create fairer business opportunities for all village residents, and increase money circulation and purchasing power in the village [70,71]. Nevertheless, several obstacles need to be overcome in agribusiness partnerships: limited human resources and tools in contemporary horticultural cultivation techniques, weak harvest systems and technology, the lack of information technology support, expensive investment costs, the lack of marketing guarantees, slow payment systems, unhealthy competition between farmers and producers, institutional consolidation weak, and limited agricultural companies as affiliates and cores of agribusiness partnerships. Thus, there is a need to focus on transparent management; high commitment between partnering parties; the provision of adequate installations for post-harvest handling and marketing of produce; and mentoring and coaching by experts in the commodity sector being developed.

Government policies assist and direct programs or activities in agribusiness partnership institutions. However, due to the lack of clear legal certainty or the incompatibility

of policy products with the actual situation of society, fraud often occurs at the implementation level. This means the policy becomes less efficient. Several other obstacles that can hinder the sustainability of agribusiness partnership institutions related to aspects of government policy include the failure of the monitoring system for imported horticultural products. Foreign products flood the domestic market, which can reduce the market share of domestic horticultural products. Furthermore, this condition has the potential to disrupt the existence of partnership institutions that have been formed. Then, there is limited credit with soft interest rates in horticultural financing, and the project approach used by government programs tends to be discontinuous and not rooted in society.

The institutional performance of agribusiness partnerships, apart from being highly dependent on technical factors, also depends on local institutional social factors. In institutional partnerships for fruit and vegetable commodities, the institutional social factors that influence the effectiveness of institutional partnerships are as follows: (1) The existence of kinship relationships, with positive impacts in the form of ease in negotiating and making agreements or accessing information. On the other hand, the negative impact is that business-based business orientation becomes weaker. (2) There is a relationship with partners in the form of "subscriptions" so that the guarantee of product supply is continued. The partner's way of maintaining subscriptions is by providing ties in the form of capital assistance or renting out land to farmers in the hope that their products can be sold to partners (suppliers). (3) There is a possibility for collaboration with universities to develop products. (4) There is a relationship with farmer groups or farmer organizations so that marketing and quality development becomes easier and more efficient. (5) There are partners who want to help farmers gain capital. (6) Regional companies play a role in supporting the development of horticultural and agricultural agribusiness in the region.

The horticultural agribusiness partnership institution has several weaknesses and needs improvement. In efforts directed toward market production, there needs to be mutual partnership support. The mutual partnership is shown by the fact that the relationship between farmers and producers with individual collecting institutions is more frequent than the relationship between sellers and buyers. The active involvement of the private sector in production still needs to be higher, which is almost invisible currently, such as in the partnership model between supermarkets and fruit farming groups. However, agribusiness partnership patterns are found in the form of PIR patterns and agricultural contracts between farmers or farmer groups and regional companies, and between farmers or farmer groups themselves. Agribusiness actors need to understand that the collaboration that is built is a form of cooperation that requires and strengthens each other. Therefore, the game rules that are created should benefit all parties without fooling or harming the weak farmers.

Table 2 shows the added value that farmers can obtain from downstream persimmon fruit products so that persimmon farmers can ideally increase their sales value and income through downstream processing their products. To achieve success, farmers must focus on improving product quality, diversifying their offerings, strengthening collaborations and marketing networks, increasing market access, and improving their financial well-being. However, increasing the productivity and added value of persimmons requires a significant investment [72]. Cooperation among farmers, the government, research institutions, and other related parties is necessary to implement this strategy and achieve better results. The global persimmon market is expected to reach up to USD 1.20 billion by 2029, with Asia being the largest market [73]. This information is important as it highlights the huge potential for growth and profitability in the persimmon industry [74]. Therefore, implementing guidelines and downstream strategies can increase farmers' income through horticultural products. Please refer to Table 3 for specific strategies.

The model applied (Table 3) can also be adapted to local situations in the region. The farmers are involved in planning and implementing strategies, as well as collaborating with other stakeholders to achieve optimal results. To maximize the downstream process, all parties need to understand the internal and external factors that influence the project. In

order to increase the added value of farmers' income in East Java through the downstream processing of persimmon fruit products, a SWOT (strengths, weaknesses, opportunities, and threats) analysis is necessary. It has been revealed by researchers that downstream processing not only impacts farmers but also the state's income [75,76].

The model for increasing the added value of farmers' income through downstream persimmon fruit products has great potential if assisted by agricultural traditions as persimmons have great potential, and the government support their production. However, to maximize profits and minimize risks, it is necessary to implement effective strategies to overcome challenges such as technological and financial limitations, as well as competition and climate change. Farmers and companies in East Java can find many opportunities through innovation, the right collaboration, and a sustainable approach (Figure 2).

In the internal perspective of SWOT, persimmon fruit farmers have strengths and weaknesses. For example, the strength of persimmon fruit farmers in East Java is that the climate and soil conditions allow for the growth of persimmon trees to produce abundant fruit. In addition, fertile soils and a tropical climate with sufficient rainfall make persimmon cultivation in Indonesia a good prospect for development [77]. This is supported by competent human resources with both tradition and practical experience. Farmers have practical experience in the implementation of downstream models and the adjustment of planting times so that the production volume and value added of persimmons will be increased [78]. In addition, persimmon farmers receive government support through regional government policies prioritizing agriculture and the development of the agricultural industry. Meanwhile, on the other hand, weaknesses such as technological limitations that cause farmers to be unable to use advanced technology to increase production and downstream efficiency still need to be solved. Capital constraints and a lack of business knowledge have caused the production and marketing of persimmons to be somewhat hampered. Then, on the external side, persimmon farmers have opportunities that support this downstream process and threats that hinder it. Persimmon farmers have a growing market, so demand continues to increase, and this is not only happening in indonesia but also in countries like China, Spain, South Korea, Taiwan, Japan, Azerbaijan, and Brazil [79,80]. Healthy and naturally processed persimmon fruit products create opportunities to market persimmon fruit products more widely. This process is the result of the support of scientists who have created processed products that are varied and useful. This activity, of course, requires collaboration with private parties such as the food processing industry and retail companies. On the other hand, competition with similar products can be a significant threat. Meanwhile, climate change and unpredictable natural disasters can affect the production and availability of persimmons.

To strengthen the persimmon industry, farmers need to increase the use of technology, achieved through training and research collaboration, as well as develop business skills for efficient management. They can also collaborate with the private sector in marketing processed products, as well as achieving innovation by collaborating with research institutions. To overcome obstacles such as climate change, farmers need to have a strong risk management plan and differentiate the marketing of their products. Diversifying the product portfolio and establishing partnerships with the government will also help minimize risks and maximize opportunities in the downstream processing and marketing of persimmons. This strategy will help persimmon farmers to exploit their internal potential and external opportunities while overcoming internal weaknesses and facing external threats in their efforts to increase the downstream processing and marketing of persimmon fruit.

Some strategies that can be implemented involve increasing production, product downstream processing, and marketing to optimize the persimmon fruit industry in East Java. It is necessary to improve production efficiency and persimmon stock management to take advantage of excess persimmon production. A favorable environment and climate can be maximized by improving the quality of persimmon products. The existence of an important local market requires careful marketing strategies at the local level [81,82]. In addition, the potential for partnerships with the government, government agencies, and other related

parties must be utilized to increase collaboration in developing the persimmon industry. On the other hand, infrastructure and market access problems that could hinder distribution must be identified and corrected. It is also necessary to provide training and assistance to farmers to increase their knowledge regarding downstream and long-term techniques. In facing opportunities, it is necessary to increase the production of downstream products to meet export demand, as well as participating in government programs and initiatives that support downstream processing. Marketing strategies should be based on the difference between supply and demand for persimmon products. Threats from competitors and climate change can be addressed by improving product quality, utilizing effective marketing, and developing a strong risk management plan. By implementing this strategy, persimmon farmers in East Java are expected to optimize their potential and overcome challenges in increasing production and marketing of high-quality persimmon products.

## 5. Conclusions

This research paper has identified that persimmon fruit production in Malang and Tulungagung district has significant potential in Indonesia, with large areas of land planted and high production amounts every year. In addition, there are a variety of downstream persimmon products in the form of processed food and beverages which can provide significant added value and have the potential to increase farmers' income and empower local communities. The results of this study also propose several strategies, such as product diversification, improving quality and packaging, certification and labels, increasing nutritional value, marketing and promotion, developing networks and partnerships, training, access to capital, research, innovation, and farmer empowerment.

The SWOT analysis for the model of increasing the added value of farmers' income through downstream persimmon fruit products in East Java shows the strength in the high potential of persimmon fruit, strong agricultural traditions, available human resources, practical experience of farmers, and government support. Weaknesses include technological limitations, capital constraints, and the need for business knowledge. Opportunities lie in emerging markets, collaboration with the private sector, and innovative product development. Threats come from competition of similar products and the risk of climate change and natural disasters.

Strategies to increase added value for persimmon farmers in East Java include improving production quality, implementing sustainable agricultural practices, developing processed products, establishing partnerships with the private sector, effective marketing and promotion, good packaging quality, and product diversification, optimizing logistics and distribution, business management, and finance, as well as organic and sustainable certification. The advantages of this activity are significant persimmon production, a supportive environment and climate, strong local market potential, and partnership and networking opportunities. However, there are areas for improvement in infrastructure and market access, current knowledge of downstream techniques, and farmer confidence in large-scale businesses. On the opportunity side, there are export opportunities, government support, and identification of gaps between supply and demand. Threats come from competition of similar products and climate change, which can harm the production and quality of persimmon products.

This research paper contributes to the reformulation of persimmon downstream processing by adopting mapping based on aspects of strengths, weaknesses, opportunities, and threats from internal and external factors. In addition, this study also reveals the right strategy to promote an increase in the added value of persimmons and farmers' income. Furthermore, this study contributes to the development of a downstream strategy for persimmon products through added value that can increase farmers' income by involving partnerships with various stakeholders so that business actors can maximize their production in the downstream process of persimmons.

This field research allows for dynamic change that can be caused by shifts in the environment, climate, culture, and government policies. Therefore, it is possible to continue

to conduct research in this field. Formulating a master plan, such as one involving permits, respondent contacts, and good research instruments and one based on preliminary research, will provide good research results.

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