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Sustainable Shallot (Allium cepa L) Farming Development Model in Payung Village, Karo Regency

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ABSTRACT

This study aims to analyze the development model of sustainable shallot farming in Payung Village, Payung District, Karo Regency. The research method uses qualitative and quantitative approaches with data collection techniques through in-depth interviews, field observations, and surveys. The research sample includes shallot farmers, agricultural extension workers, and related stakeholders. The results of the study show that the development of sustainable shallot farming requires a comprehensive strategy that pays attention to ecological, economic, and social aspects. The key factors identified include: Implementation of environmentally friendly cultivation practices, Efficient management of land resources, Use of superior seeds and appropriate agricultural technology, Access to adequate capital and markets, and Institutional empowerment of farmers. Internal factors that become strengths are natural resource parameters, farmer experience parameters, shallot production parameters and land area parameters. The dominant force influencing the development of shallot farming in the research area is natural resources. Internal factors that are weaknesses are farmer capital parameters, onion seed parameters, input use parameters and farmer partnership parameters. The most dominant weakness is farmer capital. External factors of opportunities are market demand parameters, farming profit parameters, agroindustry infrastructure and supporting facilities parameters and support parameters for groups and extension workers. The most dominant opportunity is market demand. Recommended development models include: ongoing technical assistance, farmer capacity building, product diversification, and strengthening partnerships between farmers, the government, and the private sector. This research is expected to contribute to increasing productivity, sustainability, and welfare of shallot farmers in the region

Keywords: Development Model; Farming; Shallot; Karo Regency

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1. INTRODUCTION

Shallots are one of the most important horticultural commodities in the Indonesian economy, especially as a food ingredient needed daily. Shallots have a fairly high economic value, but they are not free from pest attacks and diseases that can cause crop failure. (Jasri, 2019; Siregar et al., 2021; Sugiarto & Ramadania, 2024) In pest and disease control, farmers generally take simple measures, such as physically and mechanically, as a form of natural defense reaction. However, with the expansion of agriculture, these simple control methods are no longer sufficient to suppress the population and the malignancy of pests and diseases.

In the Payung Village area, Karo Regency, North Sumatra, shallots are one of the main commodities for farmers. Shallot farming in this location is relatively very wasteful in the use of production facilities, which can be seen from low cost productivity (Widyantara, 2018). This study aims to develop a sustainable shallot farming model in Payung Village, Karo Regency, by considering technical, economic, and environmental aspects (Wahyuni et al., 2024).

The study was conducted using the BOCR approach to identify important factors in the development of shallot farming in Payung Village (Darojat et al., 2020). In addition, the research also refers to studies related to improving cooperative performance in supporting sustainable asparagus farming (Ustriyana et al., 2018) and shallot farmers' strategies in obtaining profits (Widyantara, 2018).

Based on the analysis of the situation, there are several obstacles faced by shallot farmers in Payung Village, both from technical, economic, and environmental aspects. From the technical aspect, the main problems faced are pest and disease attacks, as well as the lack of knowledge of farmers in making quality shallot seeds. From the economic aspect, farmers face the constraints of lack of capital for the production process, as well as suboptimal marketing of crops. To overcome these obstacles, comprehensive interventions are needed, including increasing the capacity of farmers, strengthening farmers' economic institutions, and adopting appropriate technologies (Wahyuni, Hermansyah, et al., 2022; Wahyuni & Mesra, 2022).

To overcome pest and disease problems, the role of extension from the agricultural office is very important in providing information and knowledge to farmers on how to control effectively. In addition, better capital and marketing support is also needed to improve the performance of shallot farming, referring to the experience of asparagus farming development in Pelaga Village, Karo Regency (Lubis et al., 2022; Sebayang et al., 2021; Sebayang & Sembiring, 2020; Wahyuni, Hariyanto, et al., 2022).

2. RESEARCH METHOD

A. Research Approach

This study uses a descriptive approach, by describing the current condition of shallot farmers, including farmer obstacles; advantages and methods that have been carried out by farmers in developing it.

B. Research Location

The research was carried out in Payung Village, Payung District, Karo Regency. This design was selected based on the geographical area that generally has existing agricultural potential as well as the relevance of the research topic to local conditions.

C. Population and Sample

The population in this study consists of shallot farmers in Payung Village. The sample was taken by purposive sampling, involving 30 shallot farmers who are considered to represent various characteristics of farming in the village.

$$n = \frac{N}{Nd^2 + 1}$$

N = Population
n = Sample
d = Precision within 100 percent

D. Data Collection

Data is collected through several methods:

- **Interviews**: Conduct in-depth interviews with farmers to dig up information about farming practices, the obstacles they face, and their expectations for the development of shallot farming.
- **Questionnaires**: Distribute questionnaires to farmers to obtain quantitative data on aspects such as land area, production, and agricultural inputs used.
- **Observation**: Directly observe the shallot cultivation process in the field to obtain more accurate data on the agricultural practices applied.

E. Data Analysis

The collected data will be analyzed with quantitative and qualitative approaches. Quantitative analysis was carried out to calculate the average production, cost, and income from shallot farming. Meanwhile, a qualitative analysis was carried out to identify themes and patterns from interviews and observations, which would provide a comprehensive overview of the conditions of farming in Payung Village.

F. Evaluation and Recommendations

After the data analysis is carried out, the results of the research will be evaluated to identify effective development strategies. Recommendations will be compiled based on the findings of the research, focusing on increasing productivity, cost efficiency, and sustainability of shallot farming in Payung Village.

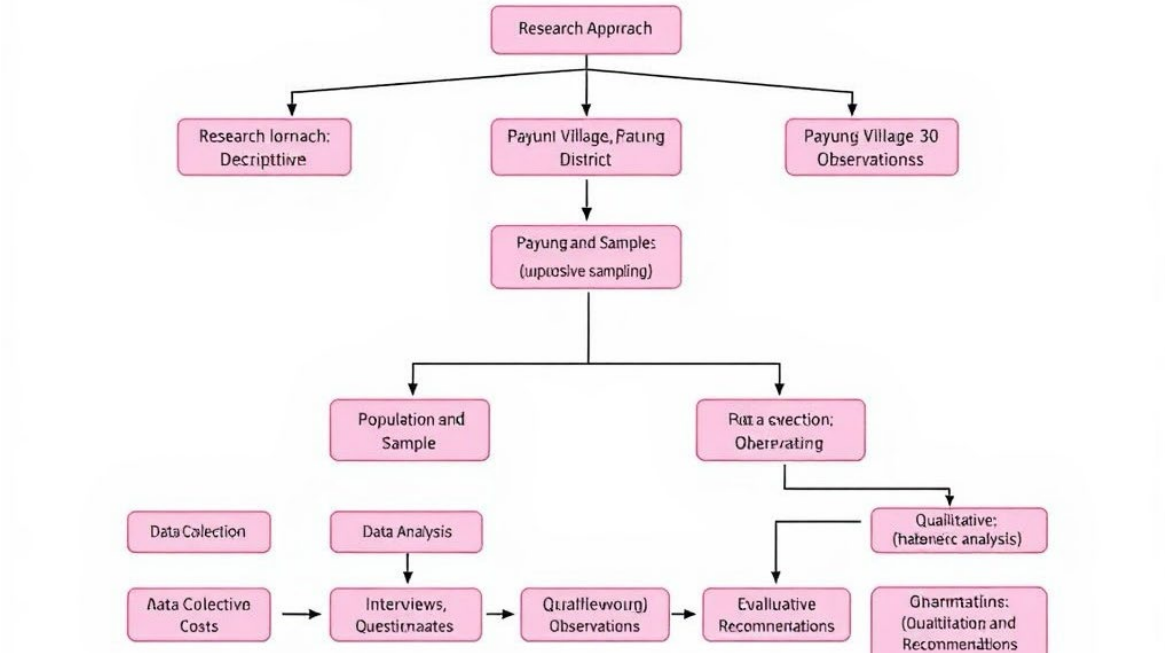

Fig 1. Research Methods

3. RESULTS AND DISCUSSION

A. Result

Payung Village, located in the mountainous area of Karo Regency with an altitude of 1,200-1,500 meters above sea level, is one of the interesting shallot production centers to study. The comprehensive research conducted reveals the complexity and potential for the development of shallot farming in this region.

1) Geographical and Social Characteristics

The majority of the residents of Payung Village, around 85%, depend on the agricultural sector for their livelihoods. With a population of around 2,500 people, they have developed shallot cultivation as one of the leading commodities. The diverse land ownership structures, ranging from self-owned land to profit-sharing systems, create their own dynamics in their agricultural practices.

2) Cultivation Practices

Farmers in this village generally use superior varieties such as Bima Brebes and Super Phillip, with a fairly high productivity reaching 10-12 tons per hectare. The cultivation system they apply is still dominated by a monoculture pattern with a continuous planting system throughout the year. The average farmer has arable land between 0.5-1 hectare, with relatively uniform cultivation techniques.

The cultivation process starts from preparing the land using a tractor, making beds, to planting with a planting distance of 20x20 cm. Plant maintenance is carried out through periodic watering, application of NPK fertilizer and follow-up fertilizer, and pest control using chemical pesticides.

3) Economic Analysis

Economically, shallot farming in Payung Village shows attractive profit potential. Production costs per hectare range from Rp 20-25 million, with sales turnover reaching Rp 200-250 million per planting season. The net profit obtained by farmers ranges from Rp 100-150 million per hectare, a significant figure for the size of small-scale agriculture.

4) Challenges and Obstacles

Despite providing profits, shallot farming in this village is not free from various challenges. Internally, farmers face capital limitations, low technological knowledge, and dependence on chemical

pesticides. Meanwhile, external factors such as price fluctuations, pest attacks, and climate change also affect the sustainability of farming.

5) Development Strategy

Based on the findings of the study, several development strategies are recommended:

a) Technological Aspects

- Implementing precision agriculture
- Using superior and certified seeds
- Developing integrated pest control

b) Institutional Aspects

- Strengthening farmer groups
- Increasing the capacity of farmers through training
- Facilitating access to capital

c) Marketing Aspects

- Develop a wider marketing network
- Forming farmer cooperatives
- Leveraging digital platforms for marketing

Continuous Development Model

The research recommends a comprehensive sustainable development model, including:

- Ecological Model: Focus on eco-friendly agriculture and land conservation
- Economic Model: Increased productivity and production cost efficiency
- Social Model: Farmer empowerment and strengthening of social capital

B. Discussion

1. S-O Strategy

The strategies implemented for the development of onion farming by utilizing the existing strengths and opportunities are as follows:

- Utilizing existing natural resources (natural conditions suitable for cultivating shallot plants) and increasing shallot production, so that it can meet the demand of domestic and international markets
- Utilizing the experience of farmers who have declined in increasing farming profits and meeting market demand
- Expanding onion cultivation land in increasing onion production by using agro-industry infrastructure and supporting facilities as well as the role of farmer groups and extension workers. This strategy needs to be carried out because the processing of natural resources and farmers' experience in shallot farming is a strong foundation so that the development of shallot farming can be realized properly. By utilizing natural resources and the area of shallot cultivation which can increase the production of shallots that meet market demand. With increasing production so that it can contribute to the profits of farmers in farming shallots.

2. W-O Strategy

The strategy implemented for the development of shallot farming in the research area by minimizing weaknesses to take advantage of existing opportunities is as follows:

- Farmer capital can be effective and efficient by using agro-industry infrastructure and supporting facilities in increasing farming profits
- The use of farmer inputs and partnerships by utilizing agro-industry infrastructure and supporting facilities along with the support of farmer groups and extension workers.
- Increasing the use of superior shallot seeds with the participation of farmer groups and extension workers and increasing the profits of onion farming This strategy needs to be carried out because in general, with the increasing use of seeds and with the use of inputs, it helps to increase the profits of shallot farming and can meet market demand. With

partnerships in shallot farming, it can help farmer groups in Payung village along with extension tools to advance shallot farming.

3. W-O Strategy

The strategies for the development of shallot farming in the research area by looking at the strength to minimize the threat are as follows:

- Utilizing farmers' experience in farming and natural resources to overcome environmental factors.
- Maintaining the quality of shallot production and increasing knowledge and experience in accessing the market This strategy needs to be carried out because with the existence of natural resources and farmers' experience in farming shallots, it can be assumed that environmental factors in shallot farming can be overcome.

Environmental factors such as pests and diseases, climate change and environmental conditions caused by erucation can be overcome by farmers. With the experience of farmers in farming, farmers have been able to overcome the demand from the market for shallots, which has a great opportunity for onion production.

4. W-O Strategy

The strategy for the development of shallot farming in the research area by minimizing weaknesses and threats is as follows:

- Increase the use of shallot seeds that are resistant to threats from environmental factors and improve the use of inputs better.
- Increasing farmer partnerships to enter market access. With the existence of a marketing chain today, cooperation with partners is urgently needed. Fulfilling capital, using superior shallot seeds can help shallot farmers in accessing the shallot market. Demand and supply in the market can be helped through information and assistance from partners.

4. CONCLUSION

Based on the results and discussions carried out, it can be concluded as follows:

1. Internal factors for the development of shallot farming in the research area:
   a. Internal factors that become strengths are natural resource parameters, farmer experience parameters, shallot production parameters and land area parameters. The dominant force influencing the development of shallot farming in the research area is natural resources.
   b. Internal factors that are weaknesses are farmer capital parameters, onion seed parameters, input use parameters and farmer partnership parameters. The most dominant weakness is farmer capital.
2. External factors for the development of shallot farming in the research area: a. External factors of opportunities, namely market demand parameters, farming profit parameters, agroindustry infrastructure and supporting facilities parameters and support parameters for groups and extension workers. The most dominant opportunity is market demand. b. External Factors of threats, namely environmental factor parameters and market access parameters. The most dominant threat is environmental factors.
3. The development strategy of shallot farming in the research area is in quadrant I (one). The focus of the strategy that must be carried out is to maximize internal strengths and take advantage of existing opportunities. Dominant strategy in the development of shallot farming. Among other things, utilizing natural resources and farmers' experience in farming shallot plants to increase shallot production so that it can meet market demand and especially so that farmers can get great profits in shallot farming.

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