

Agroecological Challenges in Three Agricultural Development Areas in Aceh

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Abstract. Agroecological zones group an area on soil and climate differences that interact with crops will have impact on differences in commodities, farming systems, productivity, and farmers' challenges in managing their agricultural businesses. Aceh Province which is grouped into 3 Agroecological Zones, namely the southwest coast, middle and northeast coasts have different agricultural characteristics. This descriptive research tries to answer the challenges of farmers in managing agricultural businesses in 3 different Agroecological Zones. The results showed that in the southwest zone there were 9 challenges, and in the middle zone there were 10 challenges faced by farmers. The main challenges in these two zones is that agricultural development assistance such as capital, superior seeds, production inputs, counseling, and program supervision is not appropriate and complete. In the northeast zone, there are 13 challenges with the main challenges was the difficulty of farmers in getting subsidized fertilizers. Synchronization of agricultural development programs with the challenges faced by farmers based on the ZAE area is very important, because it will be a more precise and simpler solution to solving agricultural challenges in agricultural-based regional development.

Keywords: Agroecological Zone, Agricultural Development, Farmer Challenges.

1 Introduction

One of the challenges faced by humanity in the world is how to provide nutritious food, fair, decent, and sustainable food for mankind the world in various natural and climatic conditions that are always changing [1]. Estimated that the global food demand will grow by 70% from 2009 to 2050, and generally, food needs are provided by the agricultural sector [2,3]. However, the number of world farmers is estimated at 874 million continues to decline [4,5], including in Indonesia, dropping from 38.30 million in 2016 to 33.40 million

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in 2020 [6]. This decline is inseparable from the various challenges faced by farmers which have made the farming profession less attractive to the public [7].

Nevertheless, agriculture in Indonesia is still an important sector in supporting economic growth, because this sector is still able to survive during the economic crisis and has a positive impact on economic recovery by creating jobs [8]. As a source of income, in 2020 the agricultural sector has contributed a Gross Domestic Product (GDP) of Rp. 2.115 trillion or 13.70% of the total GDP of Rp. 15,433,- trillion at current prices, and the agricultural sector ranks second after the manufacturing sector [9,6]. While in Aceh Province the agricultural sector provides a GDP of Rp. 51,545,- billion at current prices, or 30.98% of total GRDP, this number is a group of business fields that provide the largest portion of GRDP [10]. As with its national role, for the province of Aceh, agriculture is also a very important sector of the regional economy.

Aceh as a province in the western region of Indonesia has an area of 57,956 km² or 3.02% of Indonesia's area [10]. As an agricultural area, Aceh is divided into 3 Agroecological Zones (ZAE), namely the South West Coast Region which leads to the Indonesian Ocean side, the Central Region of Aceh which is a highland area, ZAE for the Northeast Region which leads to the north side of the Sumatra Strait, and the establishment of 3 zones this is part of the Aceh government's long-term development plan in the agricultural sector [11]. Differences in soil types, land types, climate and social communities in each zone certainly provide different challenges in agricultural management in the region.

Agroecological Zone is a grouping of diverse land agro-ecosystems in a classification that is more applicable to an area that has similar characteristics of soil, landform, and climate. This grouping aims to identify and determine agricultural areas with ordered economic-scale commodities, to obtain an economical and sustainable farming system [11,12]. The similarity of agroecosystems as a grouping of agroecological zones in an area will result in the similarity of commodities cultivated by community groups with similar characteristics so that they have the same challenges faced in managing agricultural businesses.

Farmers are a group of people who really understand the challenges that occur in their farming business. if there are factors that encourage increased income, farmers will maintain or apply these factors [12], and vice versa. In addition, information on farmers' challenges in managing farming as a basis for planning agricultural development in different agroecological zones is very important to study, because it is also related to the vulnerability of farmer households [13]. The combination of information on agroecological zones with farmers' challenges in managing agricultural businesses has not been used as a basic study of agricultural development. So based on this principle, overcoming challenges and developing agriculture in different agroecological zones or zones needs to start with knowing the challenges faced by farmers in running their agricultural business in these different zones.

2 Research methods

2.1 Location and research time

This research was conducted in Aceh Province, where Aceh was chosen as a research location with the consideration that it already has 3 agricultural agroecological zones which are a reference for the development of agricultural areas in the long term [11]. The study was conducted for 3 years with a one year study time in each agroecological zone (Table 1).

Research was conducted in the Southwest Region in 2018, the Central Region in 2019, but due to the Covid19 pandemic, research for the Northeastern Region was conducted in 2021.

Table 1. Agroecological Zone, Research Time, and Distribution of Number of Samples

ZAE South West Region – Research Conducted June – November 2018				ZAE North East Region – Research Conducted June – November 2021			
No	District /City	Farmer Population (Persons)	Sample (Persons)	No	District /City	Farmer Population (Persons)	Sample (Persons)
1	Aceh Jaya	20.532	28	1	Big Aceh	26.742	30
2	West Aceh	51.122	71	2	Pidie	70.166	79
3	Nagan Raya	23.000	32	3	Pidie Jaya	25.324	29
4	Southwest Aceh	50.474	70	4	Bireuen	72.729	82
5	South Aceh	101.647	140	5	North Aceh	80.132	91
6	Subussalam	27.150	37	6	Lhok Seumawe	2.250	3
7	Singkil	16.024	22	7	East Aceh	63.445	72
Amount		289.949	400	8	Langsa	7.428	8
ZAE Central Region – Research Conducted June – November 2019				9	Aceh Tamiang	4.421	5
1	Bener Meriah	1.852	5	Amount		310.787	400
2	Central Aceh	65.502	182	Note: The number of respondents for each ZAE Region is based on the Slovin Formula with a value of $d = 5\%$			
3	Gayo Lues	20.219	56				
4	Southeast Aceh	56.677	157				
Amount		144.250	400				

2.2 Research data

This research is a descriptive study using primary and secondary data. Secondary data was collected through documentation techniques, observing land and agricultural commodities, including population, climate, land and soil types. Meanwhile, primary data was collected using a questionnaire to farmer respondents in each ZAE area. In the questionnaire, farmers were asked to submit a maximum of 10 challenges faced in running their agricultural business, and each problem presented was given a score of 1. Respondents' answers that were given a score became the variable to be studied.

2.3 Population and sample

The population of this study is farmers in each ZAE area. Sampling was carried out by cluster random sampling with the main cluster in the ZAE area and the district/city sub-cluster. The determination of the number of samples follows the Slovin formula with a value of $d = 5\%$, while the number of samples for each cluster is as shown in Table 1.

2.4 Data analysis method

The analysis was carried out descriptively by tabulating the respondents' answer scores. The results of the answers are ranked based on the highest - lowest scores, then averaged as the

mean value of farmers' answers to agricultural challenges faced by farmers in each ZAE region. The scoring results are analyzed based on the facts that have occurred, supporting theories, and research results that have occurred elsewhere.

3 Equations and mathematics

3.1 Aceh agroecological zone area description

The grouping of diverse lands in areas that have similar land and climate characteristics in agroecological zones aims to organize agricultural areas so that a farming system with economic and sustainable commodities is obtained [11]. Aceh Province which is located in the westernmost position of Indonesia has an agricultural area that is divided into 3 Agroecological Zones (ZAE), namely the South West Region which leads to the south side or the Indonesian Ocean, The Central Region which is in the highlands or on the ridge of the row, and the North East Region which leads to the north side or the Sumatra Strait [11]. This grouping is closely related to cropping patterns and agricultural activities, where an agricultural business is strongly influenced by climate, regional shape, and soil type as agro-ecological factors [14]. The descriptions of the three ZAE regions are shown in Figure 1 and Table 2.

The South West ZAE area which is on the south side or borders the Indonesian Ocean, has an area of 19,234 Km² or 33.88% of the area of Aceh province, generally below 600 M above sea level and has flat to slightly wavy land with soil types entisol, histosol, inceptisol, and ultisol. In this area agricultural development is directed at plantation crops, especially oil palm. The Central Aceh ZAE region which is in the central part of the Gayo highlands or on the Bukit Barisan has an area of 16,187 Km² or 28.51% of the area of the province of Aceh, generally located at an altitude of 600-2,000 M above sea level and has undulating land, hilly to mountainous with soil types Andisol, entisol, inceptisol, and ultisol. In this area, agricultural development is directed at upland vegetables and fruits. The North East ZAE area, which is on the north side or bordering the Sumatra Strait, is the largest ZAE area with an area of 20,654 Km² or 36.38% of the total area of Aceh province, in general it is below 600 M DPL and has flat to slightly wavy land with soil types entisol, inceptisol, and ultisol. In this area, agricultural development is directed at vegetables, rice, crops, fruits and lowland plantation crops.

Furthermore, based on the Oldeman climate type, the South West Region has a climate type of A, B, and a little C1; The Central Region has climate types C and D; while the North East region has climate types C, D, and E [11]. The division of the Oldeman climate type is based on the occurrence of wet months or rainfall > 200 mm/month. Type A climate has wet months of more than 9 months, type B 7 – 9 months, type C 5 – 6 months, type D 3 – 4 months, and type E less than 3 months [15].

The climate data shows that the South West Region is an area with a lot of rain, and the number decreases in the Central Region and decreases in the North East Region [16]. Based on differences in altitude, topography, soil types, and climatic conditions resulted in different types of commodities suitable for cultivation [17] in each ZAE region so there are different challenges faced by farmers in managing their farming business.




Agroecological Zone (ZAE) South West Region	Agroecological Zone (ZAE) Central Region	Agroecological Zone (ZAE) North East Region
		
7 District / City : Aceh Jaya, West Aceh, Nagan Raya, Southwest Aceh, South Aceh, Aceh Singkil Geographical Location: 020 02'' – 040 61'' LU and 950 00'' – 980 10'' BT. Large Region: 19.234 Km2 or 1.923.400 Ha or 33,88 % from the area of Aceh 5.677.081 Ha.	4 District / City : Bener Meriah, Central Aceh, Gayo Lues, dan Southeast Aceh Geographical Location: 030 40' 26'' - 050 57' 50'' LU and 950 15' 40' - 970 20' 25'' BT Large Region: 16.187,60 Km2 or 1.618.760 Ha or 28,51 % from the area of Aceh 5.677.081 Ha.	9 District / City : Big Aceh, Pidie, Pidie Jaya, Bireuen, North Aceh, Lhok Seuawe City, East Aceh, Langsa City dan Aceh Tamiang Geographical Location: 040 09'21,08'' - 05045'9,007'' LU and 95055'43,6'' - 980 14'45,41'' BT. Large Region: 20.654,34 Km2 or 2.065.434 Ha or 36,38 % from the area of Aceh 5.677.081 Ha

Fig. 1. Three Regions of Aceh's Agroecological Zone
 Sources: Spatial Analysis (2018, 2019, 2021).

Table2. Research Land Pattern Based on Slope, Rainfall and Soil Type in Three Areas of Aceh's Agroecological Zone.

Description	South West ZAE Region (Ha)	Percentage	Central ZAE Region (Ha)	Percentage	North East ZAE Region (Ha)	Percentage
Slope						
I = > 40 %	440,328	22.60%	91,800	18.76%	31,611	2.75%
II = 25-40 %	317,944	16.32%	138,052	28.22%	89,999	7.84%
III = 15-25 %	201,847	10.36%	109,914	22.47%	152,134	13.26%
IV = 8-15 %	143,002	7.34%	69,443	14.19%	180,457	15.73%
V = 0-8 %	845,104	43.38%	80,036	16.36%	693,364	60.42%
Total	1,948,218	100.00%	489,245	100.00%	1,147,565	100.00%
Altitude (meters above sea level)						
a = < 600 M	1,258,473	64.60%	137,263	28.06 %	1,085,547	94.60%
b = 600 – 1.500	533,499	27.38%	315,234	64.44 %	61,671	5.37%
c = 1.500-2.000	155,799	8.00%	36,583	7.48 %	347	0.03%
e = > 2.000	447	0.02%	164	0.03 %	0	0.00%
Total	1,948,218	100.00%	489,245	100.00%	1,147,565	100.00%
Soil Type						

Andosol	10,501	0.54 %	77,405	15.82%	23,548	2.05%
Entisol	217,504	11.16 %	204,290	41.76%	118,676	10.34%
Histosol	238,797	12.26 %	0	0.00%	0	0.00%
Inseptisol	326,983	16.78 %	36,654	7.49%	515,907	44.96%
Ultisol	1.154,433	59.26 %	170,896	34.93%	489,433	42.65%
Total	1,948,218	100.00 %	489,245	100.00%	1,147,564	100.00%

Sources: Spatial Analysis (2018, 2019, 2021).

Table 3. Farmers' challenges in Implementing Agricultural Business in Three ZAE Aceh Regions.

No	Farmer Challenges	Score
South West Region		
1	Agricultural development assistance such as capital, superior seeds, production inputs, counseling, and program supervision is not appropriate and complete	120
2	Agricultural development programs are not planned until a clear market is available	120
3	Attack of major pests such as elephants, pigs, and bears	60
	Average Score	57,22
4	Plants developed do not adapt to land conditions and pay less attention to the economic value of plant products.	50
5	Difficult to get new farmland	45
6	It is difficult to take care of the developed plants	40
7	Road infrastructure that is still damaged/bad	30
8	Land optimization programs such as swamp drainage and irrigation improvements cannot be utilized properly	25
9	Difficult to get subsidized fertilizer	25
	Total Score	515,00
Central Region		
1	Agricultural development assistance such as capital, superior seeds, production inputs, counseling, and program supervision is not appropriate and complete	219
2	Plants developed do not adapt to land conditions and pay less attention to the economic value of plant products.	114
3	Lack of sustainable quality counseling and mentoring	101
	Average Score	68,00
4	Agricultural development programs are not planned until a clear market is available	57
5	The need to build an organic fertilizer and pesticide factory	53
6	Difficult to get subsidized fertilizers, seeds, and pesticides	48
7	Road infrastructure that is still damaged/bad	35
8	Attack of major pests such as elephants, pigs, and bears	26
9	Difficult to get new farmland	19
10	Land optimization programs such as swamp drainage and irrigation improvements cannot be utilized properly	9
	Total Score	680
North East Region		
1	Difficult to get subsidized fertilizer	250
2	Land optimization programs such as swamp drainage and irrigation improvements cannot be utilized properly	211
3	Agricultural development assistance such as capital, superior seeds, production inputs, counseling, and program supervision is not appropriate and complete	194
4	Difficult to get seeds, production inputs, and agricultural machinery	186

5	Plants developed do not adapt to land conditions and pay less attention to the economic value of plant products.	158
	Average Score	137,56
6	The implementation of government programs is not following the farmers' planting schedule	137
7	Attack of small pests and big pests such as elephants, pigs, and bears	130
8	Prices of agricultural products are always low and unstable	130
9	Lack of sustainable quality counseling and mentoring	102
10	Difficult access to capital for farmers	84
11	Road infrastructure that is still damaged/bad	39
12	There are always floods	28
13	Difficult to get new farmland	11
	Total Score	1.788

3.2 Farmers' challenges in 3 agroecological zones.

The agricultural pattern carried out by farmers in carrying out agricultural business cannot be separated from the conditions of the agricultural or agroecological environment in which the agricultural system is carried out [18], and as agricultural business actors, farmers are very aware of and feel the various factors that affect their farming business [19]. Information on various challenges faced by farmers in the three ZAE areas in Aceh with different agricultural agroecological characteristics becomes important as an input for agricultural development programs in each of these areas. The various challenges faced by the farmers are shown in Table 3.

Based on Table 3, there are 9 challenges faced by farmers in the South West Region with 3 challenges above the average namely agricultural development assistance such as capital, superior seeds, production inputs, counseling, and program supervision is not appropriate and complete; agricultural development programs are not planned until a clear market is available; and Attacks of major pests such as elephants, pigs, and bears. In the Central Region ZAE there are 10 challenges with 3 challenges above the average namely agricultural development assistance such as capital, superior seeds, production inputs, counseling, and program supervision is not appropriate and complete; the plants developed do not adapt to land conditions and do not pay attention to the economic value of plant products; and the lack of sustainable quality education and mentoring. In ZAE North East Region there are 13 challenges with 5 challenges above the average namely, it is difficult to obtain subsidized fertilizers; land optimization programs such as swamp drainage and irrigation improvements cannot be utilized properly; agricultural development assistance such as capital, superior seeds, production inputs, counseling, and program supervision is not appropriate and complete; difficult to get seeds, production inputs and agricultural machinery; and the plants developed do not adapt to land conditions and do not pay attention to the economic value of plant products.

In the 3 ZAE regions, farmers agreed that agricultural development assistance such as capital, superior seeds, production inputs, extension, and program supervision was not appropriate and complete and became a problem with scores above average. This shows that farmers assess the agricultural development program assistance carried out by the government does not solve the challenges of farmers so it is necessary to evaluate operationally technically to obtain the outputs and outcomes of the assistance programs carried out. Agricultural development assistance programs that are not appropriate and

complete will be problematic because the objectives of the assistance provided are not achieved. The objectives of the assistance program will be achieved if the criteria for effectiveness, efficiency, equity, and responsiveness from beneficiaries are met, are right on target, and these objectives can be evaluated in the beneficiary group [20,21]. The importance of evaluating a program is because the results of the evaluation will provide information on the level of achievement of program objectives, and become input for decision makers in planning the next program [22].

3.2.1 ZAE south west region

For South West Region ZAE, Another problem that is above average is that agricultural development programs are not planned until a clear market is available, however, in the Central Region ZAE this problem is below the average at rank 4 and in the North East Region ZAE, this problem is not a problem for farmers. Attacks of large pests such as elephants, pigs, and bears are also an above-average problem for farmers in the South West Region ZAE, however, it is below the average for farmers in the Central Region ZAE at rank 9 and rank 7 in the North East Region ZAE.

Agricultural development which is an integral part of national development is very important to be well planned in encouraging regional economic growth [23]. This is because the agricultural sector is the place where most people in poor and developing countries depend for their lives [24] including in the 3 ZAE Aceh regions. Good planning is not only limited to physical development planning but must come to market planning, where market availability is also a very important factor in supporting the success of agricultural businesses [25,26].

The attack of large pests such as elephants, pigs, and bears on agricultural businesses is a problem that is very disturbing to farmers, especially in the ZAE South West Region. In addition to increasing production costs, pest attacks also cause damage to crops and production, have an impact on decreasing the quality and quantity of production, and are economically very detrimental to farmers [27]. Various pest organisms are found in agricultural activities in Aceh province.. The attack of pigs or elephants on immature oil palm plantations (TBM) in the ZAE South West Region is very alarming and economically detrimental to farmers Rp. 50-80 million per ha or Rp. 340-550,- thousand for every death of one TBM oil palm plant. The results of research conducted by Sayuthi et. al. [28] agricultural crop pests in the form of insects, gold snails, birds, rats, and wild boars are pests that are very detrimental to rice farmers in Aceh. In dealing with plant pests, especially large pests, farmers have difficulty so special assistance is needed from the government.

3.2.2 ZAE central region

For the Central Region ZAE, another problem that is above average is that the crops developed do not adapt to land conditions and do not pay attention to the economic value of plant products. In ZAE North East Region this issue is also above average but in ZAE South West Region it is below average at rank 4. Lack of sustainable quality extension and mentoring is also an above-average problem for farmers in the Central Region ZAE, however, it is below the average for the South West Region ZAE farmer at rank 4 and rank 10 in the North East Region ZAE.

The occurrence of incompatibility of the plant development program with the existing land is a problem for farmers who are the target of the program. Although in principle a

good agricultural development program must adjust the physical conditions in the form of land and climate with the conditions for growing plants [29]. Because the cultivation of crops that do not follow this suitability will have an impact on not obtaining the desired production and income targets, land damage, and the large operational costs of the farming business [30]. Furthermore, this condition will be more detrimental to farmers if the developed commodity does not pay attention to the economic value of the plant.

On the other hand, agricultural conditions continue to develop along with technological developments in agriculture. For farmers, this development requires assistance from qualified extension workers who can follow agricultural developments and teach the application of these technological developments [31]. Quality counseling will increase agricultural production, farmers' income, and independence, as well as economic growth [32]. Therefore, the unavailability of quality extension workers who assist farmers in carrying out farming activities will fail farmers to increase productivity, and as a driving force for rural economic growth.

3.2.3 ZAE north east region

For ZAE for the North East Region, another problem faced by farmers who are above average is that it is difficult to get subsidized fertilizers. In South West Region ZAE this problem is below average at 9 and in ZAE Central Region is at 5. Another problem that is also above average is land optimization programs such as swamp drainage, and irrigation improvements that cannot be utilized properly. In the South West Region ZAE, this problem is below the average at rank 8 and in the Central Region ZAE at rank 10. Difficulty in getting seeds/seeds, production inputs, and agricultural machinery is also a problem above the average for farmers in the North East Zone, but not in other Aceh zones. Meanwhile, the challenges of developing plants that do not adapt to land conditions and pay less attention to the economic value of plant products are challenges that are above the average with the Aceh Central Region ZAE.

The problem of scarcity or difficulty in getting subsidized fertilizers is in the highest ranking for farmers in the North East Region, although below the average for the other ZAE areas of Aceh. Fertilizer shortages also occur in corn farmers in Kendal Regency, Central Java. As a result, farmers use improvised fertilizers and maximum production is not achieved [33]. Fertilization is carried out to increase crop production, but high fertilization costs will reduce agricultural business income [34]. Because fertilizer is an input with a large portion of costs in farming, the government must play a role in providing adequate amounts and subsidies for fertilizers.

In 2021 Aceh will receive 68,960 tons of subsidized urea fertilizer [35]. However, with the need for urea fertilizer for rice plants in Aceh of 300 Kg/Ha [36] with a rice harvest area of 320,752 Ha [10], 96,226 tons of fertilizer are needed. This data shows that for rice commodity there is still a shortage of 27,226 tons of subsidized urea fertilizer, not to mention for the needs of other secondary crops, vegetables, and fruits that are cultivated by farmers, as a result, subsidized fertilizer becomes a contested material and there is always a scarcity.

Optimization of irrigation as a source of agricultural water is a problem in ranking 2 in the North East Region ZAE, although it is below the average for the other ZAE areas of Aceh. Disruption of water availability in agriculture is a serious problem, especially for lowland rice in the North East Region ZAE whose production reaches 1,572,460 tons, or the highest compared to other Aceh zones. For lowland rice cultivation, water is the main factor, where water shortages will reduce production and even fail to harvest [37]. Based on the water

needs of lowland rice, to produce 1 kg of rice it takes \pm 2,500 liters of evapotranspiration, seepage, and percolation water that comes from rain or irrigation water [38], and this amount is 2-3 times greater than secondary crops or other crops [39]. So to meet the demand for sufficient water, irrigation infrastructure and channels must be in good condition, while rainfed rice fields must be equipped with pumping, and all of this is part of the government's responsibility. This is because proper, effective, and efficient water management for the welfare of the community is the responsibility of the government in the form of public services [40].

After the problem with irrigation water, farmers in ZAE North East Region also stated that it was difficult to get cheap seeds, production inputs, and agricultural machinery. In agriculture, these materials are input factors that are included in costs [41]. The difficulty of obtaining these input factors will have an impact on high production costs which reduce farmers' profits [42], farmers are not passionate about running a farming business because of the high risk [43], and agricultural production which generally provides consumption materials will be increasingly difficult to be available in the market.

Various challenges faced by Acehnese farmers according to the Agroecological Zone area are obstacles for farmers to increase production and productivity. Ideally, the government that carries out public service tasks implements agricultural development programs by taking into account the basic challenges faced by farmers in each ZAE area. Even though as the owner of the program the government can instruct to run the program. But on the other hand, some farmers are the object or target of the program. Synchronizing agricultural development programs with the challenges faced by farmers based on the ZAE area will be a more precise and simpler solution to solving agricultural challenges.

4 Conclusion

Aceh Province farmers who are in the three ZAE areas have challenges with different levels of complexity, and this is an obstacle for farmers in increasing production and productivity. This difference is inseparable from geographical conditions, land, soil, climate, and cultivated plants.

In the South West Region ZAE, there are 9 challenges, of which 3 challenges are above the average, namely agricultural development assistance such as capital, superior seeds, production inputs, counseling, and program supervision that is not appropriate and complete; agricultural development programs are not planned until a clear market is available; and attacks by major pests such as elephants, pigs, and bears. In the Central Region ZAE, there are 10 challenges, of which 3 challenges are above the average, namely agricultural development assistance such as capital, superior seeds, production inputs, counseling, and program supervision that is not appropriate and complete; the plants developed do not adapt to land conditions and do not pay attention to the economic value of plant products; lack of sustainable quality counseling and assistance. In the ZAE of the North East Region, there are 13 challenges, of which 5 challenges are above the average namely it is difficult to get subsidized fertilizers; land optimization programs such as swamp drainage and irrigation improvements cannot be utilized properly; agricultural development assistance such as capital, superior seeds, production inputs, counseling, and program supervision is not appropriate and complete; difficult to get seeds/seeds, production inputs, and agricultural machinery; and the plants developed do not adapt to land conditions and do not pay attention to the economic value of plant products.

Synchronization of agricultural development programs with the challenges faced by farmers based on the ZAE area is very important, because it will be a solution to solving

agricultural challenges that are more precise and simple in agricultural-based regional development. Furthermore, agricultural development in each zone needs to adjust to the agricultural challenges that occur, so that the planned agricultural development is more focused on solving problems for the planned development goals.

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