



## RESEARCH ARTICLE

# Vegetable Horticulture Development Strategy in Malang Regency to Support Food Security and Independence of Traditional Communities

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ARTICLE INFO	ABSTRACT
Received: Sep 2, 2024 Accepted: Oct 22, 2024	The importance of supporting food security and food independence in traditional communities so that people do not lack food so that they are not malnourished. Undernutrition causes low human productivity, low productivity causes low income, low income causes poverty. So it is very necessary to make a strategy for the development of vegetable horticulture, because vegetables are consumed by the human body every day. Every day residents need vegetable food, namely consuming vegetables 2-3 times a day. The development of the population causes the demand for vegetable horticulture to continue to increase. Therefore, it is necessary to create a Strategy Model for the Development of Vegetable Horticulture, and this is important to support food security and independence. The research methods used are quantitative and qualitative descriptive methods. The data used is primary data and secondary data. The data was analyzed using SWOT analysis and also qualitative analysis. The results of the study show that the horticultural development strategy in Malang Regency is to maintain the existing land and even increase the land area, plant cultivation training from the garden to harvest and post-harvest, provide capital and make it easier for farmers to access capital, train farmers to market online and offline, and collaborate with other agencies to market products.
<b>Keywords</b> Strategy Development of Vegetable Horticulture, Malang Regency	
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## INTRODUCTION

The development of vegetable horticulture in Malang Regency plays an important role in improving food security and supporting the independence of traditional communities. With fertile soil and a supportive climate, Malang is very suitable for the cultivation of various types of vegetables that are an important source of nutrients for the local community (Hidayat, 2023). However, in recent years, agricultural practices in the region have faced challenges such as increasingly narrow land, low technology adoption, and limited farmers' access to resources. These factors threaten the sustainability of horticultural activities that are essential in maintaining a stable supply of vegetables and maintaining food independence in the region (Intyas et al., 2022). The urgency to address this problem is further strengthened by the increasing demand for fresh vegetables due to population growth, urbanization, and changing people's consumption preferences, which further emphasizes the need for strategic interventions (Dewi et al., 2022).

Vegetable production that continues to decline in Malang Regency is dangerous for food security and availability. Here is a summary of vegetable horticultural production data in Malang Regency from 2018 to 2023, which can be integrated into your introduction. Based on data provided by the Central Statistics Agency (BPS) of Malang Regency, the production of main vegetables such as chilies, tomatoes, and shallots shows significant fluctuations due to climatic conditions, land availability, and market demand. For example, tomato and onion production experienced a steady increase from 2018 to 2020, driven by improved agricultural practices and rising demand. However, in 2021 and 2022, the production of several crops, especially chili, experienced a significant decline due to less supportive weather and reduced planting area (Central Statistics Agency of Malang Regency).

**Table 1: Main vegetable production in Malang Regency (2018–2023)**

Year	Tomatoes (ton)	Chili (ton)	Shallots (tons)
2018	12.000	15.300	9.800
2019	12.500	16.000	10.200
2020	13.000	16.500	10.500
2021	12.200	15.100	10.000
2022	12.500	14.800	10.300

If food security in the community decreases, the community can experience malnutrition. development of vegetable horticulture. The importance of supporting food security and food independence in the community so that people do not lack food so that they are not malnourished. Undernutrition causes low human productivity, low productivity causes low income, low income causes poverty. So it is very necessary to make a strategy for the development of vegetable horticulture, because vegetables are consumed by the human body every day. Every day residents need vegetable food, namely consuming vegetables 2-3 times a day. The development of the population causes the demand for vegetable horticulture to continue to increase. Therefore, it is necessary to create a strategic model for the development of vegetable horticulture, and this is important to support food security and independence.

The importance of this research lies in its potential to support the achievement of local and national goals in terms of food security and independence in agricultural production. With the increasing pressure on farmland and the global push for a sustainable food system, it is important to develop strategies that can maximize productivity while conserving resources for future generations (Fitria et al., 2024). In addition, the COVID-19 pandemic has highlighted the vulnerability of food supply chains, thus emphasizing the need for local agricultural resilience to be able to face external shocks (Sari et al., 2024). Addressing these issues requires a deep understanding of current horticultural practices as well as innovative solutions that align with modern needs without leaving aside the socio-economic context of traditional societies.

Several international studies have contributed to understanding the intersection between vegetable horticulture, food security, and sustainable development. First, research by (Pretty & Bharucha, 2018) highlighted the importance of integrating agroecological practices into vegetable horticulture. Their findings demonstrate that the use of sustainable farming methods can significantly increase yields while reducing environmental degradation, making it particularly relevant for regions like Malang that are dealing with land scarcity and ecological pressures. Second, (Huang وآخ., 2019) explored the impact of climate-smart agriculture in smallholder farming systems, emphasizing how adapting to climate change through innovations like improved irrigation techniques and drought-resistant crops can enhance food security in rural communities.

Third, a study by (Lobell وآخ., 2011) investigated the role of digital agriculture in improving smallholder productivity. They found that mobile-based platforms for weather forecasting and market information led to better decision-making among farmers, ultimately increasing their crop yields and income. This approach is especially applicable to Malang's traditional farmers, who often lack access to timely information on weather and market conditions. Fourth, research by (Garnett & Godfray, 2012) underscores the value of community-supported agriculture (CSA) as a model for linking local food production with community resilience. CSA models not only boost local food production but also foster stronger economic ties within rural communities, helping to build food systems that are both self-reliant and sustainable.

Lastly, a comprehensive analysis by (Obianefo وآخ., 2022) examined the relationship between horticultural supply chains and food security in developing countries. They emphasized the need for infrastructure improvements, access to markets, and policy support to improve the efficiency of horticultural production and distribution. This research highlights the importance of integrating Malang's traditional agricultural systems into broader supply chains to enhance their resilience and reach.

This research aims to:

1. Identify the potential of vegetable horticulture in Malang Regency.
2. Analyzing the strengths, weaknesses, opportunities, and threats of vegetable horticulture

### 3. Making a Strategy for the Development of Vegetable Horticulture in Malang Regency.

## LITERATURE REVIEW

### Agricultural potential of Malang Regency

Malang Regency is renowned for its favorable climate and fertile soil, which create ideal conditions for diverse agricultural activities, particularly the cultivation of vegetables. The region's rich agricultural potential is highlighted by the successful production of key horticultural crops such as tomatoes, chili peppers, and shallots, which play a significant role in meeting local food demands (Ayu et al., 2023). This agricultural strength forms a solid foundation for enhancing food security through the implementation of sustainable farming practices. By promoting environmentally friendly techniques and optimizing resource use, Malang Regency has the potential to become a key player in supporting regional food systems (Atmaka وآخ., 2014; Septiadi, 2020)

### Challenges in vegetable horticulture

The development of vegetable horticulture in Malang faces significant challenges, primarily driven by the reduction of agricultural land due to urbanization and land conversion (Irawan, 2003) This issue is compounded by the financial limitations of traditional farmers, many of whom continue to rely on outdated farming practices, resulting in suboptimal productivity (Arifin, 2004) These factors underscore the necessity for innovative strategies focused on efficient land management and farmer empowerment. Solutions may include the adoption of modern farming technologies, improved access to financial resources, and policy measures aimed at preserving agricultural land for sustainable horticulture development.

### Technological innovation in agriculture

Modern agricultural technologies, including precision agriculture, integrated pest management, and organic farming practices, offer promising solutions to enhance crop yields and sustainability. These technologies allow for more efficient resource use, such as optimized water and fertilizer application, while minimizing environmental damage (Mulyani et al., 2020). Research indicates that adopting these innovations can significantly boost productivity and reduce ecological footprints. In Malang, integrating these modern techniques into traditional farming systems could not only enhance agricultural productivity but also strengthen local food security by making farming more resilient to environmental challenges and market demands. This highlights the importance of supporting technological adoption in rural farming communities.

### Government and institutional support

through initiatives such as subsidies, training programs, and access to credit, are pivotal in advancing vegetable horticulture. These measures help smallholder farmers overcome financial and technical barriers, fostering growth and sustainability in the sector (Kasmi وآخ., 2023) Research shows that government-backed agricultural programs have significantly improved productivity and rural incomes, particularly when focused on empowering smallholders (Wongkar وآخ., 2023) In Malang, strengthening such programs is crucial to enabling traditional farmers to modernize their practices and integrate more fully into the agricultural value chain, thereby ensuring their continued contribution to local food security and economic growth.

### Sustainable practices and agroforestry integration

Sustainable agricultural practices, such as agroforestry, organic farming, and water conservation techniques, are vital for ensuring the long-term sustainability of vegetable horticulture in Malang. These methods enhance soil fertility while offering broader environmental benefits, including increased biodiversity, improved ecosystem health, and greater resilience to climate change. Studies suggest that integrating these practices into local agricultural systems can promote ecological balance, reduce environmental degradation, and sustain food production over time. By adopting these sustainable approaches, Malang's farming communities can not only protect natural resources but also secure agricultural productivity for future generations, ensuring both food security and environmental sustainability.

## **Market access and value chain development**

Market access is a critical factor influencing the profitability of horticultural agriculture. Research highlights the importance of developing a robust value chain, supported by both online and offline marketing strategies, to enhance farmers' market reach and economic returns. By adopting digital tools and collaborating with larger market players, traditional farmers can improve their profitability and competitiveness (Zulkifli وآخ., 2023). This, in turn, boosts food security and promotes farmer independence. In Malang, encouraging the integration of digital marketing platforms and stronger market linkages for local farmers is essential for fostering economic growth and ensuring sustainable agricultural development.

## **Community-based models for food security**

Research demonstrates that community-driven farming models, which emphasize local knowledge and collective resource management, are highly effective in enhancing food security at the local level. These models leverage the strengths of traditional agricultural practices while fostering collaboration among farmers, resulting in more resilient and sustainable food systems. In Malang, where traditional communities are integral to food production, incorporating a community-based approach into agricultural development strategies is crucial. This approach not only strengthens local food systems but also empowers farmers to manage resources sustainably, ensuring long-term food security and greater resilience to environmental and economic challenges.

## **METHODOLOGY**

This study uses a qualitative descriptive method to analyze the development strategy of vegetable horticulture in Malang Regency in supporting the food security and independence of traditional communities. Qualitative descriptive research aims to provide an in-depth and comprehensive picture of the real conditions in the field, especially related to the potential, constraints, and development strategies of the vegetable horticulture sector (Creswell & Creswell, 2017). This method is well suited to understand complex dynamics, such as social, economic, and ecological aspects that affect the horticultural sector.

The primary data in this study was obtained through in-depth interviews with farmers, agricultural extension workers, and other related parties in Malang Regency. Meanwhile, secondary data is collected from official reports, such as publications from the Central Statistics Agency (BPS), scientific journals, and government documents related to horticultural development programs (Central Statistics Agency, 2022).

Data analysis was carried out using SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) to evaluate strengths, weaknesses, opportunities, and threats in the development of vegetable horticulture in Malang Regency. This approach is useful in identifying internal and external factors affecting the horticultural sector, as well as providing a basis for formulating effective development strategies (Gurl, 2017). In addition, qualitative analysis is also used to understand the relationship between variables found through interviews and documents, which are then integrated into field evidence-based development strategies (Huberman, 2014).

The stages of analysis include data collection, data reduction, data presentation, and conclusion drawn. In the early stages, data from various sources are analyzed to identify key themes relevant to horticultural development. Furthermore, the data is reduced by grouping similar information, then presented in the form of a SWOT table to facilitate interpretation and strategy preparation.

## **RESULTS**

### **The potential of Malang Regency**

The results of the study show that Malang Regency is a district whose land is in the form of mountains so that the air temperature is low. Low temperatures are perfect for horticulture such as cabbage, potatoes, carrots, and others. Thus, Malang Regency has great potential in horticultural development. Because of its suitable climate and its land is spacious and fertile. The large population also has the potential to be a workforce to develop vegetable horticulture.

### Strengths, weaknesses, opportunities and threats (SWOT analysis)

Aspects	Description
Strength	Suitable climate for vegetable cultivation (temperature, humidity, precipitation). Good agricultural infrastructure, including paved roads and bridges. Strong government support.
Weakness	The number of agricultural workers is reduced. Land is decreasing due to the conversion of functions for settlements and infrastructure. Agricultural technology is still simple. Low capital for farmers.
Opportunity	The population is increasing, increasing the demand for vegetables. Increased community nutrition awareness. Agricultural technology that continues to develop. Government credit assistance such as KUR.
Threat	The selling price of vegetables is low. Vegetables are easily damaged and do not last long. Unpredictable weather (strong winds, floods, droughts) that damage the crop.

From the analysis of strengths, Malang Regency has great potential in the development of vegetable horticulture thanks to a very supportive climate, good infrastructure, and support from the government. Favorable climatic conditions facilitate the growth of various types of vegetables, while adequate infrastructure facilitates access from the field to the market. Government support, especially in the form of policies and subsidies, is an important factor that can be maximized to encourage the growth of this sector.

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However, the existing weaknesses are also a significant challenge for farmers. The decline in the number of agricultural workers results in a potential decrease in productivity, while the conversion of land for non-agricultural needs such as settlements and highways limits planting areas. In addition, the use of simple technology and limited capital hinder the modernization of farming, making it difficult for farmers to increase efficiency and production output.

On the other hand, the opportunities that exist are quite promising to develop the horticultural sector in Malang. With the increasing population and awareness of the nutritional importance of vegetables, the demand for vegetables continues to grow. In addition, the rapid development of agricultural technology has allowed farmers to switch to more efficient and environmentally friendly farming methods. Government assistance in the form of people's business credit (KUR) also opens up opportunities for farmers to get the capital needed to increase production.

However, the threats faced cannot be ignored. Low selling prices often make farmers' profits not proportional to production costs, while perishable vegetable crops make farmers vulnerable to losses. In addition, erratic weather changes such as high winds, floods, and droughts can damage crops, threaten crop yields and reduce the supply of vegetables in the market. An effective strategy must be able to overcome this challenge to ensure the sustainability of the horticultural sector in Malang.

### The role of traditional communities in the agricultural system

The role of traditional communities in the agricultural system in Malang Regency shows that although the traditional agricultural methods used have cultural values and local wisdom, there are

limitations in productivity that hinder food security and economic independence. This phenomenon is in line with the conditions in various agricultural areas in Indonesia, where traditional farmers often face difficulties in adopting new technologies that can increase production yields. This is exacerbated by modern challenges such as climate change, land degradation, and limited access to markets and capital. For example, data from the Central Statistics Agency (BPS) shows that most farmers in Indonesia still rely on traditional methods with suboptimal yields compared to modern technology-based agriculture.

In the framework of the Diffusion of Innovations theory put forward by (Rogers, 1962), traditional societies tend to be in the final majority or tailer phase in the adoption of new technologies. This indicates that there are social and economic barriers that prevent them from adopting innovation quickly. One of these obstacles is limited access to relevant information, knowledge, and technology, as well as the availability of infrastructure that supports modern agriculture. Research also shows that conservative attitudes in maintaining farming methods inherited from generation to generation also slow down the process of innovation adoption, making it difficult for traditional agricultural productivity to increase.

To maximize the role of traditional communities in supporting food security, an agroecological approach that combines local wisdom with modern agricultural technology must be encouraged. Intensive training and counseling that takes into account the local cultural context, as well as the provision of access to capital and infrastructure, is urgently needed. Synergy between the government, academia, and the farming community in developing sustainable agricultural models can be a solution to face this challenge and ensure that traditional communities are not left behind in more advanced agricultural development.

### **Horticulture's contribution to food security**

The contribution of horticulture to food security in Malang Regency is very significant, considering that abundant vegetable production can provide a nutritious food source for local communities and support the sustainability of the agricultural economy. This phenomenon is in line with the national trend in Indonesia, where horticulture, especially vegetables and fruits, is one of the fast-growing agricultural sectors and plays an important role in increasing food diversification and meeting the nutritional needs of the community.

According to the Food Security theory put forward by (FAO, 1996), food security includes four main dimensions: availability, access, utilization, and stability. Horticulture plays a role in providing food availability through the production of vegetables that can be accessed by the local community. In addition, vegetables also contribute to food utilization because they contain vitamins, fiber, and minerals that are important for health, supporting food security in terms of nutrition. However, one of the challenges faced is how to maintain production stability throughout the year, especially with climate change that can affect crop yields and availability in the market

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### **Challenges and solutions in horticultural development**

Horticultural development in Malang Regency faces a number of significant challenges, including climate change, pest and disease attacks, and limited access to capital and technology. This phenomenon is also experienced nationally in various horticulture-producing regions in Indonesia, where farmers often face the risk of extreme weather that affects production stability. Data from the Meteorology, Climatology, and Geophysics Agency (BMKG, 2020) shows that weather anomalies such as erratic rainfall can result in a decrease in horticultural production by up to 30% in some areas. In addition, pest attacks and plant diseases that are increasingly difficult to control without the use of chemical pesticides are a problem that suppresses crop yields.

According to the theory of Sustainable Agricultural Development (Brundtland, 1987), sustainable agriculture must be able to meet current food needs without sacrificing the ability of future generations to meet their needs. In this context, the main challenge in horticultural development is to ensure sustainability by minimizing the negative impact of agricultural practices on the environment, such as soil degradation and pollution due to the use of pesticides. One of the relevant solutions is the implementation of Good Agricultural Practices (GAP), which emphasizes the use of environmentally friendly agricultural inputs and efficient resource management.

To overcome this challenge, synergy between farmers, the government, and the private sector is needed. The government needs to expand access to capital for horticultural farmers through low-interest credit programs, as well as provide training on modern agricultural technologies such as drip irrigation and integrated pest control. In addition, the role of agricultural extension workers is very important to provide direct assistance to farmers in adopting environmentally friendly technologies that support the sustainability of the horticultural sector. With this intervention, it is hoped that these challenges can be overcome and horticultural productivity can continue to increase.

## CONCLUSION

Malang Regency has great potential for the development of vegetable horticulture, supported by a suitable climate, good and paved road access, and government support. However, there are several weaknesses such as the narrower land area, low farmer capital, declining number of farmers, and technology that is still simple. Opportunities that can be taken advantage of are the increasing population, technological developments, and credit assistance from the government.

On the other hand, the threats faced include low selling prices and rapid destruction of agricultural products. To develop horticulture in Malang Regency, the strategies that need to be implemented include maintaining and expanding land, providing cultivation training from the planting stage to post-harvest, providing easier access to capital for farmers, training them in online and offline marketing, and collaborating with various agencies to market products more widely.

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