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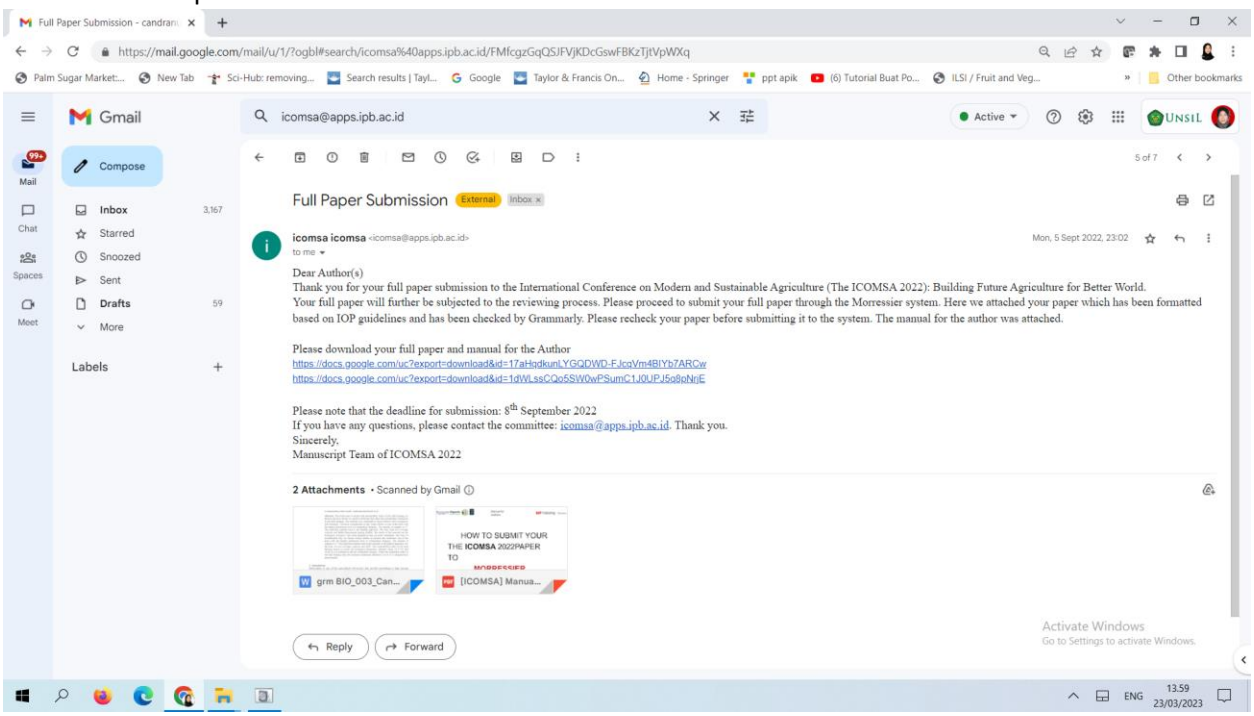

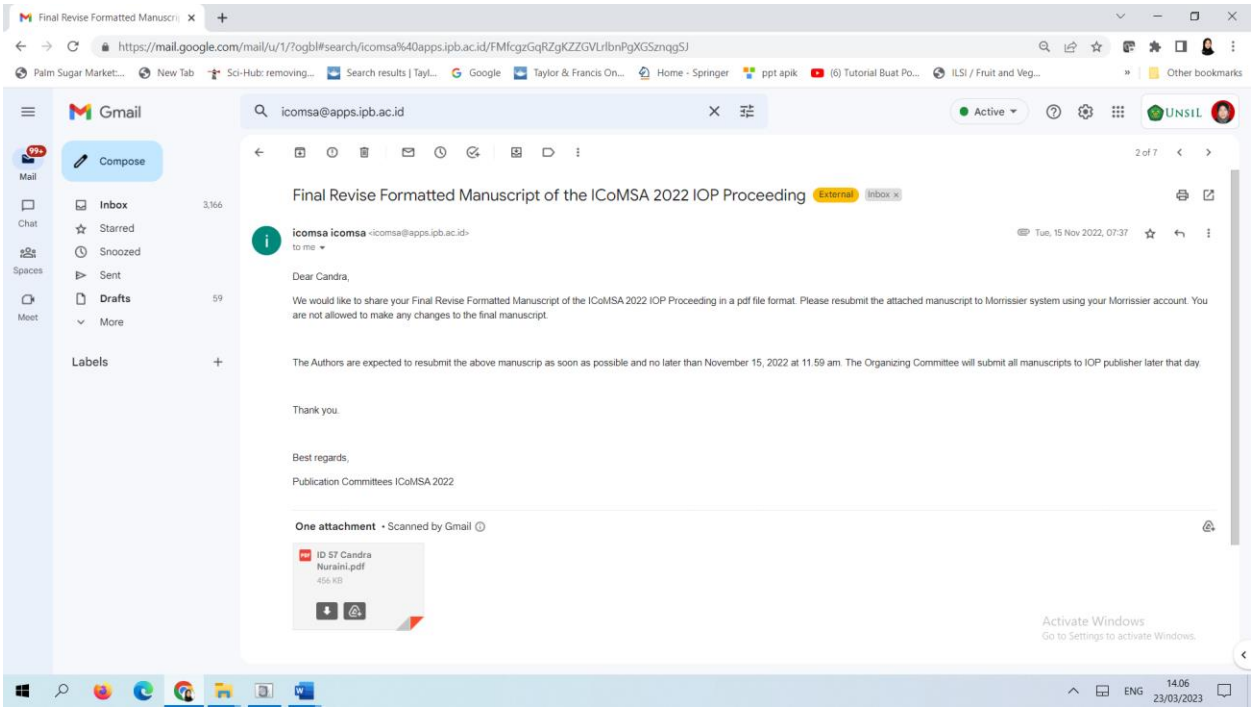

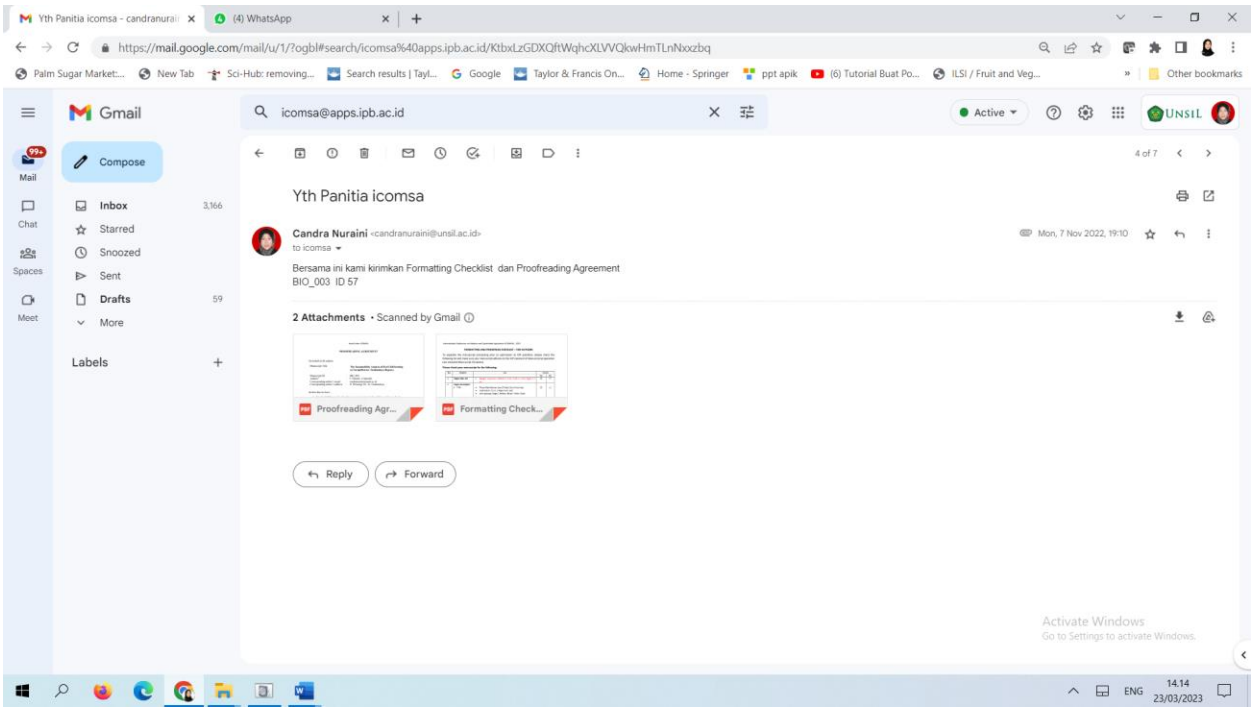
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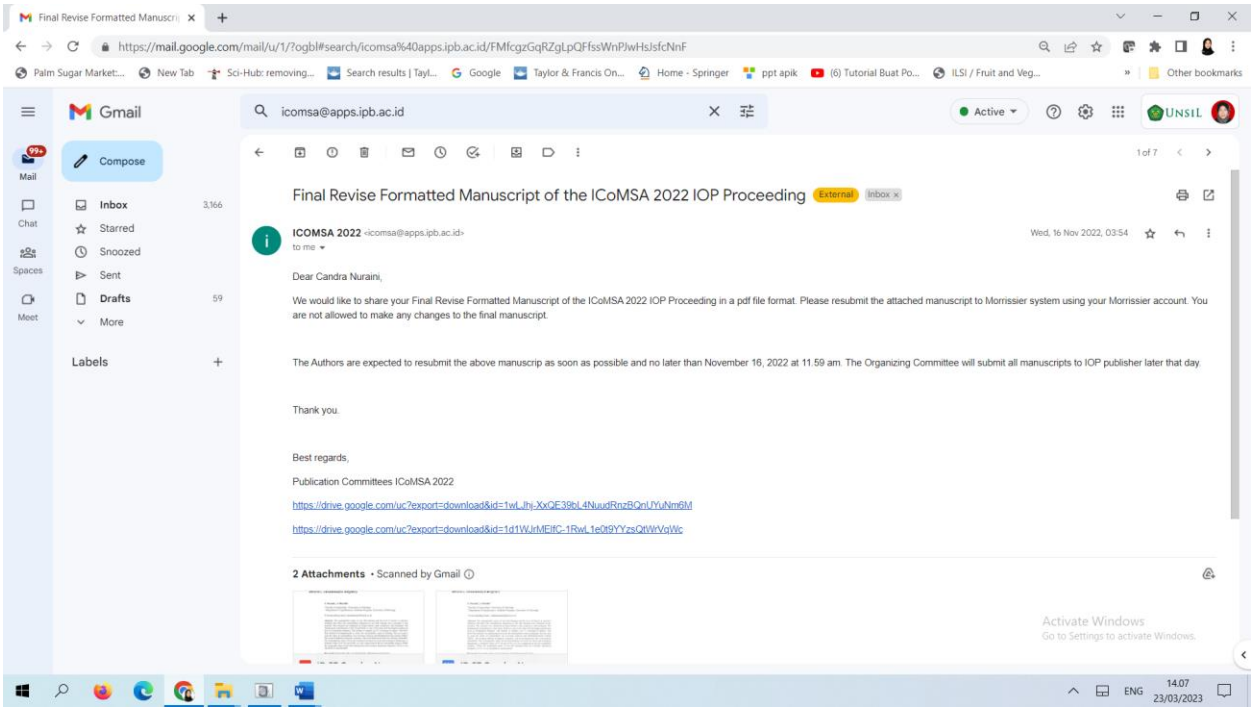
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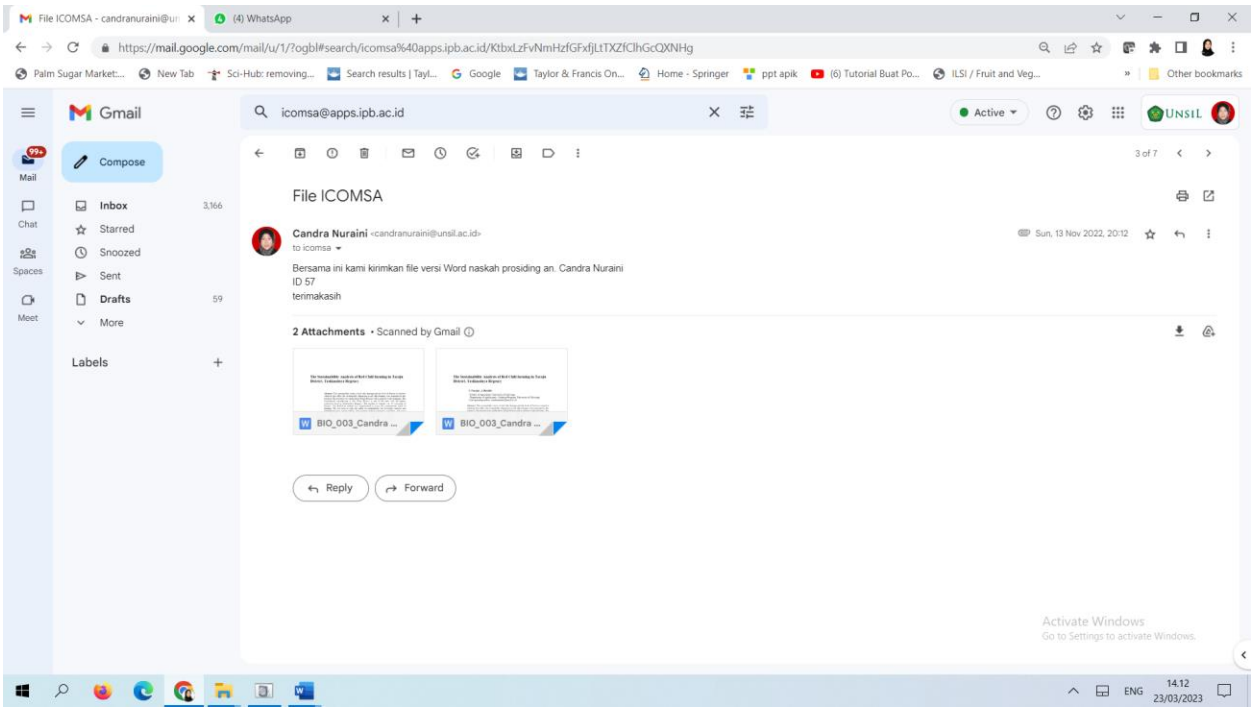
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The Sustainability Analysis of Red Chili farming in Taraju District, Tasikmalaya Regency

C Nuraini[1], A Mutolib[2],

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Abstract. The sustainability status of red chili farming and the level of factors or sensitive attributes that affect the sustainability dimension in red chili farming were examined in this research. The research was conducted in Taraju District with a purposive side technique. The fundamental consideration is that Taraji District is one of the areas with the highest production level in Tasikmalaya Regency. The number of samples was 37 consisting of farmers. The RAP-Fish method was implemented to assess the sustainability status of farming. The test used to scale the index of sustainability was Leverage Analysis and Multidimensional Scaling (MDS). The research defined ecological, economic, and social dimensions that were entirely sustainable. The Sustainability index of red chili farming was based on social and ecological dimensions; it obtained values of 47.36 and 43.00, so it was categorized in the less sustainable category.While the sustainable index of red chili farming from the economic dimension obtained is 24.45, it was classified as unsustainable.
Keywords: Sustainable index, red chili farming, Multidimensional Scaling

1. Introduction

Horticulture is one of the agricultural sub-sectors that provide a high enough contribution to the national economy. One of the horticultural commodities is red Chili (Capsicum annum variorum). Chili is oneof the horticultural commodities that have high economic value. The benefits of red chili are used to fulfill daily needs as supporting material for food or raw material for processed food and the pharmaceutical industry. On the other hand, chili can be consumed as a mixture of cooking spices, and it can also be preserved in suggestion: as chili sauce, sauce, pickled paste, dried fruit, and flour. Tasikmalaya Regency is one of the five largest red chili-producing regions in West Java Province, namely Garut, Sukabumi, Cianjur, Bandung, and Tasikmalaya Regencies. However, based on BPS data.

[2] it is explained that Tasikmalaya Regency has decreased production while the other four regions haveincreased. This condition will be related to business sustainability. Sustainable farming is the implementation of sustainable development.

Sustainable agriculture is agriculture that seeks to improve the local community's economy from the results of farming and to maintain the condition of biological resources. At least seven kinds of activities are needed to achieve the goals of sustainable agriculture consisting of 1) Economic Development; 2) Food sufficiency and food security; 3) Human resource development; 4) Farmers' self-esteem; 5) Farmer community empowerment; 6) Environmental stability and safety and; 7) Long-term productivity[8].

Sustainable agriculture is an effort to guarantee social, cultural, and economic life in the plant production system. The sustainability of preservation and formation also requires comprehensive technical assessment and analysis. The approach used for sustainability assessment covers four.

Dimensions cover the ecology, economy, and society of that system and disclose information regarding intervention conditions. This research was done to analyze the sustainability perception of red chili farming and to analyze the level factors regarding sensitive attributes that affect the sustainability dimension of chili farming applied in Taraju District, Tasikmalaya.

2. Research Methods

The research method implemented in this study was a survey method to collect information from farmers. The location determination uses a purposive sampling technique, namely Banyuasih District, Tasikmalaya Regency. The research location was in a chili farming center in Bojong District. The data assessed were primary data and secondary data. The total population of red chili farmers in Banyuasih District was 64 people. Determining the number of samples used the solving formula so that 39 chili farmers were obtained. The analytical method used in this research was used the RAP-Fish (Rapid Appraisal for Fisheries Analysis) approach used[4][5]. This technique refers to the ordination technique through the Multidimensional Scaling (MDS) approach. Leverage Analysis and Multidimensional Scaling (MDS) were employed to define the estimation of the scale of the sustainability index [2].

Leverage Analysis provided the various attributes of the sustainability status of chili farming. This analysis explained that the attributes positively and negatively affect the sustainability status. Meanwhile, The effects of attributes on the sustainability of farming were depicted in the order of priority, consisting of the value of Root Mean Square. The criteria ofdecision-making used in this activity are that the greater the RMS value, the more significant the influence of the role of these attributes on the sustainability status of chili farming. Multidimensional Scaling (MDS) was conducted to determine the position of sustainability based on the sustainability index scale in chili farming, with a value range between 0-100. The sustainability criteria were divided into several categories, such as the sustainability category, with a sustainability index of 0.00-25.00 (poor), 25.00-50.00 (less), 50.00-75.00 (enough), and 75.00-100 (good) [6].In addition, it was also known that the value of estimation and the coefficient of determination (R2) for the stress value requirement were below 0.25. [7]

3. Results and Discussion

3.1. Sustainability Analysis in Red Chili Farming

To encourage the sustainable production of food crops and horticulture, conduct a sustainability analysis on red chili farming. The analysis of chili farming sustainability represented ecology, economic, and social dimensions so that it can be used as a basis for developing red chili farming in the next generation. The results of the multidimensional RAP-Fish estimation with the MDS method have resulted in the sustainability index value. In addition to the sustainability index value, the stress value and R2 value are also obtained. The value of R2 (coefficient of determination) shows the relationship between the system and the attributes used.

3.2. Sustainability status from the aspect of the Social Dimension

According to the results of the multidimensional aspects of RAP-Farm, the condition of sustainability for the social dimension in red chili farming is presented in Figure 1.

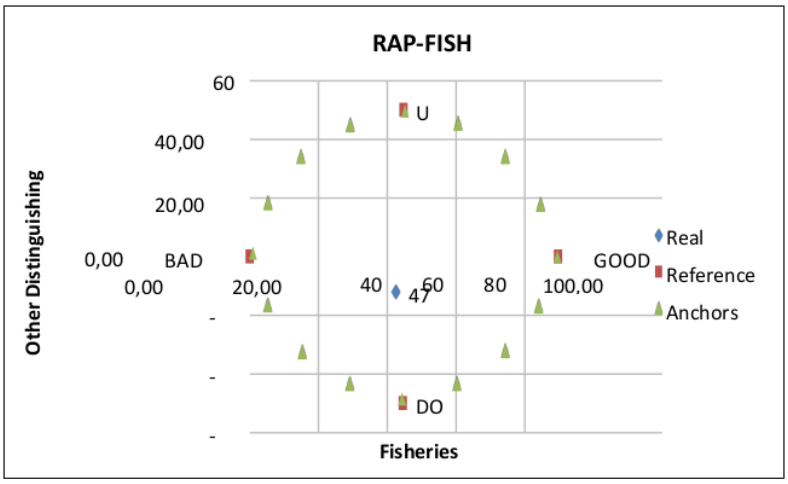

Figure 1. The Sustainability Index of Social Dimension Aspect of RAP-FISH

The sustainability index of red chili farming was calculated at 47.36. The analysis results describe that the social dimension of red chili farming is concluded to be less sustainable because the index value range is 25-50. The analysis result also shows a stress value of 0.13, and this value is below 0.25. So it means that the results of thisanalysis are pretty excellent or feasible.

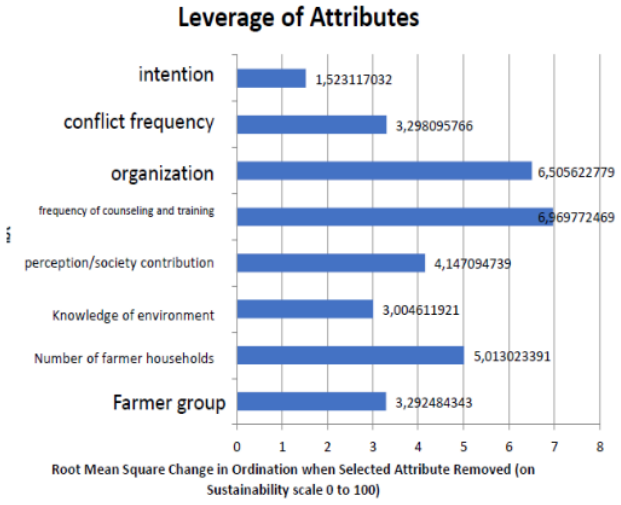

Figure 2. The Attribute of Social Dimension

The RSQ value obtained by sustainability analysis is 0.946. It shows that the system uses attributes (farmers' interests, frequency of conflicts, farmer institutions/groups, frequency of counseling and training, community roles, knowledge of the environment, and the number of farmer households)

Explanation behavior in the red chili farming system rises by 94.60% of the existing system. Thus, the attributes of the social dimension discussed in explaining the current condition of the red chili farming system are pretty good. The details of the value of each point are described in Figure 2.

Based on the results of the sensitivity analysis from the social dimension, it is stated that the most sensitive attribute is the frequency of counseling and training in red chili farming.This impact is because the increasing intensity of counseling and exercise can increase knowledge, skills, and attitude. So it can affect increasing farmer performance and productivity.

Meanwhile, the other attributes that can be used as levers to elevate the value of sustainability are institutions or farmer communities and the number of farmer households. Farming institutions can potentially increase productivity and scale up the income and welfare of farmers [10].

3.3. Sustainability Index of Ecological dimension

The multidimensional analysis of the RAP-Farm sustainability status for the ecological dimensions of red chili farming is displayed in Figure 3.

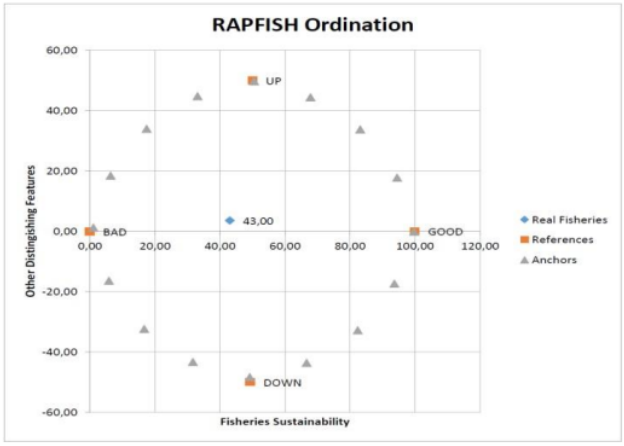

Figure 3. The Sustainability Index of Ecological Dimension of RAP-FISH

The index of red chili farming sustainability is 43.00.It describes that the ecological dimension of red chili farming is claimed as less sustainable because the index value reaches 25-50. However, the stress value based on analysis is 0.15, it stated below 0.25. A value below 0.25 means that the results of this analysis are good enough or feasible.

The RSQ value was obtained at 0.943. Thus, the current attributes (crop rotation, biological pesticides and herbicides, pests and diseases, support from climatic conditions, process of waste for feed, technology adoption of fertilizers and pesticides measurement, the utilization rate of land for chili, and land suitability for chili) used in the system have explained the behavior of the red chili farming system by 94.60% of the existing system. Thus, all the attributes of the ecological dimension assessed in explaining the current condition of the red chili farming system are slightly good. The sensitivity analysis of ecological dimensions is presented in Figure 4.

The sensitivity analysis of the ecological dimension depicted that the most sensitive attributes were pests and plant diseases. Pests and plant diseases caused the low production of chili. The losses caused by problems and conditions depend on the type and intensity of the irritation. Damage from pests and diseases caused a loss of production from 25 percent to 100 percent [1].

Meanwhile, another attribute that can be used as a level-increased value of the sustainability index is the carrying capacity of the climate. The condition of the weather is closely related to climate change [11], [12]. Climate change caused by global warming is one of the most critical challenges in agriculture, especially in the food crops and horticultural sub-sectors. So those sub-sectors are the most vulnerable to climate change [13],[14]. Technically, the vulnerability is closely related to land utilization systems and soil contents, cropping patterns systems, soil structure, water availability, plant management technology, and a variety of plants [15].

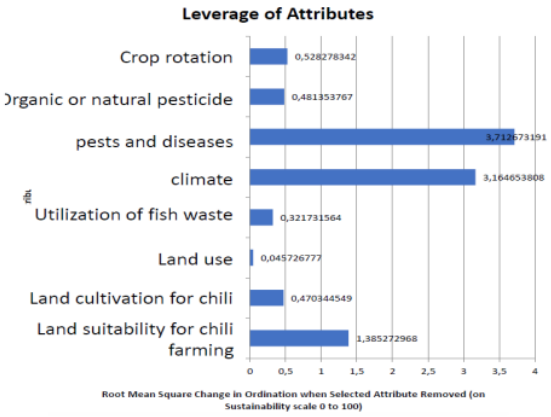

Figure 4. The Attribute of Ecological Dimension

3.4. Sustainability Index of Economic Dimension

The multidimensional analysis of the sustainability status of the RAP-Fish method for the economic dimension of Red Chili Fishing is presented in Figure 5.

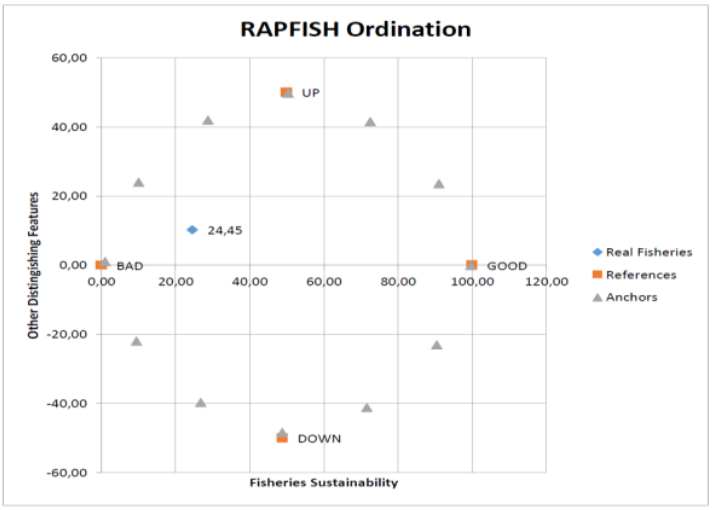

Figure 5. The Sustainability Index of the Economic Dimension Aspect of RAP-FISH

The index of red chili farming sustainability index was 24.5.It describes that the economic dimension status of red chili farming is in the unsustainable category because the index value range is 0 - 25. The stress value is 0.15, and thisvalue is below 0.25. It means that the results of this analysis are pretty or feasible. The RSQ value obtained is 0.943 and is close to the value of 1 (one). It explains that the system uses the current attributes. Have presented the behavior of the red chili farming system by 94.60% of the existing system. Thus, all the characteristics of the economic dimension used in explaining the current condition of the red chili farmingsystem are pretty good. The sensitivity observation of the economic size of farming sustainability is presented in Figure 6.

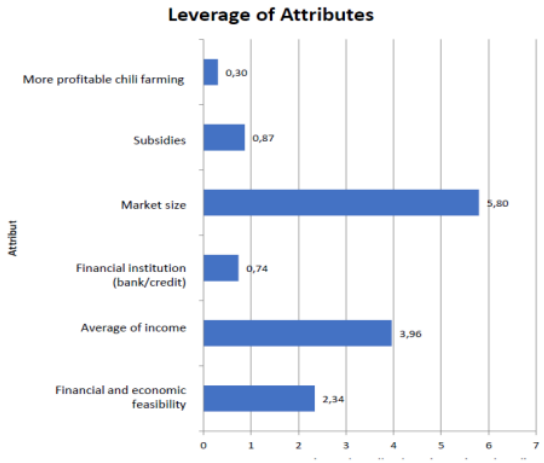

Figure 6. The Attribute of Economic Dimension

The sensitivity analysis of the economic dimension estimates that the most sensitive attribute in chili farming is the opportunity for the market size that can accommodate the results of red chili farming. The available markets are the local market and the national market. Meanwhile, other attributes that can be used as leverage attributes to increase the value of the sustainability index are the average income of farmers and the financial and economic feasibility of farming.

4. Conclusion

Chili farming sustainability index, in terms of social and ecological dimensions, obtained values of 47.36 and 43.00, so they are in the less sustainable category. On the other hand, the economic dimension of sustainability analysis obtained a value of 24.45. Therefore, that value stated that the dimension was not sustainable.

5. acknowledgment

I would like to thank my institution and those who have assisted in this research so that they can participate in international conference activities.

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The Sustainability Analysis of Red Chili farming in Taraju District, Tasikmalaya Regency

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Corresponding author: candranuraini@unsil.ac.id

Abstract. This study aim to analyze the sustainability status of red chili farming and analyze the lever factors or sensitive attributes that affect the sustainability dimension in red chili farming. The research was conducted in Taraju District with a purposive side technique. The basic of consideration is that Taraju District is one of the areas with the highest production level in Tasikmalaya Regency. The number of samples is 37. The analytical method used is the Rapfish approach. The tests used are Leverage Analysis and Multi-Dimensional Scaling (MDS). The results of the research are the ecological,

economic and social dimensions that are quite sustainable. The Sustainability index of red chili farming is based on social and ecological dimensions; obtained values of 47.36 and 43.00, so it is included in the less sustainable category. While the sustainable index of red chili farming from the economic dimension obtained is 24.45, it is categorized as unsustain.

Keywords: Sustainable index, red chili farming, Multi-Dimensional Scaling

Introduction

Horticulture is one of the agricultural sub-sectors that provide a high enough contribution to the national economy. One of the horticultural commodities is red chili (Capsicum annum varlongum). Chili is one of the horticultural commodities that have high economic value. The benefits of red chili are used to fulfill daily needs as supporting material for food, or raw material for processed food and pharmaceutical industry. At the other hand, Chili can be consumed as a mixture of cooking spices and it can also be preserved in suggestion: as chili sauce, sauce, pickled paste, dried fruit, and flour. Tasikmalaya Regency is one of the 5 largest red chili-producing regions in West Java Province, namely Garut, Sukabumi, Cianjur, Bandung, and Tasikmalaya Regencies. However, based on BPS data

[2] it is explained that Tasikmalaya Regency has decreased production, while the other four regions have actually increased. This will be related to business sustainability. Sustainable farming is the implementation of sustainable development.

Sustainable agriculture is agriculture that seeks to improve the local community's economy from the results of farming and maintaining the

condition of biological resources. At least seven kinds of activities are needed to achieve the goals of sustainable agriculture, namely: 1) Improving economic development; 2) Prioritizing food sufficiency; 3) Improving human resource development; 4) Increase self-esteem; 5) Empower[35] and liberate[36] farmers; 6) Maintain environmental stability (safe, clean, balanced, updated), and; 7) Focus on long-term productivity goals[8].

Sustainable agriculture is an effort to guarantee social, cultural and economic life in plant[37] production system[38]. The sustainability of preservation and formation also requires comprehensive technical assessment and analysis. The approach used for sustainability assessment covers four[39]

dimensions[40] such as ecology, economy and social[41] of that system and disclose information regarding intervention condition[42]. This study aims to analyze the sustainability status of red chili[43] farming; (2) analyze the level factors/sensitive attributes that affect the sustainability dimension of chili[44] farming in Taraju District, Tasikmalaya[45]

Research Methods

The research method used in this study is a survey method. The determination of the location use[46] purposive[47] sampling technique, namely Banyuasih District, Tasikmalaya Regency. Based on the the research[48] location is in a chili[49] farming center[50] in Bojong District. The data used are primary data and secondary data. The total population of red chili[51] farmers in Banyuasih District are 64 people. The determination of the number of samples use[52,58] the solvin[53] formula,[54] so that[58,55] 39 chili[56] farmers were obtained.[57] To answer the objectives of this study,[59] the Rapfish (Rapid Appraisal for Fisheries Analysis) approach was used[60][4][5]. This

technique refers to the ordination technique through the Multi-Dimensional Scaling (MDS) approach. The analysis used in this research are Leverage Analysis and Multi Dimensional Scaling (MDS) [2]

Leverage Analysis is used to analyze various attributes on the sustainability status of chili farming, so that it can be seen which attributes have the most positive or negative effect on the sustainability status. Meanwhile, to see the extent of the influence of these attributes, it is based on the order of priority on the value of the Root Mean Square (RMS) ordination on the X axis. The criteria of decision making used in this activity is the greater RMS value, the greater the influence of the role of these attributes on the sustainability status of chili farming. Multi Dimensional Scaling (MDS) is used to determine the position of sustainability based on the sustainability index scale in chili farming, with a value range between 0-100. The sustainability criterias are divided into several categories, namely the sustainability category, with a sustainability index, namely: 0.00-25.00 (poor), 25.00-50.00 (less), 50.00-75.00 (enough) and 75.00-100 (good) [6] .In addition, it is also known that the stress value and the coefficient of determination (R2), for the stress value requirement, are below 0.25. [7]

Results and Discussion

Sustainability Analysis in Red Chili Farming

For encouraging sustainable production of food crops and horticulture, it is necessary to conduct a sustainability analysis on red chili farming. The analysis of chili farming sustainability includes ecological, economic and social dimensions, so that it can be used as a basis for developing red chili farming in the future. The results of the multidimensional RAP-fish analysis use the ordination technique through the MDS method resulted in a red chili farming

sustainability index value. In addition to the sustainability index value, the stress value and R2 value are also obtained. The value of R2 (coefficient of determination) shows the relationship between the system and the attributes used.

Sustainability status from the aspect of the Social Dimension

Based on the results of the multidimensional analysis of RAP-Farm, the sustainability status for the social dimension in red chili farming is presented in Figure 1.

Figure 1. The Sustainability Index of Social Dimension

RAPFISH Ordination

60,00

UP

40,00

20,00

Real Fishe[88]

0,00 BAD

0,00 20,00

40,00

47,36

60,00

80,00

GOOD

100,00 120,00

-20,00

Reference

Anchors

-40,00

DOWN

-60,00

Fisheries Sustainability

Other Distingishing Features

The results from the analysis of the sustainability index of red chili farming show that the sustainability index is 47.36 . The results of the analysis describe that the social dimension of red chili farming is categorized as less sustainable, because the range of index value is 25-50. The results of the analysis also show a stress value of 0.13, and this value is below 0.25. So it means that the results of this analysis are quite good or feasible.

Figure 2. The Attribute of Social Dimension

The RSQ value obtained by sustainability analysis is 0.946. It shows that the system uses attributes (farmers' interests, frequency of conflicts, farmer institutions/groups, frequency of counselling and training, community roles, knowledge of the environment, the number of farmer households)

explaining behaviour in the red chili farming system by 94.60% of the existing system. Thus, The attributes of the social dimension used in explaining the current condition of the red chilli farming system is quite good. The details of the value of each attribute are described in Figure 2.

Based on the results of the sensitivity analysis from the aspect of the social dimension, it is shown that the most sensitive attribute is the frequency of

counselling and training in red chili farming. Increasing the intensity of counselling and training can increase knowledge, skills, and attitude changes that can have an impact on increasing farmer performance and productivity. Meanwhile, the other attributes that can be used as levers to increase the value of sustainability are institutions or farmer groups and the number of farmer households. Farming institutions have the potential to increase productivity and increase the income and welfare of farmers [10].

Sustainability Index of Ecological dimension

The results of the multidimensional analysis of the RAP-Farm sustainability status for the ecological dimensions of red chili farming are presented in Figure 3.

Figure 3. The Sustainability Index of Ecological Dimension

The results of the analysis of the red chili farming sustainability index showed an index of 43.00. It describes that the ecological dimension of red chili farming is categorized as less sustainable, because the index value is in the range of 25-50. The results of the analysis show that the stress value is 0.15, and this value is below 0.25. This means that the results of this analysis are quite good or feasible.

The RSQ value was obtained at 0.943. It shows that the current attributes (crop rotation, of biological pesticides and herbicides, pests and diseases, climate carrying capacity, utilization of waste for feed, level of use of fertilizers/pesticides, the utilization rate of land for chili and land suitability for chili) used in the system have explained the behavior of the red chili farming system by 94.60% of the existing system. Thus, all the attributes of the

ecological dimension used in explaining the current condition of the red chili farming system are quite good. The results of the sensitivity analysis on the ecological dimensions are presented in Figure 4.

The results of the sensitivity analysis of the ecological dimension showed that the most sensitive attributes was pests and plant diseases. The low production of chili can be caused by pests and plant diseases. The losses caused by pests and diseases depend on the type and intensity of the attack. Loss of production is caused by the attacks of pests and disease at the from 25 percent to 100 percent [1].

Meanwhile, another attribute that can be used as a lever attribute to increase the value of the sustainability index is the carrying capacity of the climate. The carrying capacity of the climate is closely related to climate change [11], [12]. Climate change as a result of global warming is one of the most important challenges in agriculture, especially in the food crops and horticultural sub-sectors. So that those sub-sectors are the most vulnerable toward climate change [13],[14]. Technically, the vulnerability

is closely related to land use systems and soil properties, cropping patterns, soil, water and plant management technology, and plant varieties [15].

Figure 4. The Attribute of Ecological Dimension

Sustainability Index of Economic Dimension

The results of the multidimensional analysis of the sustainability status of rapfish for the economic dimension of Red Chili Farming are presented in Figure 5.

Figure 5. The Sustainability Index of Economic l Dimension

The results of the analysis of the red chili farming sustainability index showed an index of 24.5. It describes that the economic dimension of red chili farming is in the unsustainable category, because the range of index value is 0 - 25. The results of the analysis show that the stress value is 0.15, and this value is below 0.25. It means that the results of this analysis are quite good or feasible. The RSQ value obtained is 0.943 and is close to the value of 1 (one). It shows that the system using the current attributes

have explained the behavior of the red chili farming system by 94.60% of the existing system. Thus, all the attributes of the economic dimension used in explaining the current condition of the red chili farming system are quite good. The results of the sensitivity analysis of the economic dimension can be presented in Figure 6.

Figure 6. The Attribute of Economic Dimension

The results of the sensitivity analysis of the economic dimension show that the most sensitive attribute is the opportunity for the size of the market that can accommodate the results of red chili farming. The available markets are the

local market and the national market. Meanwhile, other attributes that can be used as leverage attributes to increase the value of the sustainability index are the average income and financial and economic feasibility.

Conclusion

Chili farming sustainability index in terms of social and ecological dimensions, obtained values of 47.36 and 43.00, so that they are in the less sustainable category. The red chili farming sustainability index in terms of the economic dimension obtained a value of 24.45, so it is categorized as unsustain.

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1.	~~aim~~ → aims	Faulty subject-verb agreement	Correctness
2.	~~chili~~ → chilli	Mixed dialects of English	Correctness
3.	~~chili~~ → chilli	Mixed dialects of English	Correctness
4.	*This study aim to analyze the sustainability status of red chili farming and analyze the lever factors or sensitive attributes that affect the sustainability dimension in red chili farming.*	Unclear sentences	Clarity
5.	*The research was conducted*	Passive voice misuse	Clarity
6.	~~basic~~ → basis	Confused words	Correctness
7.	~~of~~	Wrong or missing prepositions	Correctness
8.	~~of~~	Wordy sentences	Clarity
9.	~~Taraju~~ → Taraji	Misspelled words	Correctness
10.	*Multi-Dimensional; multidimensional*	Text inconsistencies	Correctness
11.	research results	Wordy sentences	Clarity
12.	~~quite~~ → pretty	Word choice	Engagement
13.	~~chili~~ → chilli	Mixed dialects of English	Correctness
14.	~~chili~~ → chilli	Mixed dialects of English	Correctness
15.	*unsustain*	Unknown words	Correctness
16.	~~chili~~ → chilli	Mixed dialects of English	Correctness
17.	~~chili~~ → chilli	Mixed dialects of English	Correctness
18.	*chili; Chili*	Text inconsistencies	Correctness
19.	~~varlongum~~ → variorum	Misspelled words	Correctness

20.	~~Chili~~ → Chilli	Mixed dialects of English	Correctness
21.	~~chili~~ → chilli	Mixed dialects of English	Correctness
22.	~~fulfill~~ → fulfil	Mixed dialects of English	Correctness
23.	food,	Punctuation in compound/complex sentences	Correctness
24.	the pharmaceutical	Determiner use (a/an/the/this, etc.)	Correctness
25.	~~At~~ → On	Wrong or missing prepositions	Correctness
26.	*At the other hand, Chili can be consumed as a mixture of cooking spices and it can also be preserved in suggestion: as chili sauce, sauce, pickled paste, dried fruit, and flour.*	Unclear sentences	Clarity
27.	, and	Punctuation in compound/complex sentences	Correctness
28.	*it can also be preserved*	Passive voice misuse	Clarity
29.	~~chili~~ → chilli	Mixed dialects of English	Correctness
30.	~~5~~ → five	Improper formatting	Correctness
31.	chilli-producing	Mixed dialects of English	Correctness
32.	data.	Closing punctuation	Correctness
33.	*This*	Intricate text	Clarity
34.	~~maintaining~~ → to maintain	Faulty parallelism	Correctness
35.	~~Empower~~ → Empowering	Incorrect verb forms	Correctness
36.	~~liberate~~ → liberating	Incorrect verb forms	Correctness

37.	the plant, or a plant	Determiner use (a/an/the/this, etc.)	Correctness
38.	~~system~~ → systems	Incorrect noun number	Correctness
39.	four.	Closing punctuation	Correctness
40.	~~dimensions~~ → Dimensions	Improper formatting	Correctness
41.	~~social~~ → society	Confused words	Correctness
42.	~~condition~~ → conditions	Incorrect noun number	Correctness
43.	~~chili~~ → chilli	Mixed dialects of English	Correctness
44.	~~chili~~ → chilli	Mixed dialects of English	Correctness
45.	Tasikmalaya.	Closing punctuation	Correctness
46.	~~use~~ → uses	Faulty subject-verb agreement	Correctness
47.	a purposive	Determiner use (a/an/the/this, etc.)	Correctness
48.	the~~the~~ research	Misspelled words	Correctness
49.	~~chili~~ → chilli	Mixed dialects of English	Correctness
50.	~~center~~ → centre	Mixed dialects of English	Correctness
51.	~~chili~~ → chilli	Mixed dialects of English	Correctness
52.	~~use~~ → used	Faulty tense sequence	Correctness
53.	~~solvin~~ → solving	Misspelled words	Correctness
54.	formula,	Punctuation in compound/complex sentences	Correctness

55.	~~that~~ 39	Conjunction use	Correctness
56.	~~chili~~ → chilli	Mixed dialects of English	Correctness
57.	*39 chili farmers were obtained*	Passive voice misuse	Clarity
58.	*The determination of the number of samples use the solvin formula, so that 39 chili farmers were obtained.*	Unclear sentences	Clarity
59.	*To answer the objectives of this study*	Misplaced words or phrases	Correctness
60.	*the Rapfish (Rapid Appraisal for Fisheries Analysis) approach was used*	Passive voice misuse	Clarity
61.	Multi-Dimensional	Misspelled words	Correctness
62.	~~chili~~ → chilli	Mixed dialects of English	Correctness
63.	farming,	Punctuation in compound/complex sentences	Correctness
64.	*Meanwhile, to see the extent of the influence of these attributes, it is based on the order of priority on the value of the Root Mean Square (RMS) ordination on the X axis.*	Intricate text	Clarity
65.	~~decision making~~ → decision-making	Misspelled words	Correctness
66.	~~is~~ → are	Faulty subject-verb agreement	Correctness
67.	that the	Inappropriate colloquialisms	Delivery
68.	that the	Inappropriate colloquialisms	Delivery
69.	~~greater~~ → more excellent	Word choice	Engagement
70.	the RMS	Determiner use (a/an/the/this, etc.)	Correctness

71.	~~chili~~ → chilli	Mixed dialects of English	Correctness
72.	Multi-Dimensional	Misspelled words	Correctness
73.	~~chili~~ → chilli	Mixed dialects of English	Correctness
74.	~~criterias~~ → criteria	Misspelled words	Correctness
75.	] .	Improper formatting	Correctness
76.	),	Punctuation in compound/complex sentences	Correctness
77.	requirement,	Punctuation in compound/complex sentences	Correctness
78.	*For encouraging sustainable production of food crops and horticulture, it is necessary to conduct a sustainability analysis on red chili farming.*	Unclear sentences	Clarity
79.	the sustainable	Determiner use (a/an/the/this, etc.)	Correctness
80.	~~chili~~ → chilli	Mixed dialects of English	Correctness
81.	~~chili~~ → chilli	Mixed dialects of English	Correctness
82.	dimensions,	Punctuation in compound/complex sentences	Correctness
83.	~~chili~~ → chilli	Mixed dialects of English	Correctness
84.	~~use~~ → using	Incorrect verb forms	Correctness
85.	~~chili~~ → chilli	Mixed dialects of English	Correctness
86.	*chili farming sustainability index value*	Intricate text	Clarity
87.	~~chili~~ → chilli	Mixed dialects of English	Correctness

88.	~~Fishe~~ → Fisher, Fish	Misspelled words	Correctness
89.	~~Distingishing~~ → Distinguishing	Misspelled words	Correctness
90.	~~chili~~ → chilli	Mixed dialects of English	Correctness
91.	*The results from the analysis of the sustainability index of red chili farming show that the sustainability index is 47.36 .*	Unclear sentences	Clarity
92.	47.36 .	Improper formatting	Correctness
93.	~~chili~~ → chilli	Mixed dialects of English	Correctness
94.	sustainable,	Punctuation in compound/complex sentences	Correctness
95.	*The results of the analysis describe that the social dimension of red chili farming is categorized as less sustainable, because the range of index value is 25-50.*	Unclear sentences	Clarity
96.	*The results of the analysis also show a stress value of 0.13, and this value is below 0.25.*	Unclear sentences	Clarity
97.	and the	Conjunction use	Correctness
98.	~~explaining~~ → Explaining	Improper formatting	Correctness
99.	~~chili~~ → chilli	Mixed dialects of English	Correctness
100.	*explaining behaviour in the red chili farming system by 94.60% of the existing system.*	Incomplete sentences	Delivery
101.	~~is~~ → are	Faulty subject-verb agreement	Correctness
102.	~~the aspect of~~	Wordy sentences	Clarity

103.	~~chili~~ → chilli	Mixed dialects of English	Correctness
104.	*Increasing the intensity of counselling and training can increase knowledge, skills, and attitude changes that can have an impact on increasing farmer performance and productivity.*	Unclear sentences	Clarity
105.	~~chili~~ → chilli	Mixed dialects of English	Correctness
106.	~~results of the~~	Wordy sentences	Clarity
107.	~~chili~~ → chilli	Mixed dialects of English	Correctness
108.	~~chili~~ → chilli	Mixed dialects of English	Correctness
109.	sustainable,	Punctuation in compound/complex sentences	Correctness
110.	*The results of the analysis show that the stress value is 0.15, and this value is below 0.25.*	Unclear sentences	Clarity
111.	*This*	Intricate text	Clarity
112.	~~quite~~ → pretty	Word choice	Engagement
113.	~~good~~ → excellent	Word choice	Engagement
114.	*The RSQ value was obtained*	Passive voice misuse	Clarity
115.	~~of~~	Wrong or missing prepositions	Correctness
116.	~~chili~~ → chilli	Mixed dialects of English	Correctness
117.	~~chili~~ → chilli	Mixed dialects of English	Correctness
118.	~~behavior~~ → behaviour	Mixed dialects of English	Correctness
119.	~~chili~~ → chilli	Mixed dialects of English	Correctness

120.	~~chili~~ → chilli	Mixed dialects of English	Correctness
121.	~~quite~~ → pretty	Word choice	Engagement
122.	~~was~~ → were	Faulty subject-verb agreement	Correctness
123.	*The results of the sensitivity analysis of the ecological dimension showed that the most sensitive attributes was pests and plant diseases.*	Unclear sentences	Clarity
124.	~~chili~~ → chilli	Mixed dialects of English	Correctness
125.	*The low production of chili can be caused by pests and plant diseases.*	Passive voice misuse	Clarity
126.	~~disease~~ → diseases	Incorrect noun number	Correctness
127.	~~at~~	Wrong or missing prepositions	Correctness
128.	~~at the~~	Wordy sentences	Clarity
129.	~~the~~ from	Determiner use (a/an/the/this, etc.)	Correctness
130.	~~percent~~ → per cent	Mixed dialects of English	Correctness
131.	~~percent~~ → per cent	Mixed dialects of English	Correctness
132.	~~increase~~ → increasing	Incorrect verb forms	Correctness
133.	~~important~~ → critical	Word choice	Engagement
134.	~~So that~~ → So	Conjunction use	Correctness
135.	~~toward~~ → to	Wrong or missing prepositions	Correctness
136.	vulnerability.	Closing punctuation	Correctness
137.	~~is~~ → Is	Improper formatting	Correctness

138.	~~rapfish~~ → raffish	Misspelled words	Correctness
139.	the Economic	Determiner use (a/an/the/this, etc.)	Correctness
140.	~~results of the~~	Wordy sentences	Clarity
141.	~~chili~~ → chilli	Mixed dialects of English	Correctness
142.	~~chili~~ → chilli	Mixed dialects of English	Correctness
143.	category,	Punctuation in compound/complex sentences	Correctness
144.	index value range	Wordy sentences	Clarity
145.	*The results of the analysis show that the stress value is 0.15, and this value is below 0.25.*	Unclear sentences	Clarity
146.	~~quite~~ → pretty	Word choice	Engagement
147.	~~good~~ → excellent	Word choice	Engagement
148.	attributes.	Closing punctuation	Correctness
149.	~~have~~ → Have	Improper formatting	Correctness
150.	~~behavior~~ → behaviour	Mixed dialects of English	Correctness
151.	~~chili~~ → chilli	Mixed dialects of English	Correctness
152.	~~chili~~ → chilli	Mixed dialects of English	Correctness
153.	~~quite~~ → pretty	Word choice	Engagement
154.	~~size of the market~~ → market size	Wordy sentences	Clarity
155.	~~chili~~ → chilli	Mixed dialects of English	Correctness

156.	*Meanwhile, other attributes that can be used as leverage attributes to increase the value of the sustainability index are the average income and financial and economic feasibility.*	Unclear sentences	Clarity
157.	~~Chili~~ → Chilli	Mixed dialects of English	Correctness
158.	, in	Punctuation in compound/complex sentences	Correctness
159.	dimensions,	Punctuation in compound/complex sentences	Correctness
160.	43.00,	Punctuation in compound/complex sentences	Correctness
161.	~~that~~ they	Conjunction use	Correctness
162.	~~that~~ they	Wordy sentences	Clarity
163.	~~chili~~ → chilli	Mixed dialects of English	Correctness
164.	*unsustain*	Unknown words	Correctness
165.	, Canada	Punctuation in compound/complex sentences	Correctness
166.	~~Apraisal~~ → Appraisal	Misspelled words	Correctness
167.	~~Rapfish~~ → Raffish	Misspelled words	Correctness
168.	~~Softwere~~ → Software	Misspelled words	Correctness
169.	~~Vancenver~~ → Vancouver	Misspelled words	Correctness
170.	the securities	Determiner use (a/an/the/this, etc.)	Correctness

171.	*Future of the human climate niche.*	Incomplete sentences	Delivery

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The Sustainability Analysis of Red Chili farming in Taraju District, Tasikmalaya Regency

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The Sustainability Analysis of Red Chili farming in Taraju District, Tasikmalaya Regency

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Abstract. This study aim to analyze the sustainability status of red chili farming and analyze the lever factors or sensitive attributes that affect the sustainability dimension in red chili farming. The research was conducted in Taraju District with a purposive side technique. The basic of consideration is that Taraju District is one of the areas with the highest production level in Tasikmalaya Regency. The number of samples is 37. The analytical method used is the Rapfish approach. The tests used are Leverage Analysis and Multi-Dimensional Scaling (MDS). The results of the research are the ecological, economic and social dimensions that are quite sustainable. The Sustainability index of red chili farming is based on social and ecological dimensions; obtained values of 47.36 and 43.00, so it is included in the less sustainable category. While the sustainable index of red chili farming from the economic dimension obtained is 24.45, it is categorized as unsustain.
Keywords: Sustainable index, red chili farming, Multi-Dimensional Scaling

1. Introduction

Horticulture is one of the agricultural sub-sectors that provide a high enough contribution to the national economy. One of the horticultural commodities is red chili (Capsicum annum varlongum). Chili is one of the horticultural commodities that have high economic value. The benefits of red chili are used to fulfill daily needs as supporting material for food, or raw material for processed food and pharmaceutical industry. At the other hand, Chili can be consumed as a mixture of cooking spices and it can also be preserved in suggestion: as chili sauce, sauce, pickled paste, dried fruit, and flour.

Tasikmalaya Regency is one of the 5 largest red chili-producing regions in West Java Province, namely Garut, Sukabumi, Cianjur, Bandung, and Tasikmalaya Regencies. However, based on BPS data [2] it is explained that Tasikmalaya Regency has decreased production, while the other four regions have actually increased. This will be related to business sustainability. Sustainable farming is the implementation of sustainable development.

Sustainable agriculture is agriculture that seeks to improve the local community's economy from the results of farming and maintaining the condition of biological resources. At least seven kinds of activities are needed to achieve the goals of sustainable agriculture, namely: 1) Improving economic development; 2) Prioritizing food sufficiency; 3) Improving human resource development; 4) Increase self-esteem; 5) Empower and liberate farmers; 6) Maintain environmental stability (safe, clean, balanced, updated), and; 7) Focus on long-term productivity goals[8].

Sustainable agriculture is an effort to guarantee social, cultural and economic life in plant production system. The sustainability of preservation and formation also requires comprehensive technical assessment and analysis. The approach used for sustainability assessment covers four

dimensions such as ecology, economy and social of that system and disclose information regarding intervention condition. This study aims to analyze the sustainability status of red chili farming; (2) analyze the level factors/sensitive attributes that affect the sustainability dimension of chili farming in Taraju District, Tasikmalaya

2. Research Methods

The research method used in this study is a survey method. The determination of the location use purposive sampling technique, namely Banyuasih District, Tasikmalaya Regency. Based on the the research location is in a chili farming center in Bojong District. The data used are primary data and secondary data. The total population of red chili farmers in Banyuasih District are 64 people. The determination of the number of samples use the solvin formula, so that 39 chili farmers were obtained. To answer the objectives of this study, the Rapfish (Rapid Appraisal for Fisheries Analysis) approach was used[4][5]. This technique refers to the ordination technique through the Multi-Dimensional Scaling (MDS) approach. The analysis used in this research are Leverage Analysis and Multi Dimensional Scaling (MDS) [2]

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3. Results and Discussion

3.1. Sustainability Analysis in Red Chili Farming

For encouraging sustainable production of food crops and horticulture, it is necessary to conduct a sustainability analysis on red chili farming. The analysis of chili farming sustainability includes ecological, economic and social dimensions, so that it can be used as a basis for developing red chili farming in the future. The results of the multidimensional RAP-fish analysis use the ordination technique through the MDS method resulted in a red chili farming sustainability index value. In addition to the sustainability index value, the stress value and R2 value are also obtained. The value of R2 (coefficient of determination) shows the relationship between the system and the attributes used.

3.2. Sustainability status from the aspect of the Social Dimension

Based on the results of the multidimensional analysis of RAP-Farm, the sustainability status for the social dimension in red chili farming is presented in Figure 1.

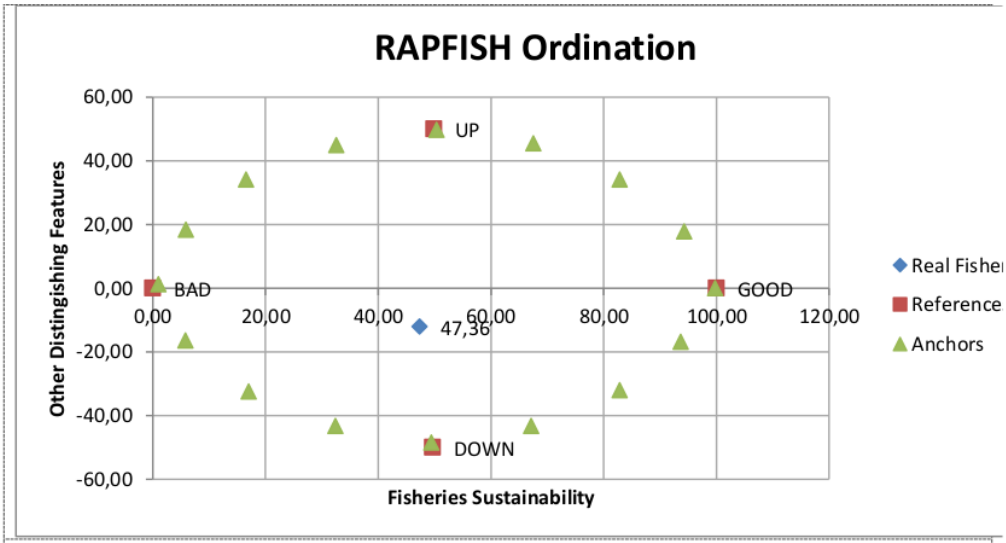

Figure 1. The Sustainability Index of Social Dimension

The results from the analysis of the sustainability index of red chili farming show that the sustainability index is 47.36 . The results of the analysis describe that the social dimension of red chili farming is categorized as less sustainable, because the range of index value is 25-50. The results of the analysis also show a stress value of 0.13, and this value is below 0.25. So it means that the results of this analysis are quite good or feasible.

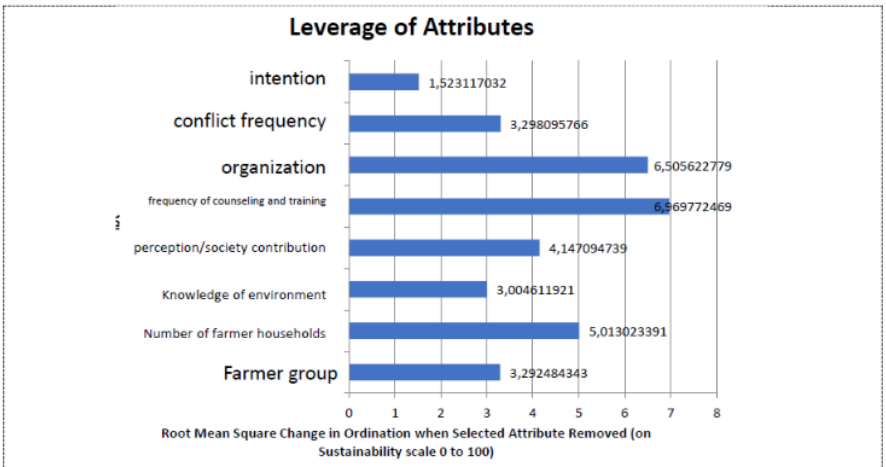

Figure 2. The Attribute of Social Dimension

The RSQ value obtained by sustainability analysis is 0.946. It shows that the system uses attributes (farmers' interests, frequency of conflicts, farmer institutions/groups, frequency of counselling and training, community roles, knowledge of the environment, the number of farmer households)

explaining behaviour in the red chili farming system by 94.60% of the existing system. Thus, The attributes of the social dimension used in explaining the current condition of the red chilli farming system is quite good. The details of the value of each attribute are described in Figure 2.

Based on the results of the sensitivity analysis from the aspect of the social dimension, it is shown that the most sensitive attribute is the frequency of counselling and training in red chili farming. Increasing the intensity of counselling and training can increase knowledge, skills, and attitude changes that can have an impact on increasing farmer performance and productivity.

Meanwhile, the other attributes that can be used as levers to increase the value of sustainability are institutions or farmer groups and the number of farmer households. Farming institutions have the potential to increase productivity and increase the income and welfare of farmers [10].

3.3. Sustainability Index of Ecological dimension

The results of the multidimensional analysis of the RAP-Farm sustainability status for the ecological dimensions of red chili farming are presented in Figure 3.

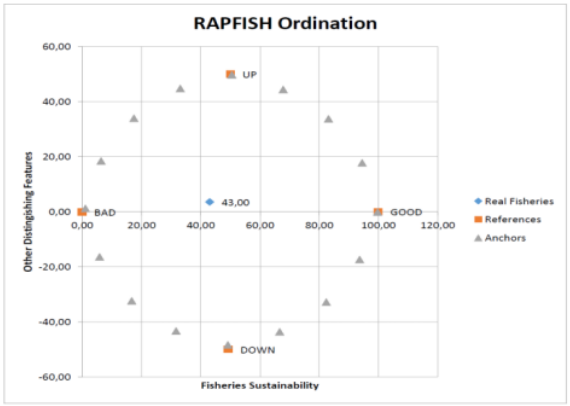

Figure 3. The Sustainability Index of Ecological Dimension

The results of the analysis of the red chili farming sustainability index showed an index of 43.00. It describes that the ecological dimension of red chili farming is categorized as less sustainable, because the index value is in the range of 25-50. The results of the analysis show that the stress value is 0.15, and this value is below 0.25. This means that the results of this analysis are quite good or feasible.

The RSQ value was obtained at 0.943. It shows that the current attributes (crop rotation, of biological pesticides and herbicides, pests and diseases, climate carrying capacity, utilization of waste for feed, level of use of fertilizers/pesticides, the utilization rate of land for chili and land suitability for chili) used in the system have explained the behavior of the red chili farming system by 94.60% of the existing system. Thus, all the attributes of the ecological dimension used in explaining the current condition of the red chili farming system are quite good. The results of the sensitivity analysis on the ecological dimensions are presented in Figure 4.

The results of the sensitivity analysis of the ecological dimension showed that the most sensitive attributes was pests and plant diseases. The low production of chili can be caused by pests and plant diseases. The losses caused by pests and diseases depend on the type and intensity of the attack. Loss of production is caused by the attacks of pests and disease at the from 25 percent to 100 percent [1].

Meanwhile, another attribute that can be used as a lever attribute to increase the value of the sustainability index is the carrying capacity of the climate. The carrying capacity of the climate is closely related to climate change [11], [12]. Climate change as a result of global warming is one of the most important challenges in agriculture, especially in the food crops and horticultural sub-sectors. So that those sub-sectors are the most vulnerable toward climate change [13],[14]. Technically, the vulnerability

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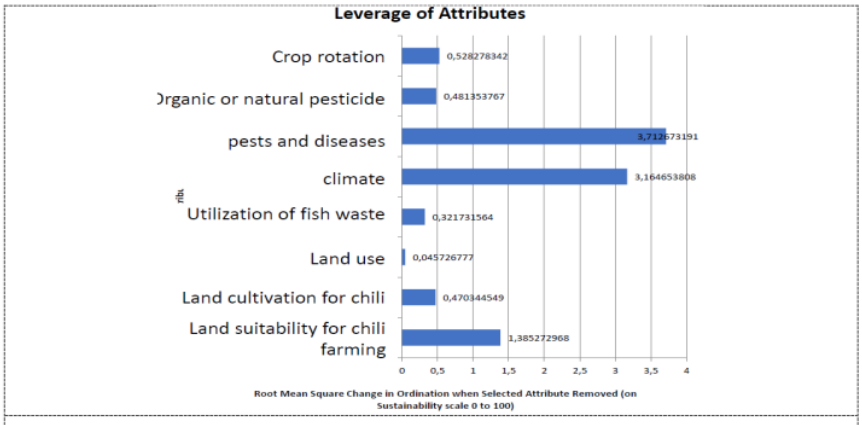

Figure 4. The Attribute of Ecological Dimension

3.4. Sustainability Index of Economic Dimension

The results of the multidimensional analysis of the sustainability status of rapfish for the economic dimension of Red Chili Farming are presented in Figure 5.

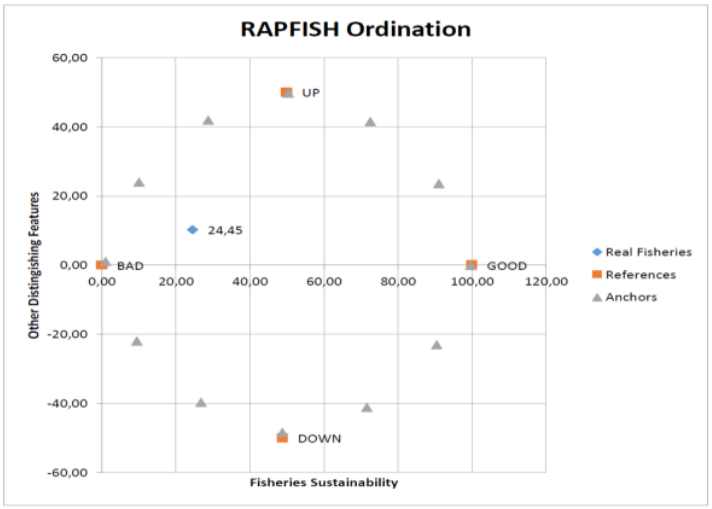

Figure 5. The Sustainability Index of Economic l Dimension

The results of the analysis of the red chili farming sustainability index showed an index of 24.5. It describes that the economic dimension of red chili farming is in the unsustainable category, because the range of index value is 0 - 25. The results of the analysis show that the stress value is 0.15, and this value is below 0.25. It means that the results of this analysis are quite good or feasible. The RSQ value obtained is 0.943 and is close to the value of 1 (one). It shows that the system using the current attributes

have explained the behavior of the red chili farming system by 94.60% of the existing system. Thus, all the attributes of the economic dimension used in explaining the current condition of the red chili farming system are quite good. The results of the sensitivity analysis of the economic dimension can be presented in Figure 6.

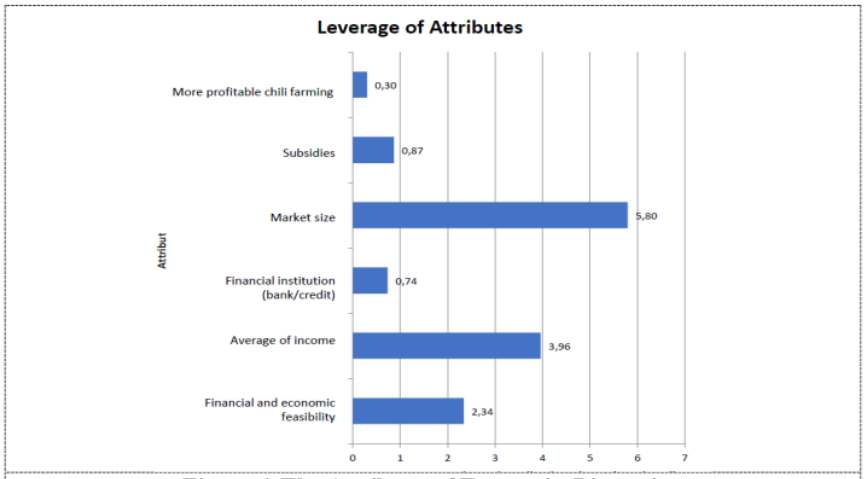

Figure 6. The Attribute of Economic Dimension

The results of the sensitivity analysis of the economic dimension show that the most sensitive attribute is the opportunity for the size of the market that can accommodate the results of red chili farming. The available markets are the local market and the national market. Meanwhile, other attributes that can be used as leverage attributes to increase the value of the sustainability index are the average income and financial and economic feasibility.

4. Conclusion

Chili farming sustainability index in terms of social and ecological dimensions, obtained values of 47.36 and 43.00, so that they are in the less sustainable category. The red chili farming sustainability index in terms of the economic dimension obtained a value of 24.45, so it is categorized as unsustain.

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The Sustainability Analysis of Red Chili farming in Taraju District, Tasikmalaya Regency

Abstract. This study aim to analyze the sustainability status of red chili farming; (2) analyzing the lever factors or sensitive attributes that affect the sustainability dimension in red chili farming. The research was conducted in Taraju District with a purposive side technique. The basic of consideration is that Taraju District is one of the areas with the highest production level in Tasikmalaya Regency. The number of samples is 37. The analytical method used is the Rapfish approach. The tests used are Leverage Analysis and Multi-Dimensional Scaling (MDS). The results of the research are the ecological, economic and social dimensions that are quite sustainable. The basic of consideration why we choose Taraju District, because this location/it is one of the areas with the highest production level in Tasikmalaya Regency. The number of samples are 37. The analytical method used in this research is the Rapfish approach. For the tests, we use Leverage Analysis and MDS. Sustainability index of the red chili farming based on social and ecological dimensions, obtained values of 47.36 and 43.00, so it is included in the less sustainable category. While the sustainable index of red chili farming from the economic dimension obtained is 24.45, so it is categorized as unsustainable.
Keywords: Sustainable index, red chili farming, Multi-Dimensional Scaling

1. Introduction

Horticulture is one of the agricultural sub-sectors that provide (providing) a high enough contribution to the national economy. One of the horticultural commodities is red chili (Capsicum annum varlongum). Chili is one of the horticultural commodities that have (having) high economic value. The benefits of red chili are used to fulfill daily needs as a supporting material for food, as a raw material for the food and pharmaceutical industry. At the other hand, Chili can be consumed as a mixture of cooking spices and it can also be preserved in the form of chili sauce, sauce, pickled paste, dried fruit and flour.

Tasikmalaya Regency is one of the 5 largest red chili producing regions in West Java Province, namely Garut, Sukabumi, Cianjur, Bandung and Tasikmalaya Regencies. However, based on BPS data [2] it is explained that Tasikmalaya Regency has decreased production, while the other four regions have actually increased. This will be related to business sustainability. Sustainable farming is the implementation of sustainable development.

Sustainable agriculture is agriculture that seeks to improve the local community's economy from the results of farming and maintaining the condition of biological resources. at least seven kinds of activities are needed to achieve the goals of sustainable agriculture, namely: 1) Improving economic development; 2) Prioritizing food sufficiency; 3) Improving human resource development; 4) Increase self-esteem; 5) Empower and liberate farmers; 6) Maintain environmental stability (safe, clean, balanced, updated), and; 7) Focus on long-term productivity goals[8].

Sustainable agriculture is an effort to guarantee social, cultural and economic life in plant production system. The sustainability of preservation and formation also requires comprehensive technical assessment and analysis. The approach used for sustainability assessment covers four dimensions such

as ecology, economy and social from that system and disclose information regarding intervention condition. This study aims to analyze the sustainability status of red chili farming; (2) analyze the lever factors/sensitive attributes that affect the sustainability dimension of chili farming in Taraju District, Tasikmalaya

2. Research Methods

The research method used in this study is a survey method. The determination of the location use purposive sampling technique, namely Banyuasih District, Tasikmalaya Regency. Based on the consideration, the research location is in a chili farming center in Bojong District. The data used are primary data and secondary data. The total population of red chili farmers in Banyuasih District are 64 people. The determination of the number of samples use the solvin formula, so that 39 chili farmers were obtained. To answer the objectives of this study, the Rapfish (Rapid Appraisal for Fisheries Analysis) approach was used[4][5]. This technique refers to the ordination technique through the Multi-Dimensional Scaling (MDS) approach. The analysis used in this research are Leverage Analysis and Multi Dimensional Scaling (MDS) [2]

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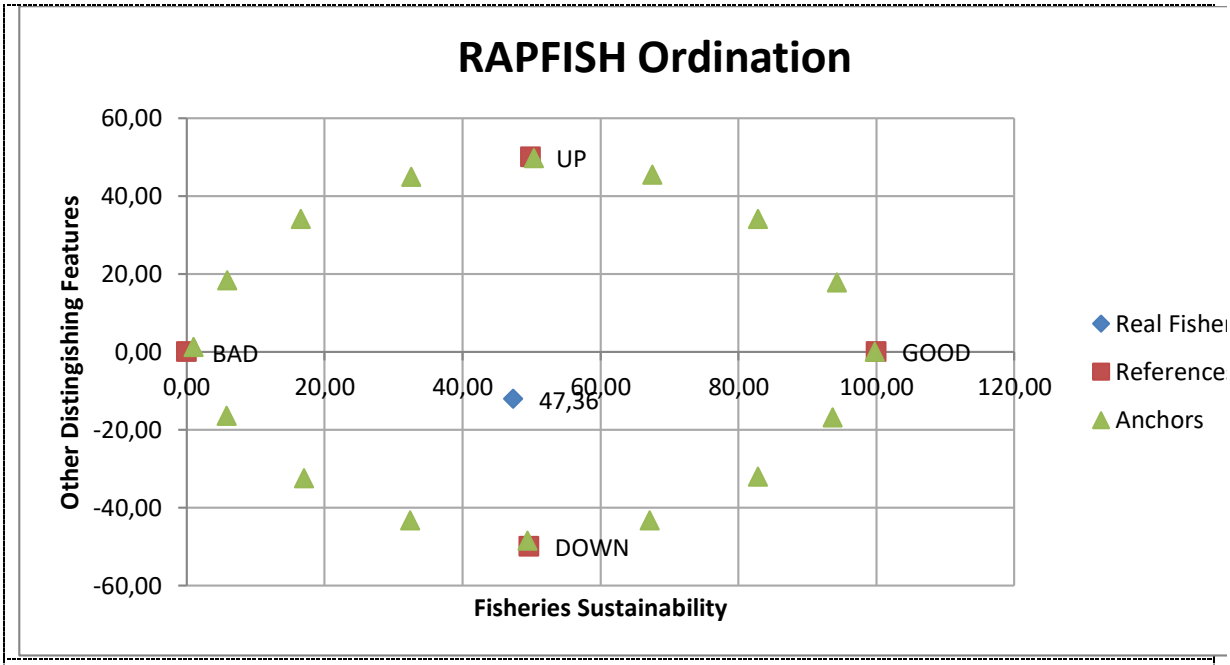

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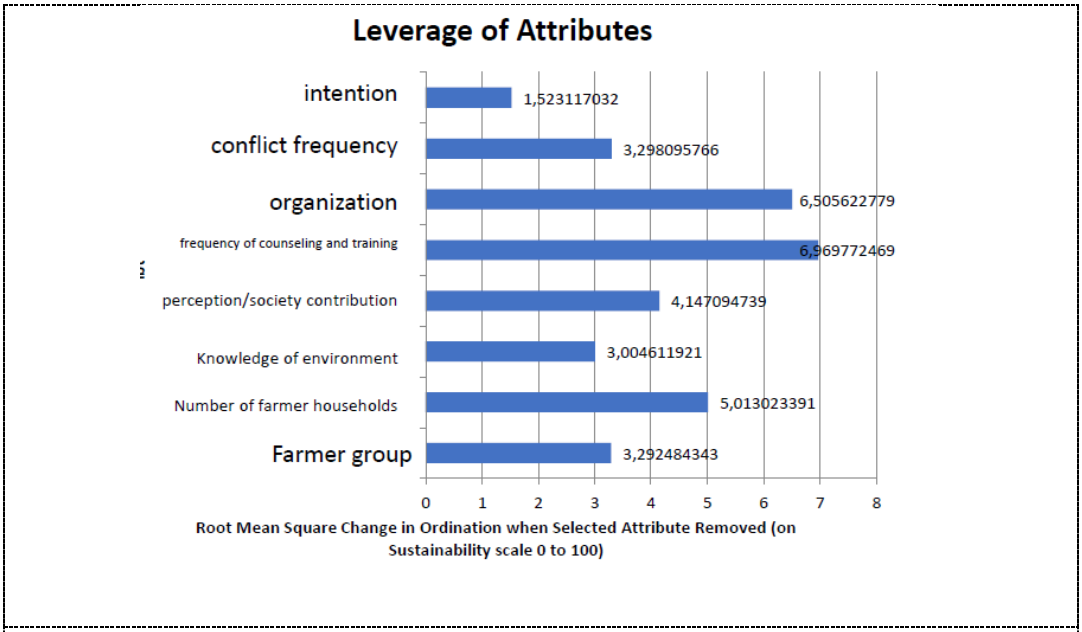

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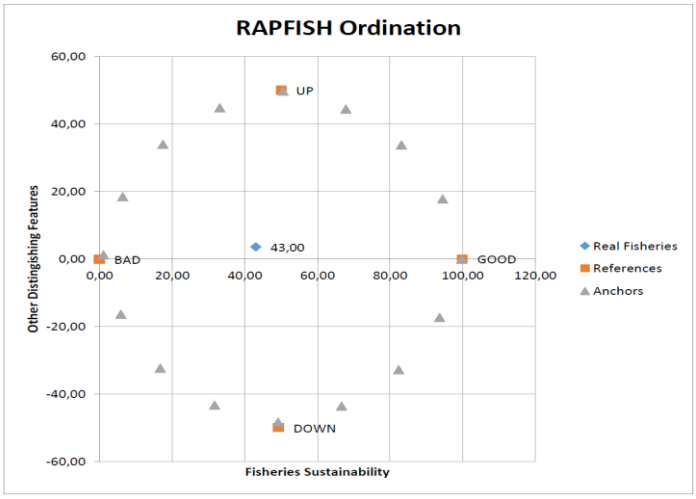
The results of the multidimensional analysis of the RAP-Farm sustainability status for the ecological dimensions of red chili farming are presented in Figure 3.



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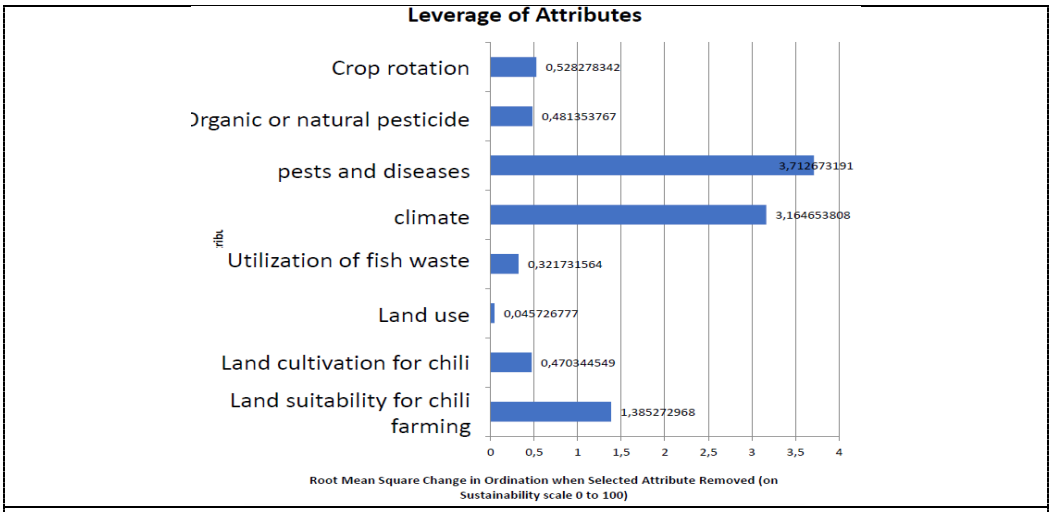
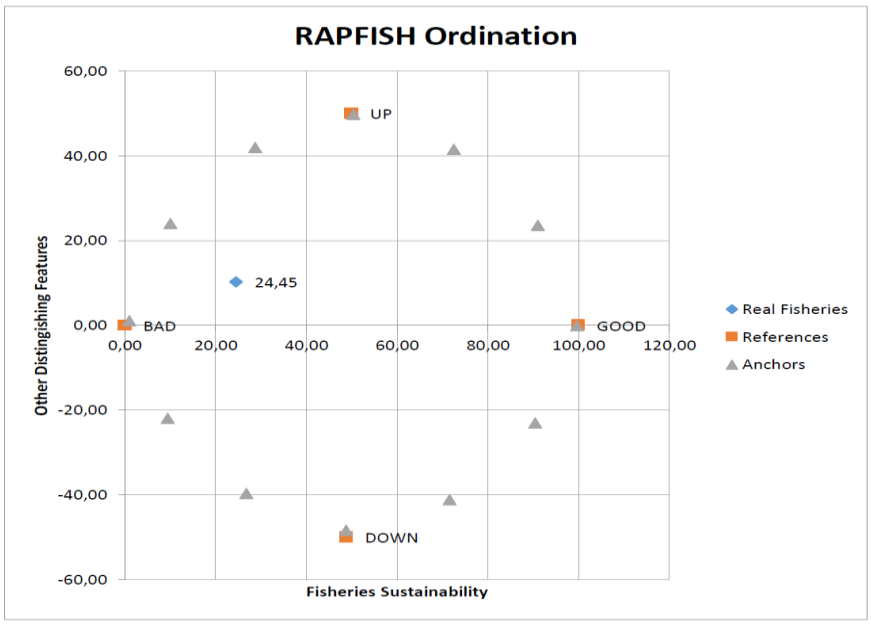


Figure 4. The Attribute of Ecological Dimension

3.4. Sustainability Index of Economic Dimension

The results of the multidimensional analysis of the sustainability status of rapfish for the economic dimension of Red Chili Farming are presented in Figure 5.



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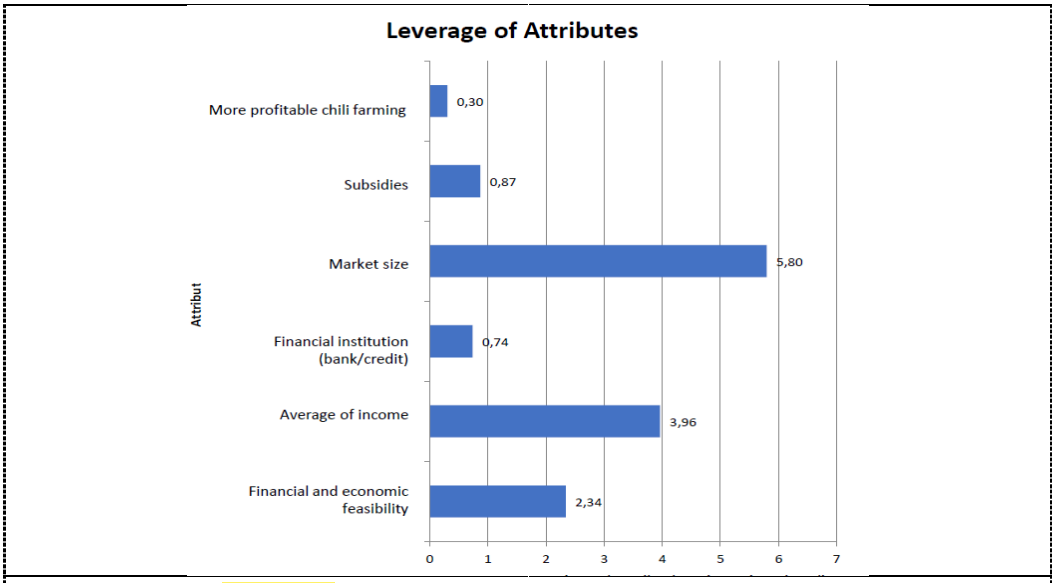

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The results of the sensitivity analysis of the economic dimension show that the most sensitive attribute is the opportunity for the size of the market that can accommodate the results of red chili farming. The available markets are the local market and the national market. Meanwhile, other attributes that can be used as leverage attributes to increase the value of the sustainability index are the average income and financial and economic feasibility.

4. Conclusion

The conclusion of this study, namely the red chili farming sustainability index in terms of social and ecological dimensions, obtained values of 47.36 and 43.00, so that they are in the less sustainable category. The red chili farming sustainability index in terms of the economic dimension obtained a value of 24.45, so it is categorized as unsustainable.

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