4th INTERDISCIPLINARY INTERNATIONAL CONFERENCE ON GREEN DEVELOPMENT IN TROPICAL REGION (4th IICGDTR)
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Acceptance Letter

Number: 043/4-IICGDTR/05/2021

Dear **I Ketut Sumantra**,

Based on the review process performed by our review team, we are delighted to inform you that your abstract, entitled:

The Development Strategy of Coffee Agro-Technopark in Tabanan Regency to Realize the Synergism of Agriculture and Tourism

is **accepted** to be presented orally at the 4th International Interdisciplinary Conference on Green Development in Tropical Regions (4th IICGDTR) within the sub theme of **Sustainable development issues**. The conference will be held online from 7-8 July, 2021, via Zoom.

We would like to convey additional information related to your abstract and the conference:

- The abstract should be formatted according to the guidelines provided, and resubmitted to the website. *The deadline for submission of the corrected abstract is 7 June, 2021***.**
- Your full paper will be considered to be published in the **International Journal of Agricultural Sciences/IJASC** or **Conference Proceeding**. We ask that your paper be formatted according to the guidelines provided by the journal/proceeding. We inform you, the final decision will be based on the recommendation from the journal editor or the proceeding editor.
- *The deadline for the full paper submission and payment for processing & publication fee is 30 June, 2021*. Detailed information about payment fees can be accessed at: http://conference.pasca.unand.ac.id/index.php/iicgdtr4/index/pages/view/Conference%20Fee
- Please prepare your conference materials according to the guidelines stated on our website, and the presentation schedule will be forthcoming. *The deadline for conference materials submission is 2 July, 2021*.

Once again, we congratulate you on the acceptance of your abstract and are grateful for your contribution to the 4th IICGDTR. Any continuing questions or correspondence may be sent to iicgdtr@unand.ac.id or iicgdtr.conference@gmail.com.

Sincerely,

Yuerlita, Ph.D
Head of the 4th IICGDTR Committee
Padang, Indonesia

CERTIFICATE

Awarded to

I Ketut Sumantra

as Presenter

Organized by:
Graduate Program
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4th International Interdisciplinary Conference on Green Development in Tropical Regions (4TH IICGDTR)

Theme:

GOVERNANCE CHALLENGES OF GREEN DEVELOPMENT IN TROPICAL ASIA

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Hosted by:
Graduate Program Universitas Andalas

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Prof. Dr.rer.soz. NURSYIRWAN EFFENDI

Partnership:

The Development Strategy of Coffee Agro-Technopark in Tabanan Regency to Strengthen the Synergism of Agriculture and Tourism

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Abstract. Tabanan Regency has various kinds of superior agricultural commodities including coffee plantations and also has several potential tourist attractions. The agriculture and tourism sectors in Tabanan have not been fully exploited so that the two have not yet run synergistically. The research objective was to identify the sub system of input, process, output and development strategy of coffee ATP in Munduk Temu, Tabanan Regency. Data were analyzed using SWOT and using Quantitative Strategic Planning Matrix (QSPM) analysis. The results showed that coffee ATP fulfills the requirements both in terms of input, process and output, but the quantity and quality of each sub-system needs to be improved. The strategic position of coffee ATP development is in quadrant I (SO Strategy). Strategic priorities with the highest TAS value: 1) implementing technological innovations for managing pre-harvest and post-harvest (st5 = TAS 6.94); 2) Policies from the local government in regulation and providing assistance to subak abian in supporting the development of ATP Coffee (st1= TAS 6.87); 3) Implementing crop-livestock integration (st3=TAS 6.86). It is necessary to strengthen institutional synergy between Village Owned Enterprises (Bumdes) managers, *subak abian* and tourism steak holders in strengthening the agricultural sector in synergy with the tourism sector.

1. Introduction

Tourism sector is highly contributing to the Bali's regional GDP and having huge impact on the economic growth. Accommodation service and F&B has a very close linkage to the tourism and are the highest contributor in the tourism sector comparing with other entities. In other side, agriculture sector, forestry and fishery have lower contribution in the regional GDP and tending to decrease by years. In 2018, according to the Bali in Figure 2019, accommodation service and F&B has shared 23,34% while the agriculture has 13,81% [1]. Other issue come up with the impact of tourism development to the environment, such as land use changing, decrease of environment quality, over exploitation, social and culture issue and criminals [2,3]. The gap between agriculture and tourism sector is caused by the unequal profit share from the agriculture sector that used to support the tourism sector. In consequence, the Balinese has lack motivation in improving the agriculture sector [4]. The low farmer regeneration does hamper the agriculture development and sustainability. Another issue in agriculture sector is a massive land use changing [4]. There is a lot of agriculture land has transformed to settlement, industrial

building, tourism accommodation or any advantageous use [5,6]. The depletion of agriculture land availability affects the provision of food sources [7], high dependency on import products [8], biodiversity loss, decrease of natural open space, environmental contamination, and interfere the local wisdom [9].

Tourism sector is recognized as the highest contributor of the local GDP in Bali Province. The challenge is making this sector to be in line with other sectors so they can be grown without sacrificing on any sectors [10]. Improving the synergy between the agriculture and tourism through a sustainable development model can be one of the long-term solutions. Creating an Agro Techno Park (ATP) is a sustainable development model that emphasizing the role of agriculture and tourism in supporting each other [11]. ATP is developed to be the center of entrepreneur's incubation, center of agricultural science and technology and also providing an eco-tourism attraction [12].

Tabanan Regency is characterized as an agriculturally based area and has many agricultural commodities, such as Robusta Coffee. Its plantation is located in Pupuan District with production about 4.813,06 tons in 2019 [13]. The Robusta development center is placed in Munduk Temu Village and recognized as integrated agricultural development area with tourism and local wisdom bases. They have three main products, including nira, salacca coffee, and coconut. This sector is highly recommended to develop as Agro Techno Park (ATP) in improving the revenue in Munduk Temu village. The development of ATP in Munduk Temu village is depending on the involvement of local institution, stakeholders, and the community organization [14,15]. Referring to the previous research conducted by Sumantra [16], a holistic analysis is needed to support the ATP regarding the planning, policy, and selection of potential product. The reconstruction of biophysics condition, society and cultural terms have to be sustained. Another research by Boy [17] stated that the centralized ATP Kolebere has connected up the agriculture, livestock and fishery in an integrated agricultural cycle. It shown that the revenue is significantly increase. The development model of ATP in Munduk Temu Village still needs to be discovered to define the appropriate strategies. This research aims to identify the sub system input, process, output and the strategy in developing Coffee ATP in Munduk Temu Village, Tabanan Regency.

2. Methods

This research is conducted in Munduk Temu Village, Pupuan District, Tabanan Regency on April 2019 till October 2019. The village area is about 1.542 hectares covered with hills topography stretched from the north to the south with 600-700 m height above the mean sea level. The location study is shown on the figure 1. A field observation, depth interview, and literature study were conducted to collect the data. Rapid rural appraisal (RRA), participatory rural appraisal (PRA) and qualitative descriptive with rural approach were used to analyze the collected data. SWOT analysis and Quantitative Strategic Planning Matrix (QSPM) were also run to define the best strategies in ATP development.

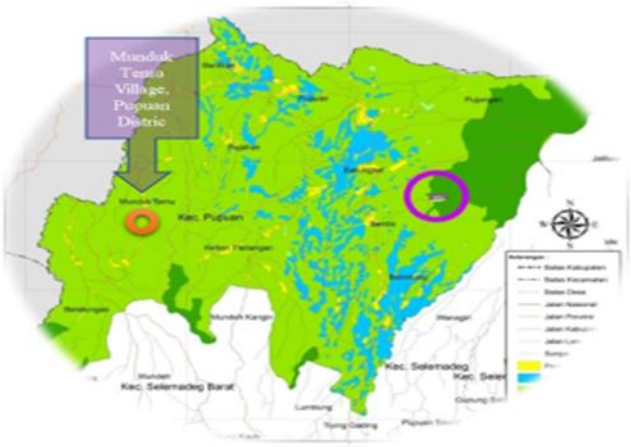

Figure 1. Location study in Munduk Temu Village

The recommendation of ATP development model is arranged according to the natural resources and environmental potential, agriculture potential, social economic, institution and partners. This research emphasized the development model of ATP, including: community empowerment program in ATP development, the role of the society in the planning and development of ATP, planning the supporting facilities, and encouraging the partnership with the third parties.

3. Results and Discussion

Munduk Temu Village is located in the Pupuan District, in the Tabanan Regency, it's about 90 km from the Denpasar City. At the north of Munduk Temu Village is Bantiran village, at the south is Blatungan village, at the east is Pajahan village, an at the west is Bongancina village. The area is approximately 1542 hectares wide, 85 hectares (50%) of settlement use, 42.59 hectares (3%) of public facilities, 1,384.21 hectares (90.00) of agriculture land. %), and forest area is about 30 hectares (2.00%). Munduk Temu Village has six official local communities, they are Munduk Temu Kaja, Munduk Temu Kelod, Anggasari Kaja, Anggasari Kelod, Kebon Jero Kangin and Kebon Jero Kauh.

In 2018, the population of the village of Munduk Temu was 3,897, with 49.45% men and 50.55% women and 1.156 households. The productive population was 2,461 people and 1,436 non-productive people. The main occupation in the village was dominated as farmer. Munduk Temu is classified as C2 agro-climatic zones. The average annual precipitation is 2564.96 mm, with highest precipitation in December with 380.87 mm and the lowest (38.51 mm) is in August. The dry season is from June to September and the rainy season is from October to May. The evapotranspiration (ETP) value is higher than the actual evaporation (ETA) in the months of June, July and August. It is causing a deficit of 20 mm of water in these months. The surplus occurs from September to May for 9 months [18]. The average temperature is 22.42^{0}C, the highest in February (23.70 ^{0}C) and the lowest in August (21.26^{0}C). The humidity is about 87%. The soil structure with dusty clay, high organic C content, low soil content, very low K content, slightly acidic pH [24].

The main plantation in the Munduk Temu Village are coffee beans and salacca. The livestock are goats, local chicken and bees. Currently, there are cattle breeding groups have also been created, which have joined the "*Gapoktan"* in Anggasari. In addition, domestic industries such as coffee beans, salacca product, and snack or crackers. Those home industries can potentially employ the local community, especially for housewives in order to support their children in getting proper education.

Munduk Temu Village has local farming organization called *Subak Abian.* It is a traditional organization that aims connect the farmers to share any updated information regarding agriculture technology to accelerate the agriculture development. The members of *Subak Abian* are farmers (land owner or keeper). There are three *Subak Abian* in this village, such as: *Abian Subak* Batur Kelamba, *Abian Subak* Batur Ibu and *Abian Subak* Batur Dayang. Those *Subak Abian* play an important role in the development of coffee plantation in this villages.

Looking at the art and culture, Munduk temu Village has its own uniqueness in term of traditional dance called *Rejang Renteng* dance. It is performed by married women by bringing small ceremonial stuffs. It also has other art performances, such as *Joged Bungbung* and *Rindik. Joged Bungbung* is a traditional dance performed by a woman and used to invite the viewers to tag along the dance. Munduk Temu Village has some tourism places, such as Monkey Forest at Batur Sakti Temple, hot spring, and spiritual attraction at Pucak Batu Gaing Temple. Those attraction is not maintained well due to the lack of facilities and budget. Other tourism experience that is offered by Munduk Temu Village, including coffee beans harvesting and roasting. It has quite large coffee beans salacca plantation that are maintained well by the local community. It become one of the reasons if Munduk Temu Village is quite potential to develop as ATP.

Therefore, at the initial stage it needs a master plan of the ATP according to its potentials. The coffee beans experiences that are offered by Munduk Temu Village is shown on figure 2 below. The master plan of the area of ATP presented on figure 3. After the planning, the community insight analysis was conducted to support the ATP planning. The results can be seen on the Table 1.

Figure 2. The coffee beans harvesting and roasting experiences offered by Munduk Temu Village

Figure 3. Site plan of ATP Munduk Temu Village (left) and bird view site (right)

Table 1. Community insight regarding ATP Coffee development in Munduk Temu Village

	Components	**Disagree** (%)	**Fair** (%)	**Agree** (%)
	Input			
1	Having the potential in agriculture and livestock to be developed as ATP	-	-	100
2	Sufficient ATP supporting facilities, including shop and outlet	-	66	34
3	Involvement of Higher Education Institution or technical services unit in workshop of coffee beans management	-	20	80
	Process			
4	Having the coffee beans processing unit.	-	66	34
5	Low diversification of coffee-based product	-	33	66
6	Having the organization and finance unit	-	20	80
	Output			
7	The coffee farmers have got good services from the *bumdes* or technical services unit.	-	14	86
8	Production of coffee-based products	-	83	16,66

Table 1 shows that the community is still hesitate about the ATP development project due to lack of ATP-supporting facilities, infrastructure, such as shop or outlets, and ATP-supporting buildings as proposed. In terms of process, there are problems with the coffee processing unit, although this equipment already belongs to *Subak Abian* Batur Dayang, Banjar Kebon Jero, so it is necessary to arrange a cooperation agreement on its use. In 2018, only the LEAK coffee brand logo was registered

as intellectual property in term of brand copyright, while innovation in the production of coffee-based products was limited to laboratory analyzes such as coffee from coffee leaves, coffee *lanang* products and preparation to register organic coffee production.

3.1. SWOT Analysis

The Internal Factors (IFE) matrix was arranged based on the results of interviews conducted with 34 respondents including village officials, community leaders, *Pekaseh* (head of *Subak*), *Bumdes* managers, farmer groups, and stakeholders at the district level. The scoring was done by comparing each of the internal factors of the ATP plan to achieve the priority stratification. The rating was done by comparing with the actual conditions of the ATP development plan to achieve the main strengths and weaknesses in the ATP development. The results of the internal factor analysis are presented in Table 2.

Table 2 Internal factors analysis results

Internal Factors	**Value**	**Rating**	**Score**
Government Policy in ATP: available	0,09	3,59	0,32
Availability of area and prominent raw materials	0,08	3,21	0,26
Robusta coffee has been certified Geographical Indication	0,09	3,53	0,31
Supporting infrastructure (roads, water, IT): available	0,09	3,50	0,30
Agro- Technopark Site: Strategic	0,08	3,35	0,28
Robusta Coffee Agribusiness: available	0,09	3,50	0,30
Community and business world's motivation in agribusiness	0,08	3,41	0,29
Total Strength Factors			**2,06**
Community skills in utilizing coffee-based technology: low	0,06	2,32	0,13
Funding for ATP development: less	0,06	2,24	0,12
Market information is not maximized	0,05	2,09	0,11
Applied appropriate technology: Less	0,06	2,26	0,13
Product Quality: low	0,06	2,32	0,13
Institutional management: low	0,06	2,24	0,12
Variant types of coffee products: less	0,07	2,71	0,18
Total Weakness Factors			**0,93**
TOTAL INTERNAL FACTOR	**1,00**		**3,00**

According to the IFE matrix (Table 2), it concluded that the main strength possessed in the development of ATP is a strong government policy both from regulations and assistance in coffee beans business with a total score of 0.32. Meanwhile, the main weakness is the lack of product diversification with a total score of 0.18. Therefore, the total score for the combined internal factor is 3.00, which means that the ATP development plan has strengths and weaknesses that are above the average standard of 2.50. The EFA matrix was prepared based on the results of interviews conducted with 34 respondents including village officials, community leaders, the head of the *subak*, the *Bumdes* manager, farmer community, and stakeholders at the district level. The scoring was done by comparing each of the external factors of coffee agribusiness development to achieve priority stratification. The rating is given by looking at the response of ATP development to the opportunities and threats that have been or will be faced. The results of the analysis of external factors are presented in Table 3.

Table 3. External factors analysis results

EXTERNAL FACTORS	Value	Rating	Score
Small and Medium Business Credit Provider Institutions: available	0,10	3,74	0,36
Partnerships with Private and Other Parties: available	0,09	3,38	0,29
Subak Abian that supports ATP: available	0,09	3,44	0,30
Universities and R&D in the Study and Development of Coffee: available	0,08	3,29	0,28
Livestock-Coffee-Fruit Crop Integration: very good	0,09	3,38	0,29
Government Assistance: available	0,08	3,29	0,28
Educational and training institutions to increase farmers' skills: Available	0,09	3,41	0,30
Total Opportunity Factors			**2,09**
Competition with other similar ATP	0,06	2,18	0,12
Constrained in financing	0,05	1,94	0,10
Middlemen who buy coffee from farmers	0,06	2,53	0,16
Pest attacks and old coffee plants	0,05	2,09	0,11
Climate change	0,05	2,12	0,11
Market growth and global competition: High	0,06	2,29	0,13
Agricultural human resources are reduced due to lack of interest in the younger generation for farming	0,05	2,09	0,11
Total Threat Factors			**0,85**
Total EXTERNAL FACTORS	**1,00**		**2,95**

Table 3 shown that the main opportunity factor used in the development of ATP is the availability of credit facilities offered in the village with a total score of 0.36. Meanwhile, the main threat is the role of middlemen that potentially damage the market with a total score of 0.16. So, the total score for the external factors is 2.95.

Based on the results of the IFA and EFA analysis, the difference between the total strengths and the total weaknesses was calculated as equation of x = 2.06 – 0.93 = 1.13. The difference in total opportunities against the total threats as: y = 2.09 – 0.85 = 1.24.

Figure 4. The SWOT Matrix Strategic Position Mapping of Agro-Technopark Coffee

The coordinate points (1,13, 1,24) in Figure 4 shows that the strategic position of Agro-Technopark site management is in Quadrant I with SO strategy. The strategies to optimize the strengths to utilize opportunities are including:

1. Strategy 1 (st1) : Local government policies in implementing programs related to providing assistance to *Subak Abian* in supporting the development of Coffee ATP
2. Strategy 2 (st2) : Increase market penetration through mutually beneficial partnerships by diversify the major commodity-based products with high competitiveness.
3. Strategy 3 (st3) : Agricultural intensification by integrating crop-livestock and fruit crops to optimize the potential of current resources.
4. Strategy 4 (st4) : Involving research institutions and implementing research results and studies based on major products.
5. Strategy 5 (st5) : Enhancing the technology innovations for pre-harvest and post-harvest Robusta coffee management to support product diversification.
6. Strategy 6 (st6) : Utilizing the quality and availability of facilities and infrastructure to integrate agriculture and tourism through coffee ATP
7. Strategy 7 (st7) : Utilizing the support of academic and training institutions as well as research institutions from universities to increase community interest in entrepreneurship through community empowerment programs to improve farmer skills to handle the upstream to downstream process.
8. Strategy 8 (st8) : Agricultural market development by improving the use of Information Technology in accelerating the integration of agriculture and tourism.

An alternative strategy was selected by using the Quantitative Strategic Planning Matrix (QSPM) method. The QSPM matrix used the scoring value and the attractive Score (AS) value that is assessed by the respondents. Based on these two values, the largest Total Attractive Score (TAS) is the main option of priority strategy, while the strategy with the smallest TAS value is the last option. The results of the QSPM analysis are shown in Figure 5.

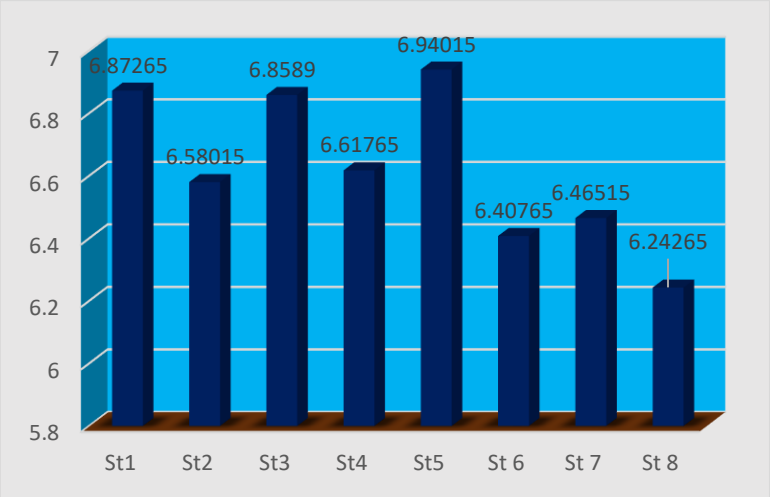

Figure 5. Total Attractive Score based on the Strategy (st1 – st8)

Figure 5 indicated that the first strategic priority was to apply technologyl innovations for managing pre-harvest and post-harvest Robusta coffee to support product diversification (st5). This strategy is important because with the major products with various quantity and quality, it will provide opportunities for creating a new businesses and other innovations that are marketable. This activity has been facilitated by the Regional Partnership Program Team from University of Mahasaraswati Denpasar, IKIP Saraswati Tabanan and the Planning and Development Agency of Tabanan Regency with several activities, including: 1. Management training for Bumdes Sari Sedana Munduk Temu; 2. Register the brand of LEAK coffee product; 3. Workshop on coffee grafting techniques; 4. Organic coffee training; 5. Preparation of the Good Agriculture Practices Book [23].

The second strategic priority is local government policy in implementing programs related to providing assistance to *subak abian* in supporting the development of Coffee Agro-Technopark (st1). The results of direct observations in the field showed that several farmer groups had received grants from the Tabanan Regency Government which were used to plantation of Robusta coffee. The coffee beens have been distributed to all members of the farmer group for Robusta coffee. To carry out processing activities, the wet method coffee processing unit located in Banjar Kebon Jero is ready to operate and has been equipped with a pulper machine, huller, fermentation/washing tub, drying floor and dryer building. This coffee peeling machine is managed by a cooperative which is a business unit of Subak Abian Batur Dayang, Banjar Kebon Jero. It is hoped that with the assistance of this wet peeler machine, farmers will pick red and the quality of their coffee will be better in accordance with the requirements determined by business partners. In line with the research results of Mubarok [18] that in the development of Petungkriono Pekalongan as ATP, the Pekalongan Regency government has a clear direction and has been contained in the applicable laws and regulations. This policy ensures the sustainability of ATP in the area [18].

The third priority strategy is agricultural intensification by integrating crop-livestock and fruit crops to optimize the potential of existing resources (st 3). Coffee plants need organic fertilizer produced by livestock, while livestock need feed that can be made from coffee grounds. Coffee beans production will generate coffee husk waste, the amount of which depends on how it is harvested. Wulandari [19] found that when picked red will produce 45% of the total weight consisting of 10% inner skin and 35% outer skin. When picked green, it will produce 21.5% of waste which is a mixture of the inner and outer skins. The Integrated Farming System model is an approach that is built explicitly between biomass producing agriculture, biomass processing industry, waste management, water use, energy generation, and soil nutrient conservation so that the integrated farming system is sustainable. IFS provides opportunities to maintain and expand biodiversity. [20]

The fourth priority of the strategy is to involve research institutes and implement research results and studies based on superior products (st.4). The involvement of research institutes and service institutions from universities in technology transfer that has the potential to increase competitiveness is very important [21,24]. From the results of interviews with the village head of Munduk Temu, several universities that helped build Munduk Temu village are Ganesha Singaraja University of Education, Udayana University, University of Mahasaraswati Denpasar, IKIP Saraswati, Bali BPTP and Tabanan Bapelitbang.

The fifth priority strategy is to increase market penetration through mutually beneficial partnerships by diversifying superior commodity-based products with high competitiveness (st2). The sixth priority is to utilize the support of educational and training institutions to increase community interest in entrepreneurship through community empowerment programs to improve the skills of farmers in

managing the upstream and downstream. The seventh priority strategy is to utilize the quality and availability of facilities and infrastructure to integrate agriculture and tourism through agrotourism (st6). The eight is the development of agricultural markets by utilizing Information Technology in accelerating the integration of agriculture and tourism (st8). Building Argo Tekno Park need lot of support from the partnerships from several parties including universities, companies, communities and the government. This partnership was able to increase the production of king fruits, longan, guava, melon and passion fruit by more than 100% and was able to increase the income of the people of Purwosari Semarang [22].

4. Conclusion

Coffee plantation with an integrated system to support coffee ATP in Muduk Temu Tabanan met the requirements in terms of input, process and output, but the quantity and quality of activities in each system component need to be improved. The strategic position of coffee ATP development in Munduk Temu, Pupuan is in quadrant I (SO Strategy). There are four main strategic priorities with the highest TAS value, such as (1) implementing technological innovations for pre-harvest and post-harvest Robusta coffee management to support product diversification (st5); (2) policies from local governments in implementing programs related to providing assistance to Subak Abian in supporting the development of Coffee Agro-Technoparks (ST1); (3) agricultural intensification by integrating crop-livestock and fruit crops to optimize the potential of existing resources (st 3); (4) involving research institutes and implement research results and studies based on superior products (st.4). The implications of this research for the development of Coffee ATP are: (1) Local governments provides the infrastructure, regulations, and programs in the management of coffee ATP; (2) Improving research activities and technology transfer in increasing the competitiveness of the products produced; (3) Improving partnerships in developing businesses in order to grow new entrepreneurs; (4) Increasing institutional synergy between village-owned enterprises (BUmdes), subak abian and tourism managers in strengthening the agricultural sector in synergy with the tourism sector.

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