Strategies to Improve Regional Food Security in Jember Regency

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Abtract: Work program of Ministry of Agriculture for 2022 focuses on providing primary food for Indonesian population. Strategic target of Jember District through Department of Food Security is in line with the work program of central government. However, ratio of production and food demand for three commodities (rice, corn, soybeans) in general has not met the targets that have been set. The purpose of this study is to identify and analyze the driving and inhibiting factors, also formulate alternative strategy and determine strategic priorities in context of developing food agribusiness. Data analysis method uses Force Field Analysis (FFA). The results showed that the dominant driving factor was the use of agricultural technology, followed by sufficient farming capital. While the inhibiting factors that need to be considered and reduced are inadequate irrigation facilities, followed by fairly high level of yield loss. To realize regional food security, it is recommended that Jember District Government maintains dissemination of latest agricultural technology, invites farmers to use loan fund, monitor agricultural irrigation channels on regular basis and be quick to deal with leaks when it suddenly occur and implement team harvesting system equipped with pedal thresher to reduce yield losses..

Keywords : food security; Force Field Analysis; strategy

INTRODUCTION

Food crops are one of the agricultural sub-sectors that have the potential to be developed because they have higher economic value and added value compared to other commodities. In addition, food crop commodities also have a strategic role, especially in fulfilling food availability to improve farmer welfare and provide employment opportunities (Laili and Diartho [1]).

Jember Regency, through the Department Food Security, has an 11th strategic target, namely increas-ing the agribusiness and agro-industry sectors with the objectives formulated as medium-term conditions to be achieved, one of which is improving food security with the target of growing community food availability and increasing the quality of utilization food. For the strategic target of increasing community food availability with an indicator of the ratio of food production compared to food needs (Dinas Ketahanan Pangan [2]).

For rice in 2020, dry grain production reached 997,207 tons or equivalent to 598,300 tons of rice. Sup-pose the average level of rice consumption of the people of Jember Regency comes 90 kg/cap/year with an estimated population of 2,550,000 people. The ratio of rice production and rice demand will get 2.58 or 96.26% of the 2020 target (2.68). This ratio has not met the target that has been set. Weather factors in 2020 cause it; wherein 2020 the length of rainy days is very high; which affects rice productivity. In addition, the increase in the population of Jember Regency also affects the ratio above (Dinas Ketahanan Pangan [2]).

Based on the formulation of the problem presented, this research aims to identify and analyze the driving and inhibiting factors faced by Jember Regency in the context of developing the food agriculture business. In addition, it also formulates alternative strategy formulations and determines strategic priorities.

METHOD

Determination of the research area is done intentionally (Purposive Method). The research was conducted in Jember Regency. The basis for determining the research area is because Jember Regency, through the Department of Food Security, aims to increase food security.

The study used non-probability sampling as a sampling technique with purposive sampling and expert judgment methods. This method was chosen because the sample was based on specific criteria according to the intent and purpose. The research results tend to be objective and provide more accurate information. The subject of the research is the decision-maker, namely the Head of the Department of Food Crops and Food Security in Jember Regency, represented by the Head of the Planning Section. The consideration is that the respondent in question has the capability and ability to formulate agricultural food policies, including developing development strategies and getting to know the specifications of the dynamics of the farming business.

A list of questions addressed to the respondents directly (face to face) was prepared in the form of a (structured) questionnaire. Open-ended questions dominate the structure of the questionnaire.

The data analysis method uses Force Field Analysis (FFA) analysis to determine the driving and inhibiting factors for developing food crop commodities in Jember Regency. The FFA stages are as follows (Sianipar and Entang [3]):

1. Identify problems based on strategic issues. Strategic issues may involve institutional aspects. From these several aspects, problems in developing food crops can be identified. Group these problems for analysis.

2. Analyze the problem by identifying the various driving and restraining forces.

Furthermore, the motivating and inhibiting factors are assessed based on scores. The scores given are given based on the following aspects (Sianipar and Entang [3]):

1. Urgency or weight factor in achieving performance.
2. Support or contribution of each factor in achieving performance.
3. The interrelationships between factors in achieving performance.

The stages of FFA analysis are summarized as follows (Sianipar and Entang [3]):

1. Determination of Urgency Value (NU) and Factor Weight (BF)

The value of urgency (NU) of each driving factor and inhibiting factor is carried out using a comparative method, namely by comparing which one is the most urgent with one another. The determination of the score is measured based on a range of values from 1 to 4, where the greater the score (score 4), the greater the urgency of the role of these factors in increasing regional food security (pushing factors) and vice versa (inhibiting factors). An even-numbered scale is applied so that respondents do not tend to choose the middle value. Factor Weight (BF) can be calculated by the formula:

$$BF = \frac{NU}{TNU} \times 100\%$$

TNU stands for Total Urgency Value. The value of urgency in question is the value of support and the value of linkage.

2. Determination of Supporting Value (ND) and Supporting Weight Value (NBD)

Supporting Value (ND) is also carried out using a comparison method to compare which one provides the most support to one another. Determination of the score is measured based on the range of values 1-4. After knowing the ND of each factor and BF as in point 1, then the NBD can be calculated using the formula:

$$NBD = ND \times BF$$

3. Determination of Associated Value (NK), Average Associated Value (NRK) and Associated Weight Value (NBK)

The value of linkage (NK) is carried out through a comparison method by comparing the extent of the relationship between one factor and another. Determination of the score is measured based on the range of values 1-4. The Average Correlation Value (NRK) of each factor can be determined using the formula:

$$NRK = \frac{TNK \text{ per faktor}}{n-1}$$

Information:

TNK   : Total Relationship Value of a factor

n   : number of driving factors or inhibiting factors

1   : factor that cannot be attributed to the same factor

After getting the NRK, the NBK for each factor can be calculated using the formula:

$$NBK = NRK \times BF$$

4. Determination of Total Weight Value (TNB)

TNB of each factor can be calculated using the formula:

$$TNB = NBD + NBK$$

5. Determination of Key Success Factors (FKK)

Based on the size of TNB in each factor, the factor that has the largest TNB is the key success factor (FKK) which can be used as a strategy or solution for determining the driving and inhibiting factors. How to determine the FKK is as follows (Triana [4]).

a) Selected based on the largest TNB.

b) If the TNB is the same, the largest BF is chosen.

c) If the BF is the same, the largest NBD is chosen.

d) If the NBD is the same, the largest NBK is chosen.

e) If the NBK is the same, it is selected based on experience and rationality.

If the number of driving factors TNB is greater than the inhibiting factor TNB, it means that the system has an advantage in its development; in other words, it is prospective to be developed. On the other hand, if the number of encouraging factors TNB is smaller than the inhibiting factor TNB, the system is not prospective to be developed. Strategic decision making in the Strength Field analysis is as follows:

1) Identify alternative solutions to problems by looking for activities that can increase more than one driving force or reduce inhibiting forces.

2) Collect strategic activities that have been identified from all problems that can be solved.

RESULTS AND DISCUSSION

Quoted from jemberkab.go.id [5], Jember is a food buffer district in East Java. However, the food security improvement program that was planned to be carried out turned out to be a COVID-19 pandemic consisting of monitoring and analyzing community food access, preparing food security and vulnerability maps, and developing Sustainable Food House Areas (Food Security Service [2]).

Table 1. Pushing and Inhibiting Factors for Increasing Regional Food Security in Jember Regency

Code	Driving factors	Code	Obstacle factors
D1	The farmer's mindset is modern	H1	Limited subsidies
D2	Sufficient working capital	H2	Labor costs are quite high
D3	Enough land area	H3	Land lease
D4	Application of cultivation techniques (Sapta Usahatani)	H4	Inadequate irrigation facilities
D5	The latest information from Field Agricultural Extension Officers (PPL)	H5	Plant nuisance organisms (OPT) attack is quite high
D6	Utilization of agricultural technology	H6	The price of pesticides is quite high
D7	Jajar Legowo planting system	H7	The yield loss rate is quite high
D8	Agricultural sector potential	H8	Land conversion
D9	Many government programs	H9	Complicated access to capital
D10	Internet for access to information	H10	There is no hedging of the results during the harvest
D11	Application of appropriate technology	H11	Dependence on chemical fertilizers
D12	There are schools and agricultural campuses	H12	Decreased soil nutrients

Based on the results of interviews and environmental analysis with the Head of the Planning Section of the Food Crops, Horticulture and Plantation Office and the Food Security and Livestock Service Office, it is found that the driving and inhibiting factors in improving food security in Jember Regency are as shown in Table 1.

Strategies to improve regional food security in Jember Regency, especially rice production

After the assessment of the factors is analyzed, the final value is obtained, namely the Total Weight Value (TNB) of each factor. The highest TNB is the Key Success Factor (FKK) in improving regional food security in Jember Regency. There are two FKKs, namely FKK for encouraging factors and FKK for inhibiting factors.

Table 2. Evaluation of the driving factors for the Improvement of Regional Food Security in Jember Regency

Code	Factors	NU	BF	ND	NBD	NK	NRK	NBK	TNB
D1	The farmer's mindset is modern	17	0.09	4	0.35	21	3.5	0.31	0.66
D2	Sufficient working capital	20	0.10	5	0.52	19	3.2	0.33	**0.85**
D3	Enough land area	19	0.10	3	0.29	16	2.7	0.26	0.56
D4	Application of cultivation techniques (Sapta Usahatani)	19	0.10	5	0.49	21	3.5	0.34	0.83
D5	The latest information from Field Agricultural Extension Officers (PPL)	16	0.08	4	0.33	20	3.3	0.27	0.60
D6	Utilization of agricultural technology	22	0.11	4	0.45	25	4.2	0.48	**0.93**
D7	Jajar Legowo planting system	21	0.11	4	0.43	22	3.7	0.40	0.83
D8	Agricultural sector potential	10	0.05	4	0.21	13	3.25	0.17	0.37
D9	Many government programs	11	0.06	5	0.28	11	2.75	0.16	0.44
D10	Internet for access to information	13	0.07	4	0.27	14	3.5	0.23	0.50
D11	Application of appropriate technology	14	0.07	4	0.29	14	3.5	0.25	0.54
D12	There are schools and agricultural campuses	12	0.06	5	0.31	15	3.75	0.23	0.54
	TOTAL	**194**	**1.00**						

The assessment results showed that factor D6 (utilization of agricultural technology) obtained the highest TNB of 0.93 and factor D2 (sufficient farming capital) was next with TNB of 0.85. Head of the Planning Section of the Department of Food Crops, Horticulture and Plantation of Jember Regency, Rudi Indrawan, the technologies that rice farmers in Jember have used are transplanters and harvesting cars. This technology can be expanded or maintained because it is considered capable of producing higher production considering the uniform spacing, saving costs and harvesting faster. In addition, rice farmers in Jember are small farmers, so their capital requirements are not as much as farmers with large lands. Farmers have also accompanied Field Agricultural Extension Officers (PPL) and were invited to prepare the administration to obtain assistance from the government.

The largest TNB value in the inhibiting factors is the H4 factor (inadequate irrigation facilities), worth 0.67. This gain is not much different from the H7 factor (the yield loss rate is quite high), which is 0.66. According to the Head of the Planning Section of the Food Crops, Horticulture and Plantation Office of Jember Regency, Rudi Indrawan, irrigation canal leaks often occur at several points, reaching around 50 percent. The Jember Regency Government has just normalized several irrigation channels that lead to three Bendungan Arah Tiga canals located in Jumerto Village, Patrang District. Through several irrigation channels, Bendungan Arah Tiga can irrigate 2,500 hectares of farmers' fields in several sub-districts. Good irrigation will increase agricultural productivity. Farmers in Jember are ready to support food security, the government's priority program. The Ministry of Agriculture has many irrigation programs, such as piped irrigation, pumping, reservoirs and others (JawaPos [6]).

Table 3. Evaluation of inhibiting factors for increasing regional food security in Jember Regency

Code	Factors	NU	BF	ND	NBD	NK	NRK	NBK	TNB
H1	Limited subsidies	15	0.09	4	0.35	16	2.7	0.24	0.59
H2	Labor costs are quite high	17	0.10	3	0.30	20	3.3	0.33	0.63
H3	Land lease	18	0.11	3	0.32	16	2.7	0.29	0.60
H4	Inadequate irrigation facilities	17	0.10	4	0.40	16	2.7	0.27	**0.67**
H5	Plant nuisance organisms (OPT) attack is quite high	12	0.07	4	0.28	20	3.3	0.23	0.52
H6	The price of pesticides is quite high	13	0.08	3	0.23	18	3	0.23	0.46
H7	The yield loss rate is quite high	18	0.11	3	0.32	19	3.2	0.34	**0.66**
H8	Land conversion	15	0.09	4	0.35	5	1.25	0.11	0.46
H9	Complicated access to capital	11	0.06	3	0.19	9	2.25	0.15	0.34
H10	There is no hedging of the results during the harvest	12	0.07	3	0.21	7	1.75	0.12	0.34
H11	Dependence on chemical fertilizers	9	0.05	4	0.21	10	2.5	0.13	0.34
H12	Decreased soil nutrients	13	0.08	4	0.31	13	3.25	0.25	0.55
	TOTAL	**170**	**1.00**						

The stages of the post-harvest handling process for rice carried out by farmers begin with determining the age of harvest on a stretch of rice fields. Determination of harvest age can be done visually by looking at rice's appearance, seeing the plant's age based on the description of each variety issued by the Indonesian Center for Rice Research or using a grain moisture content test. Optimum harvest age greatly determines the quality and yield loss at harvest. Rice harvested before optimal ripening will result in poor grain and rice quality. Generally, young rice harvested will produce quality rice with a high percentage of green and calcified grains. The yield of milled rice is low, with a high percentage of broken rice and groats and the color of the rice becomes dull (Nugraha et al. [7]). The rate of yield loss is quite high because farmers are still harvesting or threshing manually, transportation is carried out individually and they do not use tarpaulins when drying.
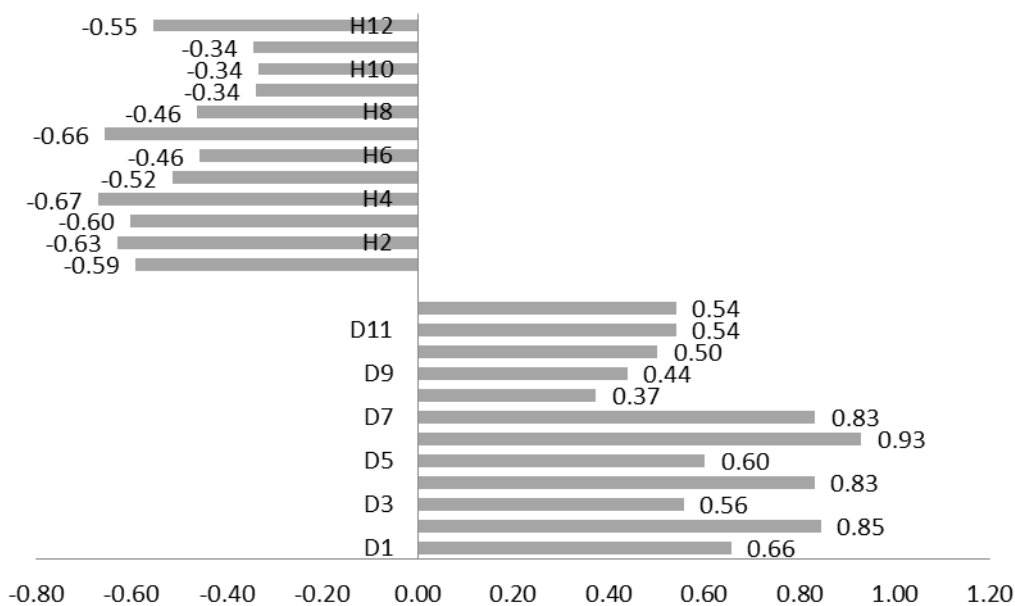
Figure 1. Field of Strength Improving Regional Food Security in Jember Regency

After the FKK is known, the next step is to formulate an effective strategy and approach is a focus strategy, namely minimizing the key inhibiting factors and maximizing the key driving factors to achieve the goal. The FKK selected the factors that encourage increased regional food security are the use of agricultural technology and sufficient farming capital so that the focus can be on maintaining existing technology, updating knowledge about agricultural technology, consulting with PPL regarding the application of the latest agricultural technology and accessing agricultural technology assistance from government and maintain or guarantee the availability of farming capital. Meanwhile, the FKK selected for the inhibiting factors were inadequate irrigation facilities and a high level of yield loss. The solution to overcome these inhibiting factors is to normalize irrigation channels regularly, which means routinely checking various planting areas and reducing yield loss by harvesting in groups and threshing rice using a thresher machine or power thresher.

CONCLUSION

The strategy to improve regional food security in Jember Regency includes efforts to maximize the use of agricultural technology by being balanced with sufficient farming capital, minimizing inadequate irrigation facilities, and overcoming the high level of yield loss. Future research can identify SWOT of agricultural technology in Jember district.

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