AGRIEKONOMIKA

http://journal.trunojoyo.ac.id/agriekonomika
Volume 12, Nomor 2, 2023
DOI: https://doi.org/10.21107/agriekonomika.v12i1.18617

Agriekonomika has been accredited as a scientific journal by the Ministry of Research-Technology and Higher Education Republic of Indonesia: ***No. 23/E/KPT/2019***
SINTA 2

Increasing Rice Production in Indonesia; An Empirical Study of The Ten Tons Syngenta Project in Pasuruan

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Received: September 2022; Accepted: August 2023; Published October 2023

ABSTRACT

Rice is a commodity that needs to be developed because it is a staple food in Indonesia. PT. Syngenta Indonesia is a multinational company which operates in the field of providing agricultural infrastructure, such as seeds and pesticides. PT. Syngenta collaborated with farmers' groups to conduct the Ten Tons program for rice production to increase yields. The purpose of the study is to 1. describe the Ten Tons rice production area program of Syngenta Indonesia in Pasuruan Regency and 2. analyze the rice farming business development strategy in Pasuruan Regency. The research was conducted in the Pasuruan Regency of East Java. Random sampling is one of the research methods used in survey research. The sample number is 36 rice farmers. Data analysis uses descriptive analysis and SWOT analysis. Research results: 1). Rice Production Area Program: the Ten Tons of Rice Farming PT. Syngenta Indonesia uses the concept of expanse, followed by several members with a total expanse of 20 ha. The program is categorized into two parts, namely KTD and KTS. KTD refers to the Ten Tons development area, which is currently still under development. KTS surpasses the Ten Tons area in quality. 2) Main rice farming development strategies: a. intensive counseling and mentoring of successful rice farming businesses by partners to farmers to increase productivity. b. Field agricultural extension workers assists farmer's groups, especially those related to capital. c. Increase the knowledge of farming group members related to field agricultural extension workers using proper crop protection products. d. Facilitate access to infrastructure facilities for rice farming.

Keywords: SWOT; IFAS; EFAS; RICE

INTRODUCTION

Rice (*Oryza sativa L.*) is one of the most widely consumed food commodities, especially in Indonesia. The people of Indonesia have a habit of making rice their staple food. The level of demand for rice is very high.Therefore, rice has a very important role in the economy of Indonesia, both in terms of production and consumption. As the population continues to grow each year, the demand for national rice will undoubtedly increase, necessitating greater food availability. According to Hariyanto et al. (2021), rice is the most important source of energy, making up for 5,45% of total consumption in 2020. While fulfilling the need for rice requires approximately 2,5 million metric

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p-ISSN 2301-9948 | e-ISSN 2407-6260

Ten Tons of rice per month, fulfilling the need for food (rice) for the population in Indonesia, which is increasing every year, is not easy. because it is faced with various problems, such as the conversion of productive land functions. Climate change, pests, and diseases can reduce rice productivity (Fahad et al., 2018; Hou et al., 2020).

Rice production in 2023 in Indonesia was 53.63 million tos of milled dry grai. This amount has decreased by 0.98% compared to 2022. If this rice production is converted into rice for consumption, rice production in 2022 is expected to be 31.54 million Ten Tons, with rice production in 2023 expected to be 30.90 million Ten Tons. In 2023, there was an decrease of 645.10 thousand Ten Tons, or 0.98 percent, compared to 2022. East Java province became one of the areas with the highest rice production.In 2023, the province of East Java will have a harvested area of 1,685.69 thousand ha. Rice production in the province of East Java amounted to 95.91 million Ten Tons. The resulting productivity is 56.9 quintals per hectare. However, several areas in East Java have productivity levels that remain below the average for the province. One such area is the Pasuruan Regency, which has a rice productivity of 53.09 quintals per hectare(Meivita et al., 2024). One of the efforts to increase rice productivity in Pasuruan Regency is to increase the competence of farmers in rice farming and in collaboration with private companies. The private company that cooperates with farmer groups in Pasuruan is PT. Syngenta Indonesia. PT Syngenta Indonesia is an agribusiness company that focuses on providing products and services in the agricultural sector, especially in the protection of crops and seeds. Syngenta Indonesia is part of the Syngenta Group, a global company headquartered in Switzerland and renowned for agricultural innovation. The company offers various of superior pesticides, herbicides, fungicides, and seed products to help farmers increase productivity and the quality of their agricultural products. Syngenta is committed to supporting sustainability in agriculture by introducing environmentally friendly solutions and sustainable farming practices. The Ten Tons Rice Production Area Program was implemented by PT. Syngenta Indonesia in collaboration with rice farmer groups is one of the programs to increase rice productivity. However, not many farmer group members understand the implementation of the Ten Ten Tons rice production area program in the Pasuruan district.

One of the successes of a development program in agriculture is at the level of adoption (Kassem et al., 2020; Susilowati & Sugiarto, 2019; Waskito et al., 2015). The program adoption rate in farmer groups is better and more effective (Pratiwi et al., 2018) when compared to individual farmers. The number of family members, motivation, and attitude also influence adoption. The role of extension agents and the conditions of production facilities also influence program adoption(Rashidghalam, 2019; Susilowati & Sugiarto, 2019) The age of the farmer influences program adoption. The status of land ownership plays a significant role. Cosmopolitan level, frequency of interactions with extension workers, and institutional support (Pratiwi et al., 2018; Roy et al., 2014) According to Aji et al. (2014), the development of rice commodity agribusiness requires paying attention to the internal and external factors of rice farmers. The synergy between external and internal parties for rice farmers must be pursued as best as possible. Therefore, it is important that farmers in the Pasuruan district join farmer groups to implement the Ten Tons rice production area program initiated by PT. Syngenta Indonesia. The problem is how the Ten Tons rice production area program is carried out by PT. Syngenta Indonesia in Pasuruan Regency, and what is the strategy for developing rice farming through this program? The aims of the research are 1. to describe the Ten Tons rice production area program of PT. Syngenta Indonesia in the Pasuruan Regency and 2. To

analyze the development strategy of rice farming in the Pasuruan Regency. Therefore, it is hoped that a strategy for developing rice farming will be obtained from this study so that rice farming can be sustainable.

METHODS

This research was carried out deliberately in the Pasuruan Regency. East Java was chosen for this research because Pasuruan Regency implements the Ten Tons program for rice production conducted by PT. Syngenta.This research was conducted in 2023. The types of data used are secondary data and primary data. The primary data source was obtained from rice farmers in the Pasuruan Regency East Java. The total population of farmers who are members of farmer groups is 200 farmers. So the sample taken by simple random sampling is 36 rice farmers. Data collection techniques included observation, interviews, and documentation. The data analysis technique for objective 1 uses descriptive analysis, and objective 2 uses SWOT analysis. The variables used are internal and external factors for rice farmers as group members. Internal factors include strengths (farming experience, motivation, family workforce, farmer groups, and a Ten Tons rice area) and weaknesses (short land, limited capital, adoption of innovation, inefficient use of production inputs, and land conversion). while external factors consist of opportunities (accompaniment, rice as a staple food, government policies, partnerships, and financial access) and threats (climatic anomalies, prices of production inputs, labor outside the family, pest attacks, and price fluctuations).

RESULT AND DISCUSSION

The Ten Tons rice production area program

The Ten Tons rice production area program is a program to increase rice production collectively by using a package of pesticide products and assistance from PT. Syngenta Indonesia from land preparation to harvesting. The Ten Tons rice production area program is a joint and massive movement to avoid pest and disease explosions by means of healthy environmental management. Based on the description of primary data, 74% of farmers only received primary education. Therefore, farming assistance and demonstration plots are on the agenda for implementing the Ten Tons rice production area program. Officers from PT Syngenta Indonesia provided assistance to farmer groups throughout the implementation of the Ten Tons rice production area program. The goal of the assistance is to boost rice farming productivity for sustainable food security (Patience Manzana et al., 2014).

The target area of the Ten Tons rice production area program encompasses 20 hectares. The program starts with a pilot demonstration plot covering an area of 1 ha. Officers accompanied the demonstration plot from start to finish. The demonstration plot aims for farmers in the Pasuruan district to find out the difference in yield between farms using pesticide products from PT. Syngenta Indonesia and farms that do not use pesticide products from PT. Syngenta Indonesia. According to Hummel, Mészáros, Ring, Beuzelin, & Stout (2014), the use of insecticides can significantly reduce insects such as rice pests.

The Ten Tons rice production area program is categorized into two parts, namely KTD and KTS. KTD is a Ten Tons development area, which is an area that is still under development and uses care products and three new Syngenta products. In contrast, KTS is a superior Ten Tons area where all care products from Syngenta are fully utilized. So, for example, in one area consisting of 10 farmers, 6 farmers are still using 3 products, of which 4 farmers have full products; they are still included in the KTD. KTS must have 90% of farmers using full Syngenta products, which are sold as a complete package are Plenum 50WG, Virtako 300SC, Filia 525SE, GRAMOXONE, SCORE 250 EC, and

Touchdown Neo in Pasuruan Regency. Approximately 60% were included in KTD, while approximately 40% were included in KTS. according to survey results. Rice farmers still need assistance to be more competent in conducting rice farming. Assistance is always carried out by Field agricultural extension workers and PT. Syngenta so that rice farming is carried out properly and correctly and so that the productivity of farmer groups and their members can increase. Assistance was carried out several times, namely by directing farmer groups about the treatment that must be carried out when processing land nurseries. Tillers produce productive and fertile rice and rice, which then ripens and become ready for harvest (Sihombing & Hutahaean, 2019). According to Prasetya, Effendi, and Nurmayasari (2019), the role of field agricultural extension workers and students has a significant relationship with the participation of rice farmers in the Gadingrejo District, Pringsewu Regency.

Rice Farming Development Strategy

The results of the identification of internal and external factors in rice farming consist of the strengths and weaknesses of rice farmers as well as the opportunities and threats to developing rice farming. We can present each element of weakness, strength, opportunity, and threat in the following way:

1) Strength

The element of strength is an internal factor for rice farmers in the Pasuruan district, namely: a). Rice farmers have long experience in rice farming. The average experience of farmers is over 10 years. The experience that farmers have in rice farming is a key strength that enables them to carry out rice farming effectively. The farmer's experience influences the possibility of farmer participation in FSS in Lagos State. Nigeria (Obayelu et al., 2020). b). Rice farmers have motivation. Rice farmers' motivation is a driving force in their rice farming operations. Part of the reason motivation serves as a driving force for rice farming is that it is the primary task and has the potential togrow. According to Aziz, Nuraini, and Saepudin (2020), motivation can encourage farmers to work so as to increase the productivity of rice farming. Therefore, motivation is the internal strength of rice farmers. c). Availability of labor in the family Labor is an important production factor for rice farming. The presence of labor in the family increases rice farmers' ability to farm because it lowers labor costs. Labor outside the family began to be difficult to obtain, and wages continued to increase. d). There are farmer groups. Farmer groups are local institutions that can support the development of rice farming by serving to disseminate innovations aimed at increasing productivity (Hilmiati, 2020). Therefore, the existence of farmer groups is a strength for rice farmers. e) There is an area that has the Ten Tons of rice. The area designated for the Ten Tons of Superior Rice (KTS) constitutes approximately 40% of the total rice farming area. This area represents the farmers' strength in rice farming.

2) Weakness

The element of weakness is an internal factor for rice farmers in the Pasuruan district, namely: a). The land owned by farmers is narrow. Land is an important factor in the production process of rice farming. Land area influences farmer behavior in rice farming (Bola & Prihtanti, 2019). The land area also affects productivity in farming. The wider the land, the more production will increase. If the land area is narrow, production will decrease (Cahyati & Hasan, 2021). Therefore, the narrow land area is a weakness of the internal rice farmers. b). Farmers' capital is limited. Farmers' capital in rice farming is the initial provision used to buy production infrastructure. Sufficient capital will help farmers be more flexible in fulfilling their production facilities. Limited capital will limit farmers' ability to meet the needs of production facilities. Thus, the lack of sufficient capital represents an internal weakness for rice farmers. c). Farmers have yet to widely adopt innovations. The age of the farmer influences the level of technology adoption(Pratiwi et al., 2018). The status of

land ownership remains unchanged. The level of cosmopolitanism and the regularity of communication with extension workers are significant factors. Institutional support plays a crucial role.d). The utilization of production facilities has not reached its full potential. According to Badan Penelitian dan Pengembangan Pertanian(BPPP) (2018), small-scale farmers can cultivate well if farmers are joined in a farmer group with large companies. This is especially true regarding the provision of providing production facilities. e). There is a change in the function of rice fields. The conversion of productive land functions to food cultivation is a challenge (Hendriadi, 2021).

3) Opportunity

The element of opportunity is an external factor for rice farmers in the Pasuruan district, namely: a). There is assistance from Field Agricultural Extension Workers and PT. Syngenta. Assistance from external parties is an opportunity to improve the competence of human resources. Farmers who belong to farmer organizations in this case According to Gainau, Rawun, and Rumenser (2021), external assistance is important. b). Rice is a staple food. Rice is a staple food. Its availability is very important because everyone needs it every day (Nasrul, Arifin, & Susilowati, 2021). Therefore, this situation presents an opportunity for the development of rice farming. c). Government policy support. Agricultural development requires conducive conditions, including the development of rice farming. Government policies, of course, create and maintain conducive conditions that support production activities (Purba et al., 2020; Zaman et al., 2020) d). There is a partnership; which is a mutually reinforcing and beneficial form of cooperation (Dwijatenaya & Raden, 2016). e). There is easy financial access. Financial access is one of the most important external factors in doing business (Mat & Razak, 2011).

4) Threats

The threat element is an external factor for rice farmers in the Pasuruan district, namely: a). There is a climate anomaly. A climate anomaly is a climate that is difficult to predict. As a result, it poses a threat to production or cultivation (Saptana et al., 2008). b). The prices of production facilities increased. The price of production inputs is a factor that farmers cannot control. Therefore, the increase in the price of production facilities will be detrimental to farmers (Khairad, 2020). c). the decline in outside-family labor. The number of outside-family workers in the agricultural sector has been decreasing over time. This results in a decrease in farming productivity (Murniati et al., 2017). d). There are pests and diseases. The presence of pest and plant disease attacks can cause decreased production (Alim et al., 2018). Therefore, pest and disease attacks are external factors that pose a threat to the development of rice farming. e). Rice price fluctuations Farmers cannot determine the price of rice in the market. There is no guarantee of rice price stability. Decreasing commodity or rice prices can result in losses for farmers (Saptana & Daryanto, 2013). Therefore, fluctuations in rice prices are a threat to the development of rice farming.

Summary of Internal Strategic Factors Analysis (IFAS) and Summary of External Strategic Factors Analysis (EFAS) for the Development of Rice Farming

Internal and external factors that have been identified are evaluated using the Internal Strategic Factors Analysis Summary (IFAS) and External Strategic Factors Analysis Summary (EFAS) analyses. The following table presents the results of the Internal Strategic Factors Analysis Summary (IFAS) and External Strategic Factors Analysis Summary (EFAS) analyses:

Table 1

Analysis of the Internal Strategic Factors (IFAS) and External Strategic Factors (EFAS) is presented in the following table:

Internal Factor Value			
Strength	**Weight**	**Ratings**	**Score**
Rice farmers have long experience in rice farming	0.10	3.4	0.340
Rice farmers have a motivation	0.15	3.7	0.555
Availability of Labor in the family	0.08	3.4	0.272
There is a supportive farmer group	0.10	3.1	0.310
There is an area of Ten Tons of rice	0.09	3.3	0.297
Total Value	0.52		1.774
Weakness			
The land owned by farmers is narrow	0.08	3.3	0.264
The capital owned by farmers is limited	0.11	3.1	0.341
Adoption of farmer innovations is still lacking	0.10	3.0	0.300
The use of production facilities has not been maximized	0.09	3.2	0.288
There is a change in the function of rice fields	0.10	3.2	0.320
Total Value	**0.48**		**1.513**
Difference between Strengths - Weaknesses			**0.261**
External Factor Value			
Opportunity	**Weight**	**Ratings**	**Score**
There is assistance from Field agricultural extension workers and PT. Syngenta.	0.13	3.3	0.429
Rice is a staple food	0.11	3.1	0.341
Government policy support	0.11	3.2	0.352
There is a partnership	0.11	3.0	0.330
There is easy financial access	0.11	3.1	0.341
Total Opportunity Value	**0.57**		**1.793**
Threat			
There is a climate anomaly	0.05	3.5	0.175
Prices of production facilities increased	0.11	3.0	0.330
Decreasing out-of-family labor	0.06	3.5	0.210
There is a pest attack	0.11	3.2	0.352
Rice price fluctuations.	0.1	3.5	0.350
Total Threat Value	**0.43**		**1.417**
The difference in the value of Opportunity - Threat			**0.376**

Source: Processed from primary data (2023)

Based on the calculation of the IFAS analysis, it can be said that the internal factor of the strength of farmers in developing rice farming has a score of 1.774 with a total weight value of 0.52. The highest farmer internal strength factor score is on the motivation factor of rice farmers, which is equal to 0.555. Farmers' motivation in doing rice farming has the highest value, meaning that motivation is the main driving force in doing rice farming. Farmers' motivation manifests as their obligation to provide a living for the family, which consistently fuels their enthusiasm for rice farming. Farming income motivates people to become more involved in agricultural development. According to Aziz, Nuraini, and Saepudin (2020), motivation has a positive effect on productivity in rice farming. To increase the productivity of rice farming, one can do so by increasing farmers' motivation. The farmer's motivation is followed by the calculation of his or her internal strength score based on farming experience. Then there are farmer groups that support it.

Additionally, the existence of a Ten Tons rice program and the availability of family labor are important factors.

The internal factor of farmers' weaknesses in developing rice farming in the Pasuruan district has a score of 1.513 with a total weight value of 0.48. The capital factor owned by limited farmers has the highest internal weakness score, which is 0.341. Capital in rice farming is used to finance all needs in farming. If the capital owned by farmers is limited, it will hamper the fulfillment of rice farming. According to Dewi, Rachmina, and Tinaprilla (2017), the capital owned by farmers is used to buy better-quality non-subsidized fertilizers and also to fulfill seed orders. So it can be said that if the farmer's capital in farming is increased, the farmer will be able to be more flexible in fulfilling farming needs. The value of the internal factor score of farmers' weakness after limited farmer capital is the factor of the conversion of rice fields. The factor of farmer innovation adoption is still lacking. Furthermore, the use of production facilities has not been maximized, and farmers' land is narrow.

External factors as opportunities for farmers in developing rice farming, according to the calculation of the EFAS analysis, are 1.793 with a weight value of 0.57. The highest external opportunity score is the factor of assistance from Field Agricultural Extension Workers and PT. Syngenta in rice farming, which is equal to 0.429. Field Agricultural Extension Workers and PT. Syngenta assistance is carried out in the context of knowledge transfer. Transfer of knowledge is the key to increasing productivity in rice farming. Assistance to farmers related to agronomic practices and marketing the results of rice farming is needed so that rice farming can be sustainable. Assistance to rice farmers in conducting their farming can increase their productivity (Aryawati & Sutami, 2020; Kusnandar et al., 2013; Prasetya et al., 2019; Sihombing & Hutahaean, 2019). opportunity factors from external sources, \\ namely government policy support. Rice is a staple food. easy final access, and the existence of a scoring partnership under the facilitation factor of Field Agricultural Extension Workers and PT. Syngenta.

The external threat factor in developing rice farming has a score of 1.417 with a weight value of 0.43. The highest external threat factor score in rice farming is the presence of pests and diseases, which is equal to 0.352. Based on data from the field, pest and disease attacks are triggered by the use of inappropriate production infrastructure. Using the right production infrastructure can reduce pest and disease attacks on rice farming (Harun et al., 2019; Rashid et al., 2019). Exactly the right use of pesticides is related to their cost. The cost of pesticides has a significant effect on farmers' income (Januarti et al., 2018). External threat factors, which have lower scores than the pest and disease attack factors, include fluctuations in rice prices. The cost of manufacturing infrastructure has risen. The declining in labor outside the family and the presence of climate anomalies are also contributing factors.

The results of the IFAS and EFAS analyses stated that the difference in internal scores between strengths and weaknesses was 0.261. This means that farmers' internal strengths have a greater influence on the development of rice farming than their internal weaknesses. The difference in the value of the external score between opportunities and threats is 0.376. This means that the influence of the opportunity factor from external farmers is greater than the threat factor.

Based on IFAS and EFAS analysis, the position of the rice farming development strategy in the Pasuruan district can be shown at the following coordinate points:

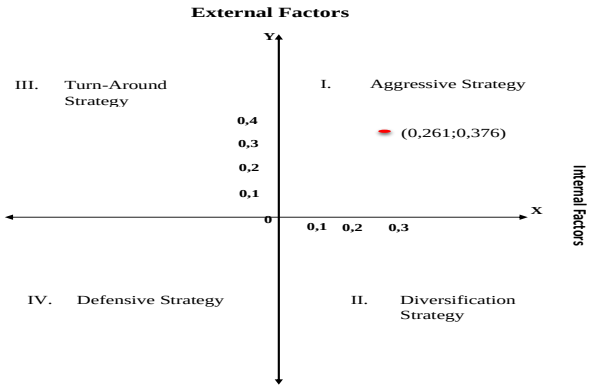

Figure 1
Position of Rice Farming Development Strategy Based on IFAS and EFAS Analysis

The rice farming development strategy is positioned in quadrant I, which represents an aggressive strategy, meaning that farmers have the strength to take advantage of opportunities to develop rice farming. Based on the SWOT analysis, an alternative rice farming development strategy was presented, namely Strengths-Opportunities (SO). Weakness-Opportunities (WO). Strengths-Threats (ST). and the following Weaknesses-Threats (WT):

Table 2
Matrix of Alternative Rice Farming Development Strategies

IFAS / **EFAS**	*Strengths*(S) 1. Rice farmers have long experience in rice farming 2. Rice farmers have the motivation 3. Availability of labor in the family 4. Support farmer groups 5. There is an area of Ten Tons of rice	*Weakness*(S) 1. The land owned by farmers is narrow 2. The capital owned by farmers is limited 3. Adoption of farmer innovations is still lacking 4. The use of production facilities has not been maximized 5. There is a change in the function of paddy fields
Opportunities(O) 1. There is assistance from Field agricultural extension workers and PT. Syngenta 2. Rice is a staple food 3. Government policy support 4. There is a partnership 5. There is easy financial access	*Strengths-Opportunities* (SO) 1. Utilizing farmer motivation by optimizing assistance from Field agricultural extension workers and PT. Syngenta 2. Leverage farmers' experience by optimizing government policy support	*Weakness- Opportunities* (WO) 1. Increase farmer capital by optimizing assistance from field agricultural extension workers and PT. Syngenta 2. Reducing land use change by optimizing government support.
Threats (T) 1. There is a climate anomaly 2. Prices of production facilities increased 3. Decreasing out-of-family labor 4. There is a pest attack 5. Rice price fluctuations.	*Strengths-Threats* (ST) 1. Utilizing farmer motivation to overcome pest attacks 2. Utilizing the experience of farmers to overcome price fluctuations	*Weaknesses-Threats* (WT) 1. Increase farmer capital to overcome pest attacks 2. Reducing land use change to overcome price fluctuations

Based on the scores from the IFAS and EFAS analyses, the main ways to improve rice farming are:

1. Utilizing farmer motivation by optimizing assistance from Field Agricultural Extension Workers and PT. Syngenta and conducting intensive outreach and counseling on good rice cultivation so that productivity increases
2. Increasing farmer capital by maximizing Field Agricultural Extension Workers and PT Syngenta assistance and assisting in identifying farmer groups' problems, particularly those related to capital.
3. Utilizing farmers' motivation to overcome pest and disease attacks and increasing the knowledge of farmer group members regarding the proper application of plant protection products
4. Increasing farmer capital to overcome pest and disease attacks and facilitating access to infrastructure for rice farming

CONCLUSION

The Ten Tons Rice Production Area Program Rice farming is carried out by PT. Syngenta Indonesia, which uses the stretch concept, which is followed by several members with a total stretch area of at least 20 ha. The program is categorized into two parts, namely KTD and KTS. KTD is a Ten Tons development area program, namely areas that are still under development. Meanwhile, KTS is the Ten Tons Superior Area. The main strategies for developing rice farming with SWOT are a. Strengths-Opportunities (SO): Utilizing farmer motivation by optimizing assistance from Field Agricultural Extension Workers and PT. Syngenta Leverage farmers' experience by optimizing government policy support. Opportunities-weaknesses (WO); maximization of farmer capital through assistance Field Agricultural Extension Workers and PT. Syngenta reduced land use change by optimizing government support. Strengths-Weaknesses (ST): Using farmers' motivation to combat pest attacks, capitalize on the experience of farmers to overcome price fluctuations. Weaknesses-Threats (WT): Farmers' capital should be increased to deal with pest attacks. reducing land use change to overcome price fluctuations.

In this study, the rice farming development strategy has been conveyed. However, it has not yet been conveyed how the response of rice farmers in the Pasuruan district to the implementation of the Ten Tons of rice area program has been. Therefore, further research focuses on research on farmer responses to the program so that it can improve program implementation in developing rice farming for sustainable food security.

DECLARATION OF INTEREST

The authors declare no conflict of interest in this study.

ACKNOWLEDGMENT

The author would like to thank PT. Syngenta Indonesia and the Agribusiness Study Program, Faculty of Agriculture, University of Islam Malang, for facilitating this research so that it runs well and smoothly.

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