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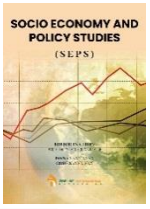

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REVIEW ARTICLE

AGRO TECHNO PARK DEVELOPMENT STRATEGY IN ACCELERATION OF COCOA PLANT TECHNOLOGY INNOVATION IN GUGUAK DISTRICT OF WEST SUMATERA-INDONESIA

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ABSTRACT

The cocoa plant is a regional superior commodity that has great potential and is able to improve the community's economy. This requires a touch of technological innovation from upstream to downstream through the Agro Techno Park Guguak, with the concept as a means of accelerating dissemination or technology transfer to the public. The purpose of this paper is to identify the Agro Techno Park development strategy in an effort to accelerate innovation in cocoa plant technology in West Sumatra. This research was conducted at Agro Techno Park Guguak, Lima Puluh Kota Regency, West Sumatra in 2021. The data analysis method used was the SWOT method. Based on the results of research on the development strategy of the Guguak Agro Techno Park in an effort to accelerate innovation in cocoa plant technology in West Sumatra, the Rapid Growth Strategy is a strategy. Strategies that can be implemented are (1) Regarding the high market demand for processed chocolate products, it is necessary to carry out post-harvest guidance and training for cocoa in a sustainable manner until they find the right market, (2) Agro Techno Park Guguak as a business incubator needs to foster melinial farmers. who have an entrepreneurial spirit, (3) guidance and sustainable assistance in cocoa farmer areas, (4) fostering farmer institutions in order to strengthen the bargaining position of cocoa farmers.

KEYWORDS

agro techno park, cocoa, agricultural innovation, development, accelerate

1. INTRODUCTION

Based on Law Number 18 of 2002 concerning the National System for Research, Development and Application of Science and Technology (Law 18/2002), this is the basis for the development of the Science and Technology Park in Article 14 of Law 18/2002 which states that the government, local governments, and business entities can build areas, demonstration centers, and other science and technology facilities and infrastructure to facilitate synergy and growth of institutional elements and foster a culture of science and technology among the community (Seo 2006, Mustafa *et al* 2020, Imansyah 2020).

With the existence of laws regulating the development and development of science and technology-based areas which will later provide opportunities and opportunities for all parties such as the government (research bodies), researchers, universities and the private sector to collaborate in building science-based facilities and infrastructure as well as giving birth to efficient and effective technological innovations that can later be implemented by the wider community (Halibas et. al 2017). For information acceleration needed a vehicle such as the Agro Techno Park is needed. The concept put forward by Agro Techno Park is a means of research, development, dissemination or technology transfer to the community and business incubation media, so that it can improve people's welfare and can foster competitive and knowledge-based young start-ups. (Tolinggi *et al* 2018, Sari 2020).

Bappenas (2015) socializes that part of the "Techno Park" is applied in the form of an Agro Science Park (ASP) and an Agro Techno Park (ATP) in several districts leading regional commodity production centers throughout Indonesia. One of the Guguak Agro Techno Park has been implemented in Fifty Cities District. The superior commodity developed at Agro Techno Park Guguak West Sumatra is the cocoa plant. The purpose of this paper is to identify the Agro Techno Park development strategy in an effort to accelerate innovation in cocoa plant technology in West Sumatra.

2. METHODOLOGY

2.1 Date and Place of Research

This research was conducted at Agro Techno Park Guguak in 2021.

2.2 Type and Sources of Data

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The research was conducted by collecting data through field observations, interviews and literature study. In this study using primary data and secondary data. Primary data were obtained directly by field observations and interviews with managers (1 person), researchers (5 people), farmers (5 people), and related local governments (2 people). Secondary data with literature study were obtained from reports on the results of the Agro Techno Park Guguak activities.

2.3 Analysis Method

The formulation of a development strategy for the Guguak Agro Techno Park area with a SWOT analysis using brainstorming techniques. SWOT is an analysis used to determine the internal and external influences of the Guguak Agro Techno Park area on the strengths, weaknesses, opportunities and threats as well as the formulation of development strategies based on the potential of the research area (Rangkuti, 2015).

3. Result and Discussion

3.1 Concept of Building and Development of Agro Techno Park Guguak in West Sumatra.

The main problem at this time is the low level of community adoption of research and technology results, especially in the field of agriculture and has no real impact on increasing agricultural productivity so that it is unable to improve farmer welfare (Suhartini 2020, Kuswardani 2018, Waspada 2016). For this reason, the government strives for a pattern of dissemination or transfer of technological information from national research centers and universities through a forum equipped with supporting facilities and infrastructure in the form of an area based on agricultural technology innovation (innovation ecosystem) called the Agro Techno Park (Abner, 2017) (Imas (2016) (Regele et. Al, 2012). Indonesia has several Agro Techno Parks, one of which is in West Sumatra known as Agro Techno Park Guguak located in Fifty Cities District. In its implementation, Agro Techno Park Guguak has a model like the chart below:

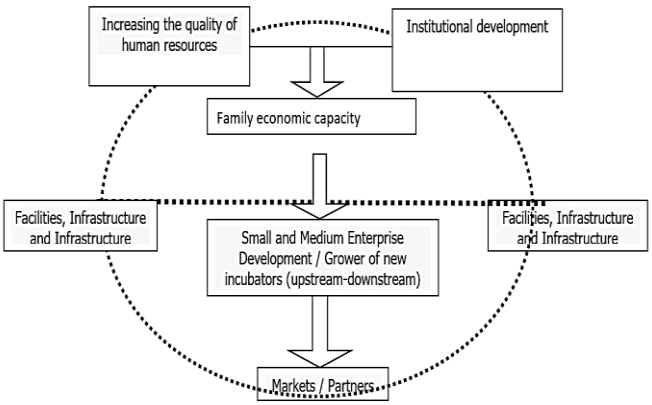

Figure 1: Model Agro Techno Park Guguak, West Sumatra

The concept of the Guguak Agro Techno Park development model is: (a) a place for demonstration and application of innovations that have been developed in the Agro Techno Park Guguak, (b) a place for the application of agribusiness-oriented upstream-downstream agricultural technology that is site-specific, and (c) training center, apprenticeship, business partnership incubation, technology dissemination, and business advocacy center to the wider community.

3.2 Guguak Agro Techno Park Development Based on Cocoa Plants

Superior commodities are mainstay commodities that have a strategic position to be developed in an area whose determination is based on various considerations both technically (soil and climate conditions) and socio-economic and institutional (Yunan 2010, Efit 2021, Soesilowati 2020). A superior commodity is a potential commodity that is considered to be competitive with similar products in other regions, because besides having a comparative advantage, it also has high business efficiency. Leading commodities are the results of community businesses that have high and profitable marketing opportunities for the community (Suci 2017, Mujiburrahmad 2021).

Cocoa is one of the leading commodities that has the potential to be developed in West Sumatra. In 2019, the land area for cocoa plants was 11,118 ha with a production of 4,866 tons with a productivity level of 437.66 kg dry beans / ha / year (BPS West Sumatra, 2020). In developing the Guguak Agro Techno Park provides assistance and transfer of cocoa technology innovations from cultivation to post-harvest processing of cocoa. With the hope that the community will have competitiveness with location-specific potential to increase cocoa productivity so that it can increase farmer family income and increase regional economic growth (Iyan, 2014). The growth of leading sectors in a region does not only have an impact on economic growth within the region but also has an impact on economic growth outside the region (Hafiizh 2017, Fauzia 2019).

Technology dissemination strategies that have been carried out using various methods include;

- Through face-to-face media (training, field schools, internships, workshops, direct guidance)

Face-to-face activities aim to increase the capacitance of farmers' human resources so that cocoa technology innovation can be implemented and adopted by farmers and the community. According to Yuniarsih (2018), dissemination techniques and methods such as regular meetings greatly influence the farmer adoption process. As stated by Zul (2018), Sirnawati and Sumedi (2019), Ryan (2020), and Susanto (2020), the dominant factor that greatly influences the adoption and implementation process of technological innovation is the intensity level of farmer communication with Agro Techno Park managers, access farmers, technological excellence, farmer openness, farmer knowledge, availability of facilities and infrastructure.

- Demonstration plot for cocoa technology innovation in the Agro Techno Park area of Guguak

Guidance through practice at the cocoa garden demonstration plot has greatly accelerated the process of adopting technological innovations for farmers. According to Rivky (2018), Haliatur (2019), Widiarso and Mubarokah (2019), Junaidi (2020), and Mamat (2020), the strategy for accelerating the adoption process of technological innovation is solving farmer problems through empowering farmers to get out of poverty and dependence so that can increase the per capita income of the farmers, this is not only changing farmers 'farming patterns but also changing farmers' perspectives and behavior. The demonstration plot for cocoa technology innovations related to cocoa cultivation, such as cropping patterns, selecting quality seeds, fertilizing, controlling pests and plant diseases, and pruning cocoa plants are expected to increase the productivity of cocoa plants.

Figure 2: Demonstration of cocoa technology innovation in the Agro Techno Park Guguak area

- Processing of various processed cocoa products.

One of the Agro Techno Park concepts is to increase the added value of agricultural commodities to increase competitiveness in the form of fostering the processing of post-harvest products. Agro-industry is expected to be able to reach the export market, create jobs and increase the interest of young workers in agriculture (start-up), be able to increase rural income, and be able to spur the development of rural industrialization (Elizabeth, 2019). Processed cocoa products that have

been produced by Agro Techno Park Guguak include original 3 in 1 cocoa powder drinks, cocoa butter, original cocoa powder, cocoa powder, and various forms of chocolate candy with various flavors.

Figure 3: Several types of processed cocoa products produced by Guguak Agro Techno Park

- Farmer Group Institutional Development

The existing institutions are still focused on production and have not led to post-production activities. This is not in line with the government's desire for farming that is economically scale, market-oriented and based on corporate areas. The Farmers' Economic Institution itself is an institution that carries out farming activities formed by and for farmers, in order to increase the productivity and efficiency of farming, both legal and non-legal entities (Permentan No. 67, 2016). However, to initiate a farmer institution into a farmer economic institution, there are obstacles including competence of human resources and low technology infrastructure, access to finance, quality of farm management, production has not met economies of scale, and knowledge of business management is not professional (Effendy 2020, Syofian 2020, Sujianto 2018, Nahraeni 2020).

Institutional development is carried out which is a partner in the management of the Agro Techno Park Guguak, the institution is named BUM-Nag Sungai Talang. Personnel and management, AD and ART from BUM-Nag have been formed. Activities that have been carried out include, among others: institutional development of Nagari-Owned Enterprises (BUM-Nag), training for BUM-Nag management and institutional members. BUMNag institutions have started to process cocoa, and function as marketing of processed products and other products produced by Agro Techno Park Guguak.

3.3 Strategy Analysis for Agro Techno Park Guguak Development

To analyze the development of Agro Techno Park Guguak as an effort to accelerate innovation in cocoa plant technology in West Sumatra, using a SWOT analysis tool, there are several factors identified consisting of internal and external factors based on the conditions of the Guguak Agro Techno Park.

- Internal Factor Analysis (IFAS)

Table 1: Internal strategy factors of Guguak Agro Techno Park

	Factor of Internal Strategy	Value	Rank	Score
	Strenght (S)			
1	The area around Agro Techno Park Guguak is a cocoa plantation area	0.13	4.8	0.62
2	Availability of agricultural training and education facilities	0.14	4.8	0.67
3	The involvement of multi actors such as government, universities and the private sector who collaborate in coaching	0.08	4.7	0.38
4	Building relationships with stakeholders related to the development of the Guguak Agro Techno Park.	0.10	4.2	0.42
5	There is a Nagari-owned company that covers farmers	0.11	4.1	0.45
	AMOUNT	2.54		
	Weakness (W)			
1	Limited national investment capacity in the downstream industry sector to process raw materials or semi-finished materials into finished products.	0.11	3.5	0.38
2	Capital support for beginner start-up	0.02	3.3	0.06
3	Institutions that are not yet strong	0.07	2.8	0.19
4	Limited facilities and infrastructure	0.12	2.3	0.27
5	Continuity of activities	0.11	2.1	0.23
	AMOUNT	1.13		
	TOTAL SW	3,67		
	SCORE SW	2.34 – 1.39 = 1,41		

From the table above, it can be seen that Guguak Agro Techno Park has training and education facilities, which are a means of transferring technology information to farmers, which is a major force (0.67) in the future development of Agro Techno Park Guguak because it is in accordance with its main function of accelerating agricultural technology innovation. And the main weakness is the limited national investment capacity in the downstream industrial sector to process raw materials or semi-finished materials into finished products (0.38).

- External Factor Analysis (EFAS)

Analysis of the external environment at Guguak Agro Techno Park that has been carried out related to external strategic factors consisting of opportunity factors and threat factors, are presented in Table 3.

Table 2: External strategy factors of Guguak Agro Techno Park				
	Factor of External Strategy	**Value**	**Rank**	**Score**
	Opportunities (O)			
1	Market demand for processed cocoa products is high	0.13	4.8	0.63
2	The area of Lima Puluh Kota Regency is a local industrial center area	0.12	4.5	0.54
3	Lima Puluh Kota Regency is an agro-tourism area	0.13	4.3	0.56
4	The Agro-climate of Fifty Cities Regency is very suitable for agricultural development.	0.15	3.7	0.55
5	The spirit of melenial farmers in developing start-ups based on agricultural technology innovation	0.10	3.6	0.36
	AMOUNT	2.64		
	Threats (T)			
1	Pest and disease outbreaks in cocoa	0.11	2.2	0.24
2	Complecated market regulation	0.14	2.6	0.36
3	Prices fluctuate, sometimes very low	0.10	2.3	0.23
4.	There is still no coaching from the private sector	0.03	2.0	0.06
	AMOUNT	0,89		
	TOTAL OT	3,53		
	SCORE OT	2.64 – 0,89 = 1.75		

Source: Data primary processed, 2021

In the table above, the total score of external factors is 3.53, this means that Guguak Agro Techno Park has a strong position in accelerating agricultural technology innovation. The main opportunity in the future is the high market demand for processed cocoa products and this is supported by the area of Fifty Cities District which is a local industrial center area.

3.4 Mapping of Guguak Park's Agro Techno Development Position

To determine the position of the current conditions and the development of the Agro Techno Park Guguak, it is shown in the image below:

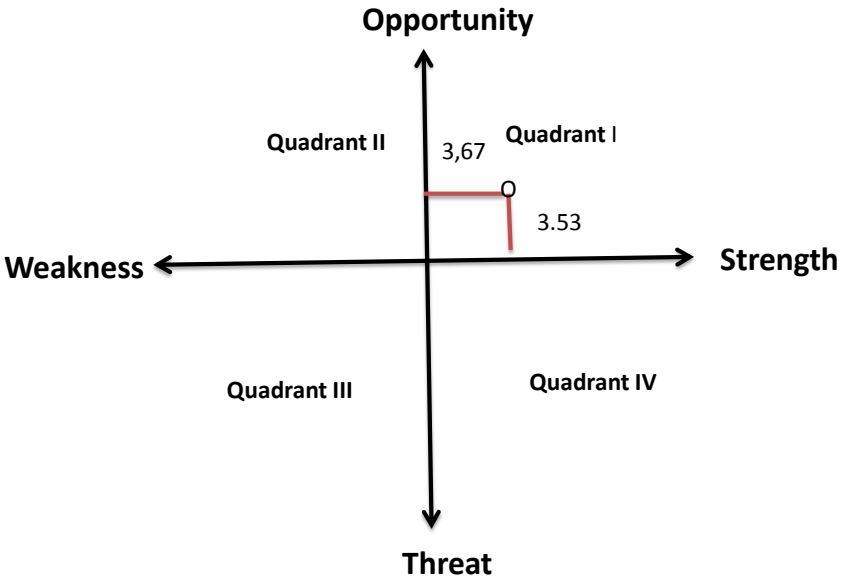

Figure 4: Guguak Agro Techno Park Development Matrix

The graph above shows that the position of the Guguak Agro Techno Park development at the coordinate point (3.67, 3.53) is located in quadrant I. This means that it has great strength and opportunity in the acceleration or acceleration of cocoa technology innovation. A development strategy that is suitable and in accordance with the position of Agro Techno Park Guguak as a means of accelerating the dissemination of agricultural technology innovation is a progressive strategy that supports regional growth, and is on a rapid growth strategy.

- Guguak Agro Techno Park Development Strategy

From the results of the analysis of internal and external factors, a development strategy for the Guguak Agro Techno Park is obtained, as in the matrix below:

4. Conclusion

Guguak Agro Techno Park is a vehicle for research, study, dissemination, as well as a means of improving the quality of farmers' human resources. Based on the results of research on the development strategy of the Guguak Agro Techno Park in an effort to accelerate innovation in cocoa plant technology in West Sumatra, the Rapid Growth Strategy is a strategy. Strategies that can be implemented are (1) Regarding the high market demand for processed chocolate products, it is necessary to carry out post-harvest guidance and training for cocoa in a sustainable manner until it finds the right market, (2) Agro Techno Park Guguak as business incubator needs to foster melinial farmers who have an entrepreneurial spirit, (3) guidance and sustainable assistance in cocoa farmer areas, (4) fostering farmer institutions in order to strengthen the bargaining position of cocoa farmers.

INTERNAL / EXTERNAL	STRENGTHS (S)	WEAKNESSES (W)
	• The area around Agro Techno Park Guguak is a cocoa plantation area • Availability of agricultural training and education facilities • The involvement of multi actors such as government, universities and the private sector who collaborate in coaching • Built relationships with stakeholders related to the development of the Agro Techno Park Guguak. • There is a Nagari-owned company that covers farmers and the community.	• Limited national investment capacity in the downstream industry sector to process raw materials or semi-finished materials into finished products. • Capital support for start-up startups • Institutions that are not yet strong • Limited facilities and infrastructure • Sustainability of activities
OPPORTUNITIES (O)	**STRATEGI (SO)**	**STRATEGI (WO)**
• High market demand for processed cocoa products • The area of Fifty Cities District is a local industrial center area • Lima Puluh Kota Regency is an agro-tourism area • The Agro-climate of Lima Puluh Kota Regency is very suitable for agricultural development • The enthusiasm of melenial farmers in developing start-ups based on agricultural technology innovation	• In relation to the high market demand for processed chocolate products, it is necessary to carry out post-harvest guidance and training for cocoa commodities to find the right market. • The area around Guguak Agro Techno Park as an incubator to grow start-ups needs to involve melinial farmers who have an entrepreneurial spirit • Continuous guidance and assistance in farmer areas. • Fostering farmer institutions in order to strengthen the bargaining position of farmers	• Can invite the private sector as investors in future development. • Institutional strengthening in strengthening the bargaining position of farmers and in finding solutions to limited capital
TREATHS (T)	**STRATEGI (ST)**	**STRATEGI (WT)**
• Pest and disease outbreaks in cocoa • Complecated market regulations • Prices are volatile, sometimes very low • Coaching from the private sector is still missing	• Guidance in cocoa cultivation • Anticipating the possibility of pest attack by maintaining pruning time and the cleanliness of the cocoa farm environment. • Bridging farmers in responding to price fluctuations	• Strengthening Nagari-owned enterprises to maintain price fluctuations and the accumulation of crop yields.

Figure 5: SWOT Matrix Guguak Agro Techno Park, 2021

i) The selected strategy is obtained based on the results of interviews which are quantified by considering the value and ranking calculations. The strategy obtained is prioritized more from the factors of strength and opportunity, because of these factors have the most benefit for the development of the agro-techno park in an effort to accelerate innovation in cocoa plant technology in West Sumatra. While the other selected strategies are based on considerations by minimizing weaknesses through existing opportunities, then minimizing threats through the strengths that have been formed, and eliminating as much as possible weaknesses and threats that exist or have not occurred in an effort to develop cocoa plant technology innovation in West Sumatra.

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