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Sustainability Analysis of Superior Horticulture Agribusiness Development in East Sumba Regency, East Nusa Tenggara Province, Indonesia

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Abstract
The objectives of this study were (1) to identify superior horticulture commodities, (2) to calculate the magnitude of multiplier effects of superior horticulture commodities, (3) to determine the status of the sustainability of horticulture agribusiness development and (4) to determine the dominant attributes influencing the sustainability in East Sumba Regency. The analysis methods used in this study were superior commodities analysis, multiplier analysis and Multi-Dimensional Scaling (MDS). The results showed that (1) the superior horticulture commodities in East Sumba were mango and cucumber, (2) the multiplier effect values for mango and cucumber were 2.10 and 2.01; (3) the multidimension status of superior horticulture agribusiness development in East Sumba was in the less sustainable category with an index value of 49.37 while the status of social and institutional dimensions were in quite sustainable with index value of 50.23 and 50.76, but was less sustainable of the ecology, economy and technology dimensions with index value of 42.92, 49.01 and 46.76 and (4) the attributes which were dominant on the sustainability of superior horticulture agribusiness development in East Sumba Regency were the use of fertilizer and pesticides, cultivated land area, utilization of loan, extention and training intensity, exsistence of government service, community compherensive of green technology, land processing technic, conflic between farmer groups and the existence of farmer group.
Keywords: sustainability, agribusiness, horticulture, multi dimension scalling

1. INTRODUCTION

Sumba is one of the big islands in East Nusa Tenggara Province which has the potential to be developed as a horticulture agribusiness area. Sumba Island consists of four districts namely East Sumba, Central Sumba, West Sumba and Southwest Sumba. Efforts to develop rural areas on Sumba Island through the development of horticulture agribusiness areas are promising alternative choices considering the majority of the population are in rural areas and living from farming activities. The agricultural sector is still a prime mover in driving the economy in Sumba Island; however, the acceleration of the performance of this sector tends to be not optimal. The agricultural conditions in Sumba Island are still very simple because the ability of human resources, especially farmers in managing the agricultural sector is still relatively undeveloped.

Sumba Island has a picture of poverty that is almost the same as the portrait of poverty in Indonesia in general. Until 2016, economic growth had not provided a positive signal for improving the level of welfare of the community and farmers in particular. There are three indicators which indicate that there is no improvement in the welfare of the people on this island, namely the Open Unemployment Rate (OUR), the Level of Quality of Life (LQL) and the level of poverty. In 2016, the average Open Unemployment Rate on Sumba Island was 3.73% while in East Sumba it was 3.14%. The average level of quality of life measured through the Human Development Index (HDI) figures is actually quite good, the average for Sumba Island is 60.6 while for East Sumba it is 61.85. But the level of poverty on Sumba Island is still quite high measured by the number of poor people for Sumba Island as much as 239,000 people or 31.98% of the total population. The percentage of poor people in East Sumba was 31.43% while the average poverty line for Sumba Island was IDR 287,730.5 and East Sumba was IDR 295,684 (BPS NTT, 2017).

The socio-economic conditions of the people in Sumba Island showed the construction of unequal rural-urban development as is the case in many regions in Indonesia. The village becomes a soft commodity for the exploitation of economic development surplus in the city while the prospects for rural economic development are increasingly bleak (Thamrin, 2008). Based on this, it is deemed necessary to conduct a study entitled Sustainability Analysis of the Superior Horticulture Agribusiness Development in East Sumba Regency, East Nusa Tenggara Province. The objectives were to (1) to identify superior horticulture commodities in East Sumba District, (2) to calculate the magnitude of superior horticulture commodity multiplier effects, (3) to find out the sustainability status of superior horticulture agribusiness development and (4) to find out the dominant

attributes influencing the sustainability of superior horticulture agribusiness development in East Sumba Regency, East Nusa Tenggara Province.

2. THEORICAL FOUNDATION

Development is a sustainable development process and involves real development stakeholders. Development can also be defined as as an effort to improve human ability to influence the future. Based on two meaning above, the main implications can be explained, namely (1) development must be able to generate optimal human capabilities both in the context of individuals and as members of society and (2) development must be able to encourage the growth of community togetherness and equality of shared welfare values that foster public trust. Thus development can mean generating the ability to develop independently and sustainably by reducing interdependence relations between area or regions or countries, and able to create mutual respect between areas or regions or countries (Sumarmi, 2012).

Based on Law No. 32 of 2009 concerning Environmental Protection and Management in Indonesia, in article 1 paragraph 3, what is meant by sustainable development is a conscious and planned effort that integrates environmental, social and economic aspects into a development strategy to ensure the integrity of the environment and safety, ability, welfare, and quality of life of present and future generations. Whereas according to WCED (Word Commission on Environment and Development), sustainable development is development that is oriented towards meeting the needs of the present without compromising the ability of future generations to meet their needs. This definition contains two main ideas, namely needs and limitations. Sustainable development mandates the fulfillment of basic needs for all (WCED, 1988).

Agribusiness is a system consisting of upstream, farming, downstream, and supporting subsystems. According to Downey (2009), agribusiness boundaries are a complete and interrelated system among all economic activities (ie upstream agribusiness subsystems, cultivation agribusiness subsystems, downstream agribusiness subsystems, agribusiness support services systems) that are directly related to agriculture. Agribusiness is defined as a system consisting of elements of activities: (1) pre-harvest, (2) harvest, (3) post-harvest and (4) marketing. As a system, agribusiness activities cannot be separated from each other, all are integrated and interrelated. Disconnection of one part will cause the system to override it. While agribusiness activities cover the agricultural sector, including fisheries and forestry, as well as part of the industrial sector. The agricultural sector and the combination of the two sectors will create good economic growth nationally (Sumodiningrat, 2000).

As a system business that covers all activities related to the exploitation of plants and animals (agricultural, farm, fishery and forestry commodities) that are market oriented not only to meet their own needs and gain value added, agribusiness brings fundamental concepts (Saragih, 2010). Thus it can be said that agribusiness is an integrative concept which consists of trading sub-systems and agricultural production facilities, farming production sub-systems, agricultural product processing and distribution sub-systems, agricultural product marketing sub-systems and sub-systems supporting agricultural activities.

Literally, horticulture derived from the Latin "hortus" which can be interpreted by the word garden and "cultura/colere" means cultivation, so that horticulture can mean cultivating garden plants (Poerwanto *et al*., 2014). Furthermore, horticulture is used more widely not only for cultivation in the garden but also used in the types of plants that are cultivated. The fields of horticulture work include hatcheries, nurseries, tissue culture, crop production, pests and diseases, harvesting, packaging and distribution. Horticulture is one method of modern farming. In its development, horticulture plants became cultivated on large-scale plantations. But the essence of the plant is worthy of being cultivated in the garden and yard of the house in order to provide benefits directly to the people who cultivate it.

According to Suparta (2014), the concept of comparative advantage is a measure of potential competitiveness in terms of competitiveness that will be achieved if the economy does not experience distortion at all. Commodities that have comparative advantages are said to also have economic efficiency. In the context of economic efficiency, a more suitable concept for measuring financial feasibility is competitive advantage or often called "revealed competitive advantage" which is a measure of the competitiveness of an activity in actual economic conditions. Furthermore, it is said that a country or region that has comparative or competitive advantages showeds excellence both in natural potential, mastery of technology, and managerial ability in the activities concerned.

Sustainable of superior horticulture agribusiness development that has been conducted by using two types of approaches, namely the territorial approach and increased community participation approach. This is important because (1) food crops and horticulture development programs provide the largest contribution to employment, helping to overcome the problem of unemployment; (2) food crops and horticulture programs are still the main support in the national economic system, especially in producing staple foods, thereby reducing food dependence on the outside world; (3) the price of food crops and horticulture products has a great weight in determining the consumer price index, so that the dynamics are very influential in suppressing the inflation rate,

therefore this agricultural development will help strengthen national economic stability and (5) increase the development of food crops and horticulture plays an important role in encouraging the industrial and export sectors, as well as reducing imports of food crops and horticulture products which in turn will strengthen the balance of payments in the country. The reality of how important the development of food crops and horticulture mentioned above has been fully realized by the government who see that the use of resources in the development of the agricultural sector in the future absolutely requires a reorientation of thought in its implementation (Director General of Horticulture, 2010)

3. RESEARCH METHODOLOGY

3.1 Research Location

The study was conducted in East Sumba Regency, East Nusa Tenggara Province from June to December 2016.

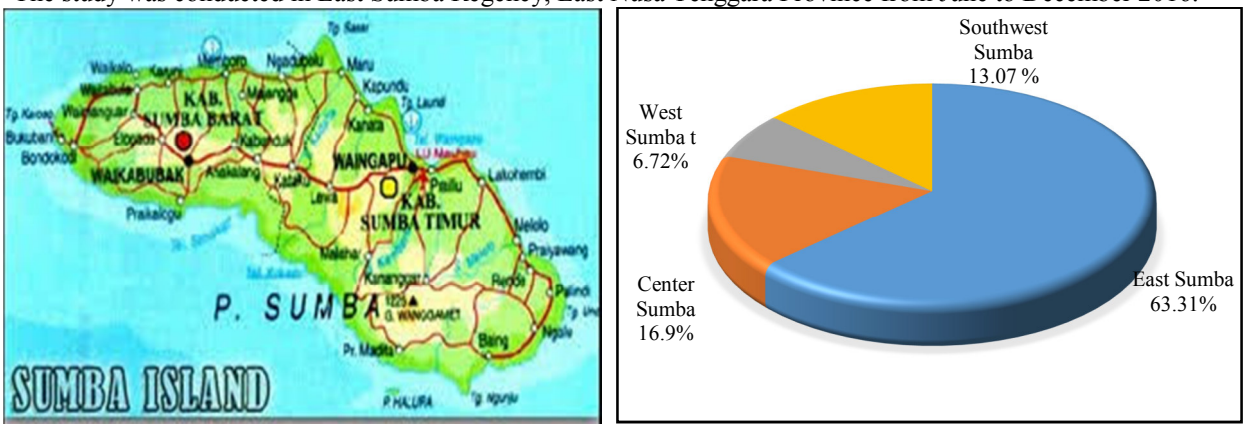

Figure 1. Map of Sumba Island and percentage of area of each regency

East Sumba Regency is the largest area of 7000.5 km2 or 63.3% of the total area of Sumba Island. (Figure 1). East Sumba Regency consists of 22 sub-districts and that is the largest number compared to the other three regencies on Sumba Island. East Sumba consists of four islands, one main island (Sumba Island) and three other small islands namely Prai Salura Island, Mengkudu Island and Nuga Island (uninhabited). About 40% of East Sumba's area is steep hills, especially in the south where the hill slopes are quite fertile, while in the northern part are rocky and infertile plains. Like other regions in East Nusa Tenggara Province, East Sumba has a dry season and a rainy season. In general, East Sumba was washed by rain in January - April, while the other 8 months experienced drought, which caused the East Sumba region to be classified as dry.

3.2 Type and source of data

The data used in this study are primary data and secondary data. Primary data was collected through direct interviews with selected respondents and experts, as well as observations at the research location. Data collection methods were carried out through interviews, discussions and field surveys. While secondary data was collected from various sources including data from the Central Bureau of Statistic, Food Crop Agriculture Office, Regional Development Planning Agency, Food Security and Agricultural Training Impementation Agency, Regional Library and Archive Office, Cooperative, Small and Medium Enterprise and Trade Office, and Village Administrative Office.

3.3 Method of determining respondent

The population used in this study were all farmers who growed vegetables and fruits, both of which specifically pursue horticulture and multicultural farmers in the East Sumba. The total sub-districts in East Sumba are 22 sub-districts but the population was chosen from 12 sub-districts. The consideration of choosing 12 of these sub-districts was because they were a large contributor to horticulture production in East Sumba.

Determination of respondents was done by using the equation of the Slovin equation (Sevilla and Consuelo, 1993) and Uma Sekaran (2000) namely $n = \frac{N}{1+N(Moe)^2}$ where: n = number of samples, N = number of population, and Moe = Margin of error (maximum 10%). Based on this formula, there are 100 respondents for East Sumba Regency. Respondents were determined from expert groups as 20 key informants. So that the total respondents who were resource persons in East Sumba were 120 people.

Whereas to determine the number of samples as respondents in each sub-district calculated using the formula: $ni = \frac{N_I}{N} \times n$ where: ni = sample size from sub-district to i, Ni = population of farmers in sub-district to i, and N = total population of farmers and n = the number of sample farmers set.

Based on the results of the calculation, samples were obtained for each sub-district with the highest number of respondents from Lewa and Pandawai sub-districts as many as 14 people, while the least sample from Kanatang and Haharu sub-districts was 5 people, in full presented in Table 1.

Table 1. Numer of sample respondents per sub distric in East Sumba

No	Sub-ditric	Number of farmer	Number of sample
1	Lewa	2,941	14
2	Nggaha Ori Angu	1,777	8
3	Lewa Tidahu	1,297	6
4	Tabundung	1,786	8
5	Pinu Pahar	1,423	7
6	Matawai La Pawu	1,260	6
7	Kahangu Eti	1,890	9
8	Pahungo Lodu	2,386	11
9	Kota Waingapu	1,390	7
10	Kanatang	1,120	5
11	Haharu	1,120	5
12	Pandawai	2,885	14
Total number		21,275	100

Source : Result of secondary data processing, 2017

Respondents who became informants were not only men but also women. In this study the number of female respondents involved were 26 people and male respondents were 74 people. The small number of female respondents because of horticulture farming activities in East Sumba was dominated by men with age domination ranging from 40 - 45 years and 25 - 39 years (Table 2).

Table 2. Age range and gender of respondents in East Sumba

No	Age (Year)	Number of respondents (People)	Gender	
			Men	Women
1	25-39	38	30	8
2	40-54	40	34	16
3	55-60	12	10	2
Total		100	74	26

Source : Primary data, 2017

The level of education is an important component for the sustainability of horticultural agribusiness development. However, in fact the level of education of farmers in East Sumba was dominated by elementary and junior high school graduates. The number of high school graduates was only 9% and undergraduate only 1%. This condition was a challenge for the government and stakeholders in providing assistance in the form of training and education to improve farmers' knowledge and skills. Respondent education data can be seen in Table 3.

Table 3. Level of education of respondents in East Sumba

No	Level of education	Number of respondents (People)	Persentation (%)
1	Elementary School	64	64
2	Junior High School	26	26
3	Senior High School	9	9
4	Undergraduate	1	1
Jumlah		100	100

Source : Primary data, 2017

3.4 Data and Analysis Method

This study was designed in three methods of data analysis which included (1) analysis of the determination of superior horticulture commodities, (2) multiplier effect analysis and (3) sustainability analysis consisting of two types of analysis namely ordination and leverage analysis.

3.4.1 Analysis of the determination of superior and reliable horticulture commodities

Determination of superior horticulture commodities is carried out in two stages:

a) Static Location Quotient analysis (SLQ)

SLQ is a data analysis method used to identify base and non-base commodities in an area. The SLQ formula is (Pir⁄Ptr) / (Pip⁄Ptp) where Pir = Production of horticulture commodities i at the regency level; Ptr = Total production of horticulture commodities at the regency level; Pip = Production of horticulture commodities i at the province level; Ptp = Total production of horticulture commodities at the province level. If SLQ> 1, then the sector is the base sector and if SLQ <1, then the sector is a non-base sector.

b) Dinamic Location Quotient Analysis (DLQ)

DLQ is calculated using the formula: DLQ= $\left[\frac{(1+gik)/(1+gk)}{(1+gtp)/(1+gp)}\right]^t$ where is it = flat the growth of the value of horticulture commodities i in the research area k (district); no = average growth in the total value of selected horticulture in the research area k (district); gip = average growth in value of horticulture commodities i at the provincial level (p); gp = average growth in total value of horticulture at the provincial level (p); t = difference between the end of the year and the beginning of the year (2012 - 2016). Classification of the determination of superior and reliable commodities is if the value of SLQ> 1 and DLQ> 1 is called the superior commodity and if DLQ> 1 while SLQ <1 is called the reliable commodity. If DLQ <1 and SLQ> 1 are called prospective commodities and if DLQ and SLQ <1 are called lagging commodities (Kuncoro *et al*, 2009).

3.4.2 Multiplier effect analysis

Farming analysis and R / C ratio are the initial stages of multiplier effect analysis. Analysis of income multiplier effects can be explained as the relationship between changes in base income with changes in total income by the formula: Δ Yt = K.ΔYb where: Yt = total income (total income); Yb = base income; Ynb = non-base income; K = Base multiplier and Δ = Income change. The multiplier basis effect formula in units of income is k = Yt / Yb. Because of total income = base + non-base income, the base multiplier effect formula can be modified to k= $=\frac{Yt}{Yb} = \frac{1}{Yt/Yt - Yt/Yn} = \frac{n}{1 - Yn/Yt}$. The income multiplier coefficient obtained indicate the magnitude of the income multiplier effect in the sector. The greater multiplier coefficient value show the tendency of community economic activity in the sector to be better (Kuncoro, 2011).

3.4.3 Sustainable analysis of superior horticulture agribusiness development

Sustainability analysis uses an agroecology-based approach with non-parametric multi attributes (Multi Dimentional Scaling = MDS), which is a modification of RAP-farm (The Rapid Appraisal of the Status of Farming). The RAPFISH method is modified to determine the sustainability of horticulture agribusiness development in the study area (Pitcher and Preikshot, 2001). The MDS method is the process of mapping objects or points observed in one space, where the same object or point is mapped close together and different objects or points are mapped far apart (Fauzi and Anna, 2002). MDS analysis results are expressed in index values (0-100) which reflect the sustainability status of the study object based on actual conditions and their ordinances in each dimension.

Table 1. Sustainability index and status

Value index	Category
0.00 – 25.00	Bad : Not sustainable
25.01 – 50.00	Less : Less sustainable
50.01 – 75.00	Quite : Quite sustainable
75.01 – 100.00	Good : Very sustainable

Source: Pitcher and Preikshot, 2001

In general, there are three stages in the sustainability analysis using the RAPFISH method, namely (1) determining the attributes or parameters in each dimension of sustainability; (2) parameter assessment on each dimension of sustainability where the assessment uses a research questionnaire; (3) assessment of sustainability index and status through ordination analysis using MDS analysis, sensitivity analysis (sensitivity analysis) and Monte Carlo analysis (anomaly analysis). Based on these three stages, the sustainability status of the study area will be indentified (Saida, 2011) .

4. RESULTS AND DISCUSSION

4.1 Results of analysis of the determination of superior and reliable horticulture commodities in East Sumba

4.1.1 Determination of superior and reliable fruits in East Sumba

The fruits developed by farmers in East Sumba consist of 11 types, namely avocado, mango, rambutan, orange, guava, soursop, papaya, banana, pineapple, snakefruit and jackfruit.

a). The results of SLQ and DLQ analysis of fruit in East Sumba

The results of the SLQ analysis describe the status of the commodity as a base commodity. If the SLQ value is greater than 1 then the commodity is a base commodity, on the contrary if the value is smaller than 1 then it is not a base commodity. Base commodities are commodities that have a comparative advantage, namely the ability to meet market demand, seen from the amount of production at the district level and the percentage at the provincial level. While the results of the DLQ analysis showed the potential development of these commodities. DLQ values greater than 1 indicate high development potential; otherwise if the DLQ value is less than 1, the potential for development is low.

The results of SLQ and DLQ analysis showed that only 6 of the 11 types of fruits studied were base commodities and three types have high development potential. Base commodities consist of mangoes, oranges,

soursop, papaya, pineapple, while the commodities with high development potential consist of mango, guava and rambutan. Completeness is presented in Table 4.

Table 4. Results of SLQ and DLQ analysis of fruits in East Sumba

No	Commodities	Analysis results of SLQ		Analysis results of DLQ	
		Criteria	Category	Criteria	Category
1	Avocado	SLQ < 1	Non Base	DLQ < 1	Low development potential
2	Mango	SLQ > 1	Basis	DLQ > 1	High development potential
3	Rambutan	SLQ < 1	Non Base	DLQ > 1	High development potential
4	Orange	SLQ > 1	Base	DLQ < 1	Low development potential
5	Guava	SLQ < 1	Non Base	DLQ < 1	High development potential
6	Soursop	SLQ > 1	Base	DLQ < 1	Low development potential
7	Papaya	SLQ > 1	Base	DLQ < 1	Low development potential
8	Banana	SLQ < 1	Non Base	DLQ < 1	Low development potential
9	Pineapple	SLQ < 1	Non Base	DLQ < 1	Low development potential
10	Snakefruit	SLQ > 1	Non Base	DLQ < 1	Low development potential
11	Jackfruit	SLQ < 1	Base	DLQ < 1	Low development potential

Source: Results of data analysis, 2017

4.1.2 Determination of superior and reliable vegetables in East Sumba

Vegetables developed in East Sumba consist of 17 types, namely carrots, red beans, long beans, chili, tomatoes, eggplant, beans, shallots, garlic, spring onion, potatoes, cabbage, petsay, cucumber, chayote, water spinach and spinach.

b). Results of analysis of SLQ and DLQ for vegetables in East Sumba

The results of SLQ and DLQ analysis showed that only 7 of the 17 types of vegetables studied was base commodities and 2 types have high development potential. The basic vegetable commodities consist of long beans, chili, tomatoes, pets, cucumbers, water spinach and spinach. Vegetables with high development potential were red beans, cabbage and cucumber. The details in Table 5.

Table 5. Results of SLQ and DLQ analysis of vegetables in East Sumba

No	Commodities	Analysis result of SLQ		Analysis results of DLQ	
		Criteria	Category	Criteria	Category
1	Carrot	SLQ < 1	Non Base	DLQ < 1	Low development potential
2	Red beans	SLQ < 1	Non Base	DLQ > 1	High potential development
3	Long beans	SLQ > 1	Base	DLQ < 1	Low development potential
4	Chili	SLQ > 1	Base	DLQ < 1	Low development potential
5	Tomato	SLQ > 1	Base	DLQ < 1	Low development potential
6	Eggplant	SLQ < 1	Non Base	DLQ < 1	Low development potential
7	Beans	SLQ < 1	Non Base	DLQ < 1	Low development potential
8	Red onion	SLQ < 1	Non Base	DLQ < 1	Low development potential
9	Garlic	SLQ < 1	Non Base	DLQ < 1	Low development potential
10	Spring onion	SLQ < 1	Non Base	DLQ < 1	Low development potential
11	Potato	SLQ < 1	Non Base	DLQ < 1	Low development potential
12	Cabbage	SLQ < 1	Non Base	DLQ > 1	High development potential
13	Petsay	SLQ > 1	Base	DLQ < 1	Low development potential
14	Cucumber	SLQ > 1	Base	DLQ > 1	High development potential
15	Chayote	SLQ < 1	Non Base	DLQ < 1	Low development potential
16	Water spinach	SLQ > 1	Base	DLQ < 1	Low development potential
17	Spinach	SLQ < 1	Base	DLQ < 1	Low development potential

Source: Results of data analysis, 2017

4.1.3 Determination of superior and reliable fruits and vegetables in East Sumba

The results of SLQ and DLQ analysis showed that the superior of fruits in East Sumba was mango and the reliable fruits were oranges, guava, soursop, papaya and jackfruit. While the superior commodities of vegetables was long beans and reliable commodities were chili, tomato, petsay, cucumber and water spinach, which are fully presented in Table 6.

Table 6. Superior and reliable horticulture in East Sumba

No	Fruits		Vegetables	
	Commodities	Category	Commodities	Category
1	Mango	Superior	Long beans	Reliabe
2	Orange	Reliable	Chili	Reliable
3	Guava	Realiable	Tomato	Reliable
4	Soursop	Reliable	Bean	Reliable
5	Papaya	Reliable	Cucumber	Superior
6	Jackfruit	Reliable	Water spinach	Reliable

Source: Results of analysis data, 2017

4.2 Results of economic analysis and multiplier effects of superior horticulture in East Sumba

Analysis of the multiplier effect was carried out on two superior commodities namely mango and cucumber. The first stage that was carried out was economic analysis of the two commodities to determine the income of the farmers' base. Base income is income derived from agribusiness development of superior horticulture commodities. After that, a baseline study of horticulture farmers was carried out. Based on this study it was founded that non-farmer-based income in East Sumba comes from several sources, namely from the results of rice fields or fields, the results of poultry, large livestock, plantations and handicrafts. The total income of non-farmer base in East Sumba was IDR 27, 600,000. From the results of the comparison of the nominal nominal value of base and non-base income, the value of the mango multiplier effect was 2.10 and cucumber was 2.02. This value showed that the total increase in total income obtained from additional investment in the base sector by 1 unit. Summary of the results of economic analysis and multiplier effects are presented in Table 7.

Table 7. Economic analysis and multiplier effects of superior horticulture in East Sumba

No	Descriptions	Superior Commodities	
		Mango	Cucumber
1	Total production (Kg)	3,500	10,000
2	Price per Kg (IDR)	12,000	5,000
3	Total income (IDR)	4,000,000	50,000,000
4	Total production and marketing costs (IDR)	16,921,7000	24,532,000
5	Profit (IDR)	25,078,000	26,968,000
6	R/C Ratio	2.4	2.20
	Income non base (IDR)	25,078,000	26,968,000
	Value multiplier effect	2.10	2.02

Source: Results of analysis data,2017

4.3 The sustainability status of superior horticulture agribusiness development in East Sumba

The results of multidimensional analysis (MDS) showed that the sustainability status of superior horticulture agribusiness development in East Sumba was in the less sustainable category with an index value of 49.37. While the results of the ordination analysis on five sustainability dimensions showed that East Sumba was on a quite sustainable status in the social dimension with an index value of 50.23 and institutions with an index value of 50.76 but less sustainable on the ecology dimension with an index value of 42.92, economy dimension with an index value of 49.01 and technology dimension with an index value of 46.76, complete presented in the form of a kite diagram in Figure 2.

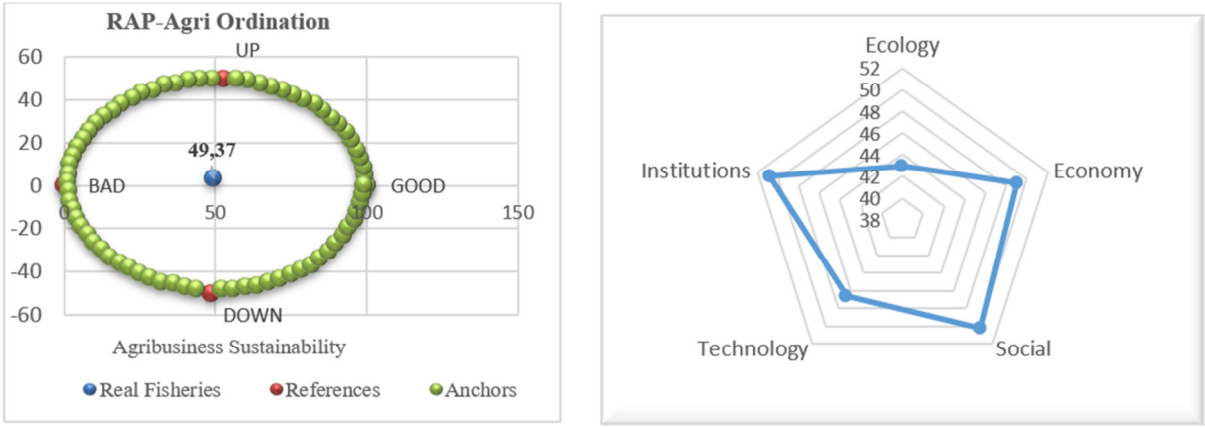

Figure 2. Results of multidimensional ordination analysis and kite diagram for East Sumba

4.4 Status and dominant attributes affect sustainability for five dimensions in East Sumba

The results of leverage analysis consist of Rap-agri and Monte Carlo output. Rap-agri analysis functions to determine the status of sustainability while Monte Carlo analysis is a tool to test the level of trust in the value of leverage in each dimension. Differences in the level of trust are usually caused by the error of the procedure or understanding of the attributes used, variations in scoring due to differences of opinion, stability of the MDS analysis process, including errors in entering data or missing data and too high stress values. The smaller the difference in the value of Rap-agri and Monte Carlo analysis means that the results of MDS analysis have a high level of trust, in other words, the results of the analysis are categorized as valid (Fauzi and Anna, 2002).

Table 8.The difference score Rap-Agri dan Monte Carlo on leverage analysis

Results	Sustainability Dimension				
	A	B	C	D	E
RAP-AGRI	42.29	49.01	52.52	46.65	50.76
Monte Carlo	43.21	48.82	52.96	46.68	50.96
Score diffrence)	-0.92	0.19	-0.44	-0.03	-0.2

Note : A= Ecology dimension; B = Economic dimension; C = Social Dimension; D =Technology Dimension

a) Ecology dimension

The results of the analysis of the ordination of ecology dimension showed that the agribusiness development of superior horticulture in East Sumba was at a less sustainable level with an index value of 42.29. While the results of the leverage analysis showed that the most dominant attributes that affecting sustanaibility agribusiness development of superior horticulture were the use of fertilizers and pesticides with a value of 4.9 and land management with a value of 3.07 (Figure 3).

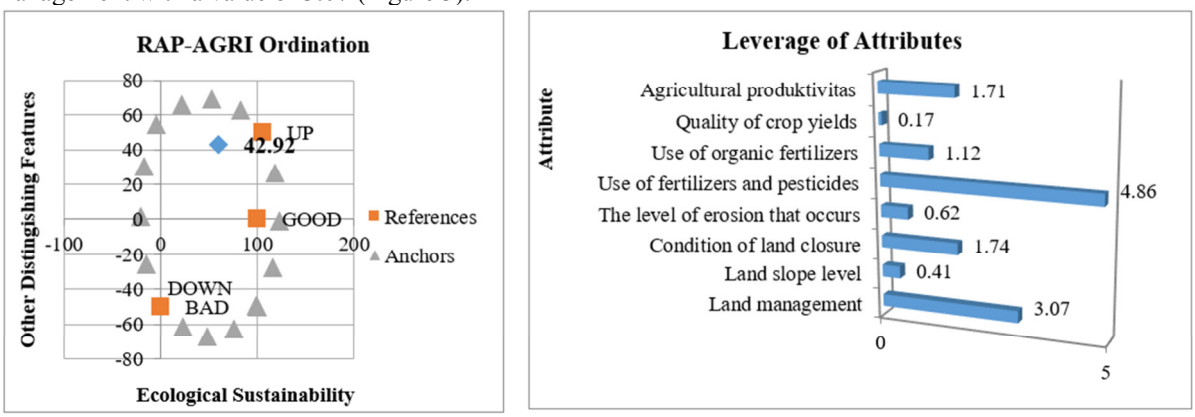

Figure 3. Results of ordination and leverage analysis of the ecology dimension in East Sumba

Based on the survey results, there were three contradictory issues concerning fertilizer and pesticides in East Sumba namely (1) some horticulture farmers stated that access to fertilizer and pesticides subsidies from the government was quite difficult, (2) farmers who received fertilizer and pesticide assistance stated that counseling and dissemination of the procedures for the use of fertilizers and pesticides are so minimal that farmers do not get maximum results from the use of assistance and (3) Field Agricultural Extension (FAE) convey an indication of misuse of government fertilizer and pesticide assistance by farmers by selling it back to the group another farmer to make a profit, then the issue arises that farmers have never received fertilizer and pesticide assistance from the government. This condition has implications for the status of a less sustainable ecology dimension.

Land processing is a problem for horticulture farmers in East Sumba due to the limited availability of facilities and infrastructure. This limitation causes farmers to cultivate their land in traditional ways and this has an impact on the area of horticulture planting. Based on the survey results, it was found that there were several groups of people who rented agricultural equipment, but farmers experienced limited capital because the cost was quite expensive. While the farmer groups that have received agricultural equipment assistance from the government are quite helped because they only need to pay the fuel costs in the users.

b) Economic dimension

The results of the ordination analysis of the economic dimension showed that the development of superior horticulture agribusiness in East Sumba was in the less sustainable category with an index value of 49.01. While the results of the leverage analysis on the economic dimension showed that cultivated land area and utilization of loan were the dominant attributes that influencing the sustainability agribusiness development of superior horticulture in East Sumba with the value of 3.77 and 2.51 (Figure 4).

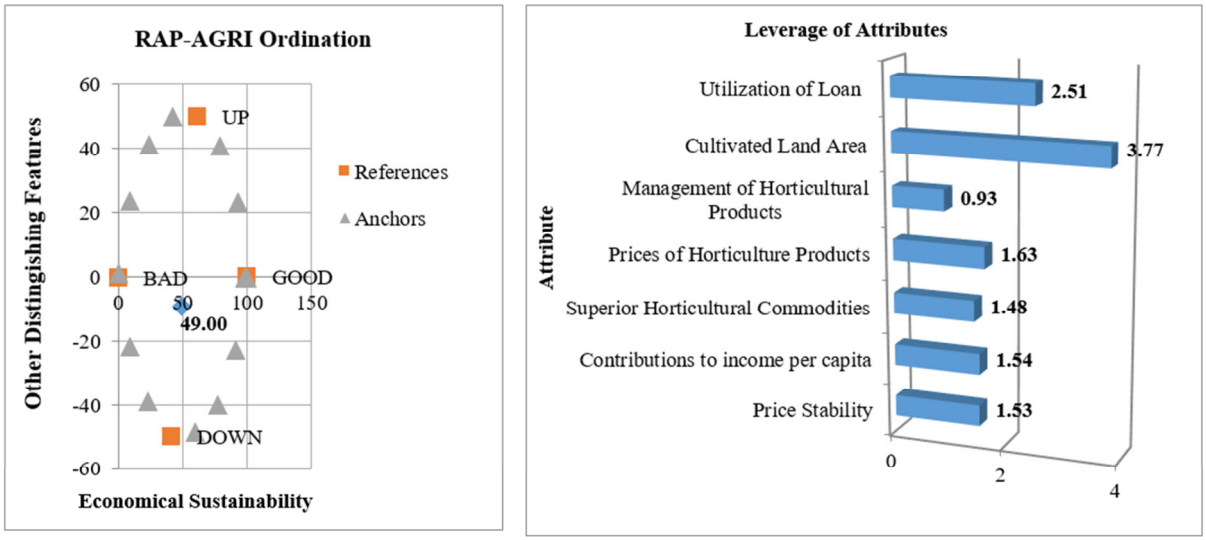

Figure 4. Results of ordination and leverage analysis of the economic dimension in East Sumba

The area of planting of horticulture farmers in East Sumba was limited not because of the lack of available land but because of the ability of farmers to cultivate kand is very limited. This is related to the lack of availability of supporting facilities and infrastructure. The number of farmers in the East Sumba regency until 2016 was 21,275 people with an average land area of 0.25 - 1.00 ha.

In addition to the wide area of arable land, the use of loans is also a problem that is quite influential on the development of superior horticulture agribusiness in East Sumba. It means that the ability of farmers to access capita/loans in financial institutions is very limited, both in cooperatives and banks. This is because farmers do not have collateral that can be used to get loans at banks or cooperatives. From the survey results, banks and cooperatives provide more business capital loans to civil servants and business actors, not to farmers. The reason was because farmers cannot provide certainty of loan repayments because of uncertain agricultural yields. Unlike the civil servants whose loan repayments are clear and certain where the bank or cooperative can directly interact with the institution that employed of those customers. Likewise with business actors in this case traders, both small traders and wholesalers, where the banks consider that the results of the traders' business are more certain than the farmers.

c) Social dimension

The results of the ordination analysis of the sosial dimension showed that the agribusiness development of superior horticulture in East Sumba was in the quite sustainable category with an index value of 50.23. While the results of the social dimension leverage analysis showed that the extention and training intencity, community compherension of green technology and exsistence of government services were the most dominant attributes affecting sustainability in East Sumba with value of 4.08, 3.66 and 3.51 (Figure 5).

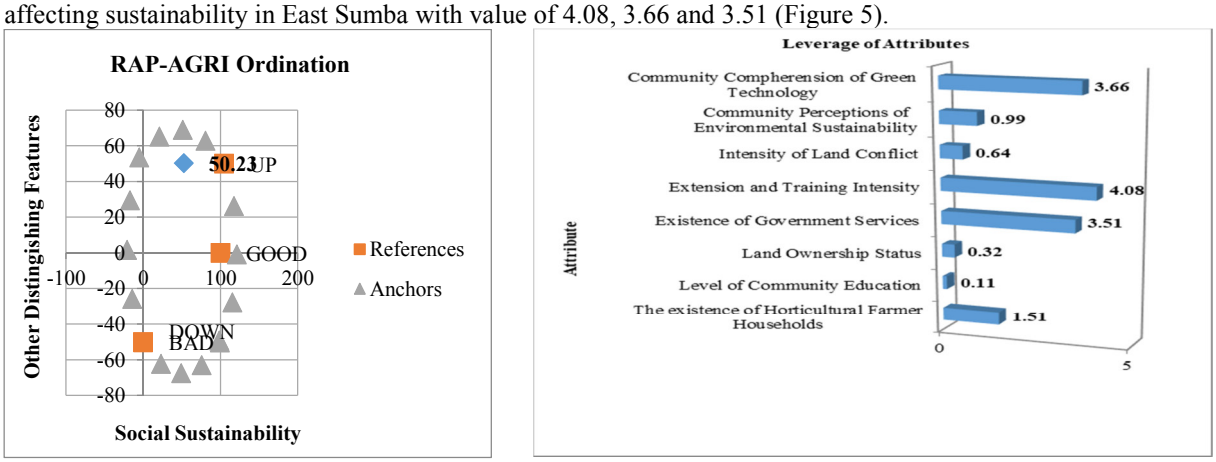

Figure 5. Results of ordination and leverage analysis of social dimension in East Sumba

The intensity and existence of counseling and training were also dominant attributes affecting the sustainability of superior horticulture agribusiness development in East Sumba. Based on the results of the survey, it was founded that counseling and training conducted by the Department of Agriculture and related services to farmers in East Sumba were still lacking, both in terms of quantity and quality. SumbaTimur is the most extensive district compared to the other 3 districts on Sumba Island where the area reaches 7,000.50 km2.

The highest number of sub-districts in this district is 22 sub-districts and 156 villages, while there are only 77 PPLs in charge of all villages (BPS East Sumba, 2017). However, the government has responded to these limitations by appointing civil servants as many as 56 people from THL-TBPP (Agricultural Extension Aid Officers Daily) and 1 Self-help Extension Officer so that the total PPL is 134 that sufficient to assist villages in all districts. Intense counseling and training greatly affects the level of horticulture production. This is evident in the data on horticulture production for the types of vegetables and fruits that are quite high for 5 consecutive years in the East Sumba region.

Another attribute that influences the condition of sustainability in East Sumba is the people's understanding of environmentally friendly technology that is very limited. Environmentally friendly technology is also called green technology, namely the science that studies all aspects of the environment, one of which is technology on how to make organic fertilizers and pesticides. The understanding of farmers about green technology is still low because of the extension provided by PPL more about the procedures for using chemical fertilizers and pesticides. This also greatly affects the amount of horticulture production in this region.

d) Technology dimension

The results of the ordination analysis of the technology dimension showed that agribusiness development of superior horticulture in East Sumba was at a less sustainable level with an index value of 46.65. While the results of the leverage analysis on the technology dimension showed that land processing technic was the most dominant attribute affecting sustainability with a value of 2.95 (Figure 6).

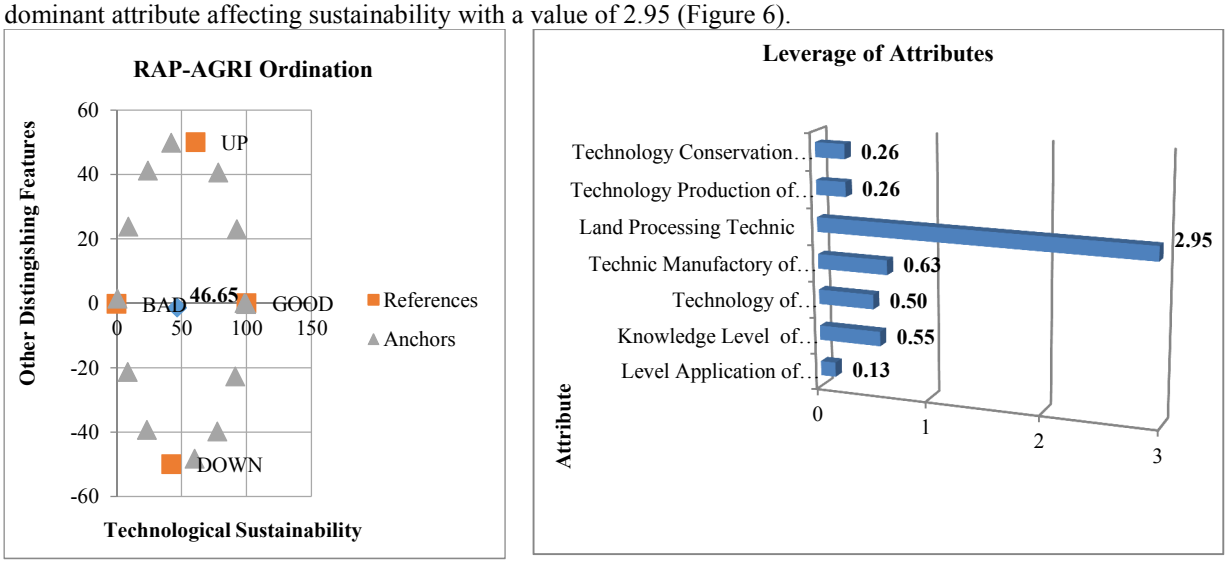

Figure 6. Results of ordination and leverage analysis of the technology dimension in East Sumba

Cultivating the soil means placing inorganic, organic, microorganism and plants in the right position so that each cycle turn produces something that can be harvested according to the initial purpose of all farming processes carried out. This activity is referred to as a land-processing technique. Based on the results of the survey it was founded that almost most of the farmers in East Sumba do not understand the technique of cultivating the land properly. Farmers still cultivate the land in conventional ways, and even tend to damage the land by used herbisides for grass exterminator, including excessive use of fertilizers and pesticides. To restore damaged land or land due to loss of nutrients requires a lot of time. While the community's need for agricultural food ingredients cannot be delayed. Low production not only impacts on product dependence from outside the region but can also trigger food insecurity and other associated diseases. East Sumba, which has high agricultural production value compared to the other 3 regencies on Sumba Island, continues to experience food insecurity conditions every year. Moreover, this region is vulnerable to being subjected to attacks by Kumbara grasshopper pests, which peaked in June 2017

e) Institutional dimension

The results of ordination analysis of the institutional dimension showed that the agribusiness development of superior horticulture was at quite sustainable level with an index value of 50.76. While the results of the leverage analysis on the institutional dimension showed that the conflict between farmer groups was the dominant attribute affecting the agribusiness development of superior horticulture in East Sumba with a value of 3.46 (Figure 7).

Figure 7. Results of ordination and leverage analysis of institutional dimension in East Sumba

East Sumba is in a quite sustainable status for the institutional dimension and the dominant attributes were the conflict between farmer groups and the exsistence of farmer group. Based on the survey results, it was founded that the conflict that often occurs between farmer groups in Sumba Island is triggered more by the unfair treatment of the government such as the distribution of agricultural facilities and infrastructure that are not evenly distributed in each farmer group in the region. Based on the survey results it was found that there were several farmer groups that received intense attention and assistance from the government while some other farmer groups did not get the same thing. This depends on the emotional closeness between the chairman or members of the farmer group and important officials in the area. In other words, nepotism is still a common thing because of various elements of interest between each party. And this is not a conducive situation for the development of farmer group institutions in the region so it must be eliminated in order to achieve the vision of the farmer group's mission as the spearhead of the progress and welfare of farmers.

The existence of farmer groups has a huge influence on the development of superior horticulture agribusiness in East Sumba especially in the institutional dimension. This is because farmers' groups are a place for farmers to discuss and express their aspirations. In addition, the farmer group also functions as a medium to collaborate with other parties or institutions. Based on the results of in-depth surveys and interviews, it is known that the existence of farmer groups in terms of numbers is sufficient, intense assistance and institutional strengthening are needed so that their existence is truly effective for farmers in the village. This is important considering that farmer group institutions are closely related to the progress of farmers in other matters that support the quality and productivity of farmers in the institutional dimension

5. CONCLUSION AND RECOMMENDATION

5.1 Conclution

Based on the results of the analysis of superior commodities, multiplier effects and the sustainability of superior horticulture agribusiness development in East Sumba Regency, the following conclusions were obtained :

1) The superior horticulture commodities in East Sumba Regency were mango and cucumber
2) The multiplier effects value for mango was 2.10 and cucumber was 2.02
3) Multidimension sustanaibility status of agribusiness development of superior horticulture in East Sumba was in the less sustainable category with an index value of 49.37 while the status of social and institutional dimensions were in quite sustainable with index value of 50.23 and 50.76, but was less sustainable of the ecology, economy and technology dimensions with index value of 42.92, 49.01 and 46.76
4) The dominant attributes influencing the sustainability of superior horticulture agribusiness development in East Sumba Regency were (1) the dominant attributes for the ecology dimension namely the use of fertilizers and pesticides and land management; (2) the dominant attributes for the economic dimension namely cultivated land area and utilization of loan; (3) the dominant attributes for the social dimension namely the extention and training intensity, community compherension of green technology and exsistence of government services,; (4) the dominant attribute for the technology dimension namely land processing technic and (5) the dominant attributes for the institutional dimension namely the conflict between farmer groups and the existence of farmer groups.

5.2 Recommendation

1) Increasing the intensity and existence of mentoring and counseling for farmers to reduce the use of chemical fertilizers and pesticides

2) Increasing the soil fertility through the use of organic fertilizer
3) Improving farmers' compherension of green technology and good soil processing techniques
4) Increasing the role and existence of farmer groups and financial institutions in supporting efforts to increase horticulture production in East Sumba Regency

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