

QUANTITATIVE LAND SUITABILITY EVALUATION FOR PLANNING VARIOUS SPICE COMMODITIES IN BAKUNG DISTRICT REGENCY BLITAR

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Abstract

The development of spice plants on agricultural land in the Bakung sub-district requires appropriate information and data regarding the potential and suitability of land use based on the quality and characteristics of the land, so that the land can be sustainably productive. Therefore, land suitability evaluation research is needed as a guide in plant development. playing spices in Bakung District, Blitar Regency with the aim of examining land suitability for planning various spices commodities in Bakung District, Blitar Regency, as well as studying limiting factors that influence actual land suitability for planning various spice commodities in Bakung District, Blitar Regency. This research was carried out in Daffodils sub-district, Blitar districts in August 2023. The survey method uses a map scale of 1:80,000 and to determine the soil sampling points it will be carried out at a predetermined spl of 11 observation points including the villages of daffodil, Bululawang, Kedungbanteng, Lorejo, Ngrejo, Plandirejo, Pulerejo, Sidomulyo, Sumberdadi, Tumpak kepuh, Tumpak sloppy. Research results: The land folder units (SPL 10) of Tumpak Billowing village is very suitable for development for spices commodities. SPL 7 has the potential to be developed for spices commodities by providing management of NPK fertilizer applications, lime applications, and terracing construction. The land suitability class in Bakung sub-district which is very suitable (S1) for various commodities is at SPL 10, precisely in Sidomulyo Village. The limiting factors for the development of various spices commodities in Daffodils District are nutrients retention, available nutrients and the danger of erosion

Keywords: *Evaluation of land suitability, reservations of crops.*

1. INTRODUCTION

Herbs and spices is part plants that originate from the stem, leaves, bark, tubers, rhizomes, roots, seeds, flowers or body parts other plants. Plant development spices on suitable land is required appropriate information and data regarding potency And suitability use land based on quality And characteristics land, so that land the can productive sustainably. For development plant spice This can done in regency Blitar in particular in subdistrict daffodil Because area the Enough have potential for development spice commodities. Subdistrict Daffodils own problems such as potential erosion, landslides, And runoff water surface land Which high (Blitar, 2019). Farmers in the District Daffodils want to optimizing land agriculture For increase income with development on commodity plant horticulture form plant spice. This could be a reason for done study or analysis class suitability land For plant spice To use know characteristics chemistry nor physics land actual. Evaluation suitability land very It is important to know the level suitability or compatibility something land with commodity agriculture certain. (Rit et al ., 2016) state that Land suitability classes consist of several class as following: 1) class Very In accordance (S1) land No have factor a significant or real barrier to use sustainable, or only has a limiting limiting factor nature monir And No reduce land productivity in real, 2) class Sufficiently Suitable (S2) land has factors influencing barriers productivity, need addition input (input). Barrier the generally Still can overcome by farmer, 3) class In accordance Marginal (S3) land have influencing weight limiting factors productivity, need addition input Which more Lots from land classified S2. For overcome factor The limit on S3 requires high capital, so that need help or intervention government or private parties because of farmers No capable overcome it And 4) class Unsuitable (N) unsuitable land Because have factor barrier Which very heavy And or difficult overcome. By Because That, study

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evaluation suitability land required as guidelines in development plant spice main in Subdistrict daffodil, Regency Blitar. Objective from study is Review suitability land For planning various commodity spice- spices in Bakung District, Regency Blitar, as well as examining the limiting factors influence suitability land actual For planning various commodity herbs and spices in Subdistrict daffodil, Regency Blitar.

2. IMPLEMENTATION METHOD

Study This held in Subdistrict daffodil, Regency Blitar Which covers survey and retrieval sample land. Analysis sample land carried out in Laboratory Source Power Land, Faculty Agriculture, University Development National "Veteran" Java East started on month August 2023 Tool Which used between other ArcGIS software, GPS, a set of tools sampling land covers (Crowbar, hoe, knife field, clinometer, plastic, paper, marker, rubber, soil drill, label, camera), And set of analysis laboratory. Material Which used form primary and secondary data. Study This use method the survey used a map scale of 1:80,000 and to determine the collection point sample land will done on spl which has been determined as 11 points observation covers Village daffodil, Bululawang, Kedungbanteng, Lorejo, Ngrejo, Plandirejo, Pulerejo, Sidomulyo, Sumberdadi, Tumpak billowing, Tumpak sloppy. Sample land Which Already taken in analysis in laboratory land in accordance with procedure Which Already There is, Then parameter Which observed compared to with table criteria characteristics chemistry land as well as matching data suitability land. Implementation study covers survey, soil sampling, analysis field and laboratory and management data. Survey with setup plan Work, setup map, determination method, determination sample (method sampling, amount, spread samples), And determination data collection method. Point determination sampling based spl And setup secondary data needed for support activity taking sample land.

Taking sample done with method random Which follow plan activity as well as plots sample Which has determined. Taking sample land to get data suitability land on various commodity Every use land with two depths of 0-20 cm and 20-40 cm. Sampling was carried out based on use land (SPL) in Subdistrict daffodil, Regency Blitar. Analysis field And laboratory Which covers slope/slope, Drainage, Rock, Flood, Texture Land, pH Land (H₂O), C-organic, Potassium (K-dd), N- total, KTK, P-available. Analysis data Good data characteristic physique, chemistry, And morphology land done matching (matching) to in table quality land For various commodity. Data the in matching with class suitability of land for various commodities To use know factor barrier smallest until factor barrier biggest. Class land suitability to obtain class suitability potential land. Next data analysis use approach quantitative with appreciation, that is give dignity (score) on every parameter And give weight weigher on each each parameter Which big in accordance with its influence to evaluation land For various community.

3. RESULTS AND DISCUSSION**Characteristics Region Study**

Use land Which different Also show characteristics Which different, good from facet biophysical nor characteristic land That Alone. This is caused by differences in type management land. Utilization And management determine ecosystem Which There is in something land. If happen difference use And management land, so condition its ecosystem even will different. By Because that is, understanding the characteristics of a land is matter Which important in evaluation suitability land.

Analysis Suitability Land

Based on data field For land suitability, has no results Far different between plant One with Which other. Classification suitability land is the level of suitability of a field land For something use certain. Suitability land This show suitability land on condition moment done evaluation land, without There is repair which mean (Rayes, 2007).

Plant Vanilla

Score class suitability land Vanilla obtained with formula: (example: SPL 1)

$$\text{Kelas Kesesuaian} = \frac{29 - 1}{29 - 25} = 28$$

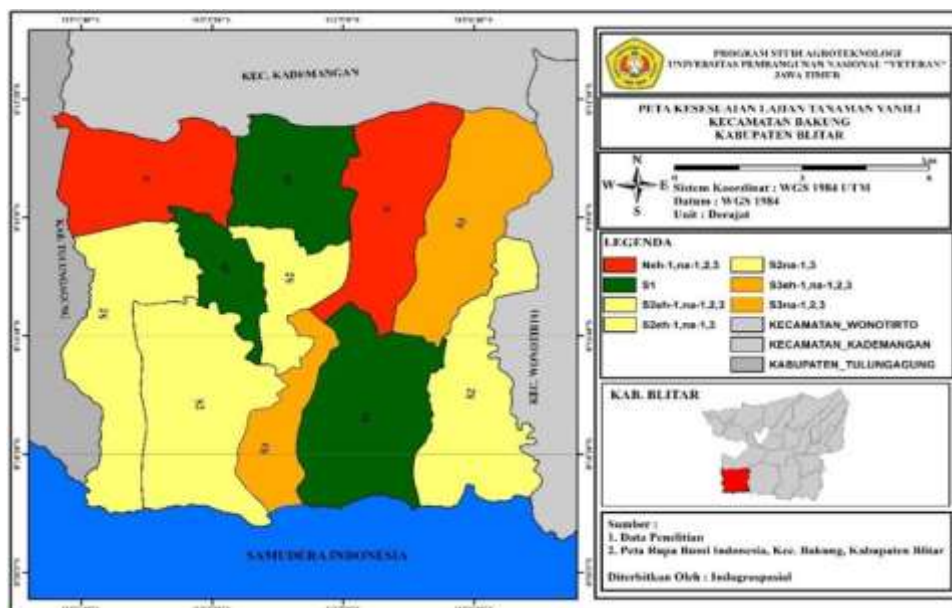
$$\text{Kelas Interval} = \frac{29 - 25}{4} = 1$$

Total Score = [score Texture = 4] + [score CEC = 4] + [score K_{dd} = 2] + [score pH = 3] + [score C-or = 4] + [score N-tot = 2] + [score P-tar = 2] + [score slope = 2] + [score rock = 3] = 26.

Results Evaluation suitability land plant vanilla (Table 1) show that vanilla plants can be planted on SPL 4, SPL 5, And SPL 10 in because on SPL the very in accordance For growth plant vanilla. SPL 7, SPL 8, And SPL 9 own potency to plant vanilla plants, however on SPL the Still own factor barrier like retention hara And danger erosion. Factor barrier hara available covers N-total, P-available, And K_{dd}. Wrong One effort Which can done is do addition material organic with giving fertilizer N, P, K in accordance with what is needed for availability Soil N, P, K can be met properly (Fahimuddin, 2016). Whereas on factor barrier The danger of erosion is slopes. Improvement efforts slope For land Which will planted the vanilla plant is what makes it bund with follow contour (slope) Which connect bund- bund individual in line (Hadipoentyanti & Ruhnayat, 2017).

Table 1. Evaluation Suitability Land Plant Vanilla

	SPL	Total scor	Kelas	Sub kelas
1	SPL 1	26	S3	S3eh-1,na-1,2,3
2	SPL 2	25	N	Neh-1,na-1,2,3
3	SPL 3	25	N	Neh-1,na-1,2,3
4	SPL 4	28	S1	S1
5	SPL 5	28	S1	S1
6	SPL 6	27	S2	S2eh-1,na-1,3
7	SPL 7	27	S2	S2na-1,3
8	SPL 8	27	S2	S2eh-1,na-1,3
9	SPL 9	26	S2	S2eh-1,na-1,2,3
10	SPL 10	29	S1	S1
11	SPL 11	26	S3	S3na-1,2,3



Picture 1. Conformity Map Land Plant Vanilla

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M. Dito Alriza P W, Purnomo Eddie Sasongko, Siswanto

Plant Pepper

Lada land suitability class scores were obtained with formula: (example: SPL 1)

$$\text{Kelas Kesesuaian} = 30 - 0.75 = 29.25$$

$$\text{Kelas Interval} = \frac{30 - 27}{4} = 0.75$$

Total score obtained with add up all score parameter characteristics land, with formulation as following:

$$\begin{aligned} \text{Total Score} &= [\text{score Texture} = 4] + [\text{score CEC} = 4] + [\text{score K-dd} = 3] + [\text{score pH} = 3] + [\text{score C-or} \\ &= 4] + [\text{score N-tot} = 2] + [\text{score P-tar} = 2] + [\text{score slope} = 2] + [\text{score rock} = 3] = \\ &27. \end{aligned}$$

Results evaluation suitability land plant pepper (Table 2) show that plant pepper can planted on SPL 10 in because on SPL the very suitable for growing vanilla plants. At SPL 3, SPL 5, and SPL 7 it has potential for planting pepper plants, will but on SPL the Still own factor barrier like retention hara And danger of erosion. Nutrient limiting factors are available covers N-total And P-available. Effort land improvement for limiting factor N- total and P-available which must be done giving material organic Which can increase pH land at a time increase availability nitrogen For the needs of soil microorganisms that will speed up process decomposition And mineralization material organic so that need hara in land fast available. Business repair P-available Which can done that is giving fertilizer Which contain P Good organic nor inorganic. Fertilization P on plant is method Which general done in cultivation agriculture And can increasing the availability of P elements in land (Mustoyo, 2013). Factor barrier danger erosion that is slope. Efforts need to be made to repair slope And danger erosion is Mechanical conservation is recommended namely by making rorak. Rorak system is Wrong One technique conservation which functions as a sediment trap And accommodate top soil Which drifting away carried away Genre surface. According to (Rahardjo & Cahyadi, 2018) explain technique conservation in a way mechanic (rorak) is a way of harvesting water classified as effective especially on small areas of land steep (10-25%). Making rorak reduce rate Genre surface And erosion. Rorak making is recommended Because technique conservation This cheap And easy done so that efficient For in recommend (Pratiwi & Salim, 2013).

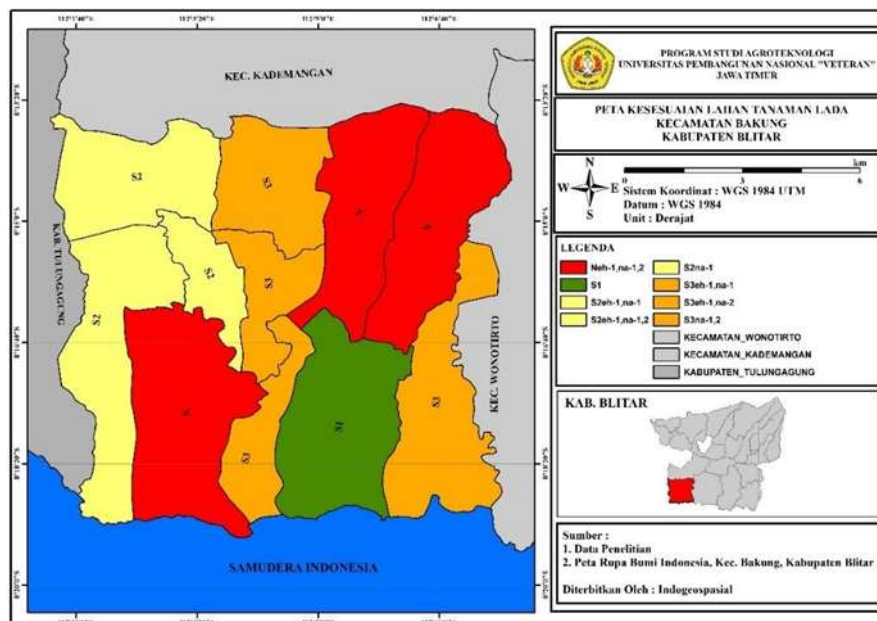


Figure 2. Conformity Map Land Plant Pepper

Plant Wood Sweet

Lada land suitability class scores were obtained with formula: (example: SPL 1)

$$\text{Kelas Kesesuaian} = 30 - 1 = 29$$

$$\text{Kelas Interval} = \frac{30 - 26}{4} = 1$$

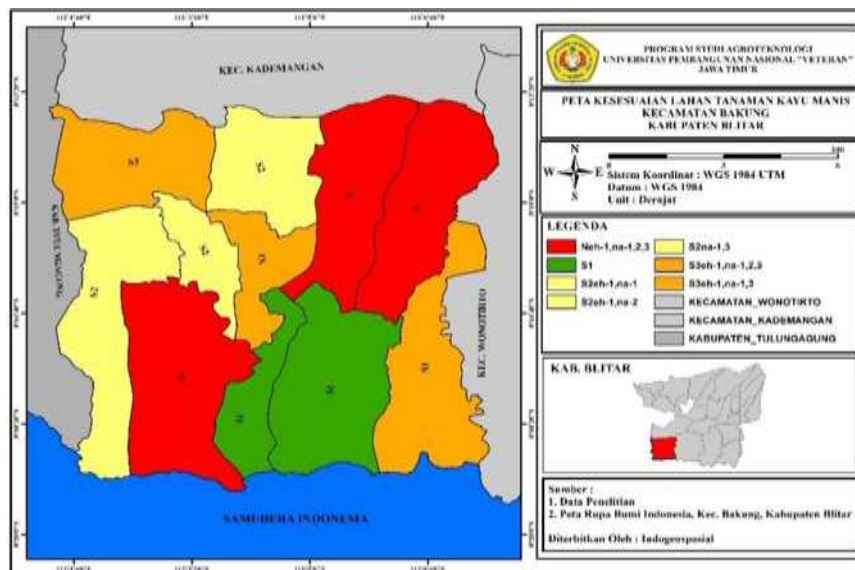
Total score obtained with add up all score parameter characteristics land, with formulation as following: (example: SPL 1)

$$\begin{aligned} \text{Total Score} &= [\text{score Texture} = 4] + [\text{score CEC} = 4] + [\text{score K- dd} = 2] + [\text{score pH} = 3] + [\text{score C-or} \\ &= 4] + [\text{score N-tot} = 2] + [\text{score P- tar} = 2] + [\text{score slope} = 2] + [\text{score rock} = 3] = \\ &26. \end{aligned}$$

Results evaluation suitability land Cinnamon plants show that Cinnamon plants can be planted on SPL 10 and SPL 11 are due to SPL It is very suitable for growth cinnamon plant. At SPL 4, SPL 5, and SPL 7 has the potential to be planted cinnamon plants, but at SPL the Still own factor barrier such as nutrient retention and erosion hazards. Factor available nutrient barriers include N-total, P- available, And K- dd . Element hara N, P And K If not enough And as factor barrier repaired with fertilization fertilizer N like urea, hara P repaired with fertilizer P such as SP-36 and K nutrients with K fertilizer like KCl (Darma, 2023). Whereas on factor barrier The danger of erosion is slopes. the bund terrace is suitable applied to land with a slope 10-40%. Terrace gulud is line bund Which be equipped with channel water in part behind gulud. Method This known also with the term channeled bund. Part- part of the bund terrace consists of bunds, channel water, and land cultivation.

Table 3. Conformity Land Plant Wood Sweet

No.	SPL	Total <u>Score</u>	Class	Sub class
1	SPL 1	26	N	Neh-1,na-1,2,3
2	SPL 2	26	N	Neh-1,na-1,2,3
3	SPL 3	27	S3	S3eh-1,na-1,2,3
4	SPL 4	28	S2	S2eh-1,na-2
5	SPL 5	28	S2	S2eh-1,na-1,3
6	SPL 6	27	S3	S3eh-1,na-1,3
7	SPL 7	28	S2	S2na-1,3
8	SPL 8	27	S3	S3eh-1,na-1,3
9	SPL 9	26	N	Neh-1,na-1,2,3
10	SPL 10	29	S	S1
11	SPL 11	30	S1	S1



Picture 3. Conformity Map Land Plant Wood Sweet

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M. Dito Alriza P W , Purnomo Eddie Sasongko, Siswanto

Plant Cardamom

Score class suitability obtained with formula:

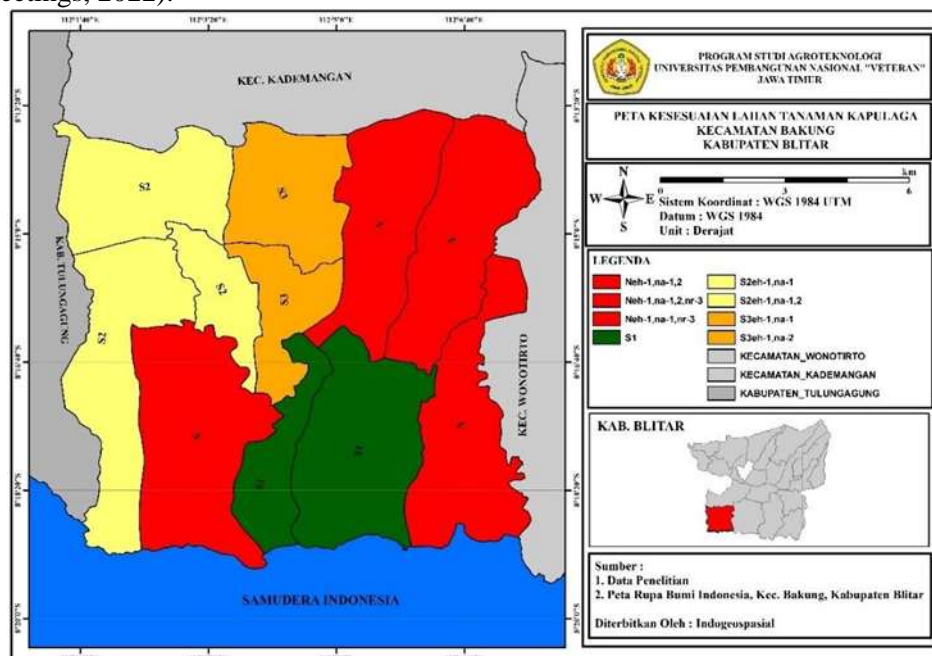
$$\text{Kelas Kesesuaian} = 30 - 1.25 = 28.75$$

$$\text{Kelas Interval} = \frac{30 - 25}{4} = 1.25$$

total score obtained with add up all score parameter characteristics land, with formulation as following: (example: SPL 1)

$$\begin{aligned} \text{Total Score} = & [\text{score Texture} = 4] + [\text{score CEC} = 4] + [\text{score K-dd} = 2] + [\text{score pH} = 3] + [\text{score C-or} \\ & = 4] + [\text{score N-tot} = 2] + [\text{score P-tar} = 2] + [\text{score slope} = 2] + [\text{score rock} = 3] = \\ & 26. \end{aligned}$$

Results evaluation suitability land cardamom plants (Table 4) shows that cardamom plants can be planted at SPL 10 and SPL 11 due to SPL the very in accordance For growth plant wood sweet. On SPL 3, SPL 5, and SPL 7 have potential For planted plant cardamom, will but on SPL the Still own Limiting factors for available nutrients include N- total, P-available, And K-dd . Matter the shows that the application of fertilizer contain element hara N, P, K need given to increase element levels hara on region study. Besides That, Slope And depth effective is factor inhibitor Which most dominant form sub class ability from something land (Famihuddin & Barus, 2016). Factors limiting nutrient retention that is pH H₂O. Based on opinion (Diniyati & Fauziyah, 2014). Cardamom plants can grow well pH 5.6-6.8. In the research results above, pH cardamom plants are included pH base. Content Phosphor in land is closely related to soil pH, this in accordance with opinion (Pack Ali Hanafiah, 2005) content Phosphor The maximum is found in the range of 6.0 – 7.0. Content Phosphor will decrease If pH land in lower 6.0 or in on pH 7.0. If pH land <6, so given chalk agriculture in a way equally, hoeed And left during two Sunday before plant. Whereas on factor barrier The danger of erosion is slopes. Limiting factors slope can done repair with application technique conservation on sloping land. Application of conservation techniques on land crooked Wrong the only one with make terrace on land so that reduce slope (Greetings, 2022).



Picture 4 Conformity Map Land Plant Cardamom

Plant Candlenut

Score class suitability obtained with formula:

$$\text{Kelas Kesesuaian} = 31 - 1 = 30$$

$$\text{Kelas Interval} = \frac{31 - 27}{4} = 1$$

Total score obtained with add up all land characteristic parameter scores, with the following formulation: (example: SPL 1)

$$\begin{aligned} \text{Total Score} &= [\text{score Texture} = 4] + [\text{score CEC} = 4] + [\text{K-dd score} = 3] + [\text{pH score} = 3] + [\text{C-or score} \\ &= 4] + [\text{N-tot score} = 2] + [\text{N-tot score P-ter} = 2] + [\text{slope score} = 2] + [\text{rock score} = 3] \\ &= 27. \end{aligned}$$

Table 5. Suitability Land Plant Candlenut

No.	SPL	Total Score	Class	Sub class
1	SPL 1	27	N	Neh-1,na-1,2
2	SPL 2	27	N	Neh-1,na-1,2
3	SPL 3	29	S2	S2eh-1,na-1,2
4	SPL 4	28	S3	S3eh-1,na-2
5	SPL 5	29	S2	S2eh-1,na-1
6	SPL 6	28	S3	S3eh-1,na-1
7	SPL 7	29	S2	S2na-1
8	SPL 8	28	S3	S3eh-1,na-1
9	SPL 9	27	N	Neh-1,na-1,2
10	SPL 10	30	S1	S1
11	SPL 11	31	S1	S1

Results evaluation suitability land plant candlenut show that plant candlenut can planted on SPL 10 And SPL 11 in because on SPL It is very suitable for growth plant vanilla. On SPL 3, SPL 5, And SPL 7 has the potential to be planted with plants pepper, but at that SPL still own factor barrier like retention hara And danger erosion. Factor barrier hara available include N-total and P-available. N, P, and K are the main macro elements for growth candlenut plant. Content Nitrogen in region study classified very low, so that fertilization is alternative. Giving fertilizer N need given on system land the which will planted Candlenut Because type This No can fixate Alone N from air. Fertilization with fertilizer artificial (inorganic) Which contain N form Urea with dose, method And time fertilization Which appropriate required so that fertilizer is more quickly available to raise status element hara N from very low become higher. For that it is necessary studies determination fertilizer dose the And method his gift in accordance needs hara plant Candlenut (Krisnawati, 2011). According to (Pearl, 2015), there is two factors that can cause P to be available in plants is generally low, namely: (1) P adsorbed land in a way experience cause solubility P Which low so that availability Also low And (2) absorption P by plant No balanced by input P addition from outside. For increase the availability of soil P elements- land on System Land Salo Saluwan need P nutrient addition is carried out through activity fertilization like use fertilizer TSP. Fertilization TSP need done on land Which P availability is low, although total soil P classified tall. Whereas on factor barrier danger erosion that is slope. Repair factor barrier slope or slope > 8% Which need done repair with technique terrace seat, belt mountain And rorak, while a slope of >40% cannot be done cultivation efforts are carried out but are used as area conservation (Holyman & Munir, 2017).

Table 2. Compliance Land Pepper Plant

No.	SPL	Total Score	Class	Sub class
1	SPL 1	27	N	Neh-1,na-1,2
2	SPL 2	27	N	Neh-1,na-1,2
3	SPL 3	29	S2	S2eh-1,na-1,2
4	SPL 4	28	S3	S3eh-1,na-2
5	SPL 5	29	S2	S2eh-1,na-1
6	SPL 6	28	S3	S3eh-1,na-1
7	SPL 7	29	S2	S2na-1

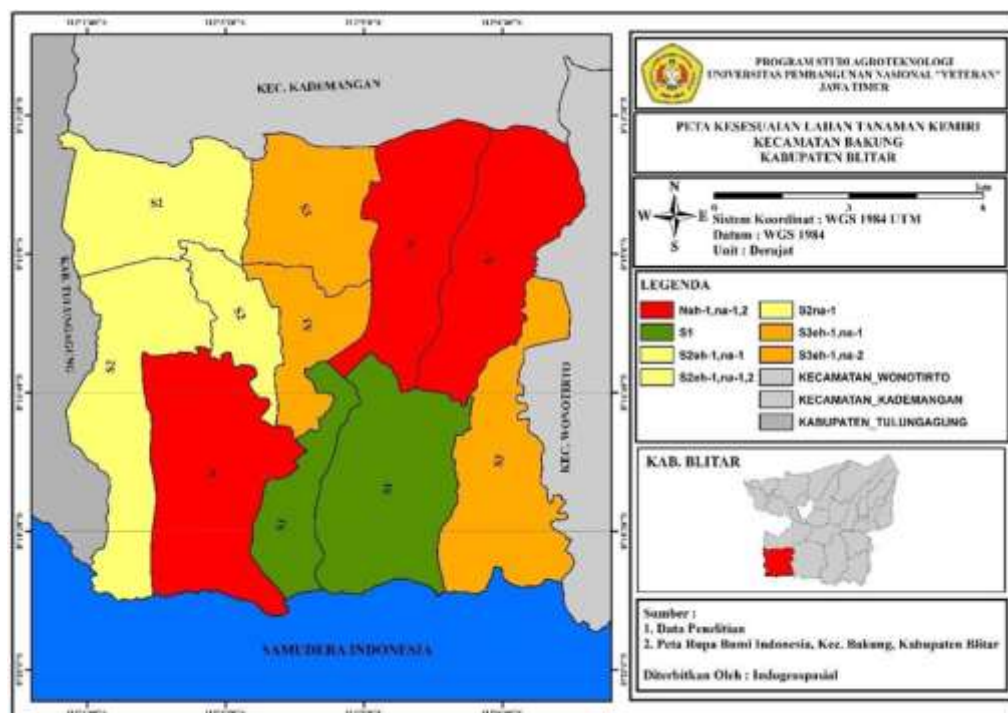
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M. Dito Alriza P W , Purnomo Eddie Sasongko, Siswanto

8	SPL 8	28	S3	S3eh-1,na-1
9	SPL 9	27	N	Neh-1,na-1,2
10	SPL 10	30	S1	S1
11	SPL 11	28	S3	S3na-1,2

Table 4. Suitability Land Plant Cardamom

No.	SPL	Total Score	Class	Sub class
1	SPL 1	26	N	Neh-1,na-1,2
2	SPL 2	25	N	Neh-1,na-1,2,nr-3
3	SPL 3	28	S2	S2eh-1,na-1,2
4	SPL 4	27	S3	S3eh-1,na-2
5	SPL 5	28	S2	S2eh-1,na-1
6	SPL 6	26	N	Neh-1,na-1,nr-3
7	SPL 7	28	S2	S2eh-1,na-1
8	SPL 8	27	S3	S3eh-1,na-1
9	SPL 9	26	N	Neh-1,na-1,2
10	SPL 10	29	S1	S1
11	SPL 11	30	S1	S1



Picture 5. Conformity Map Land Plant Cardlenut

4. CONCLUSION

The land map unit (SPL 10) is very in accordance developed For commodity herbs and spices, SPL 7 potential For developed commodity herbs and spices by providing gift management NPK fertilizer, lime application, manufacturing terracing. Class suitability land in subdistrict daffodil Which very in accordance (S1) For various commodity that is in SPL 10 specifically in Sidomulyo Village. Limiting factors for development various commodity spice- spices in Bakung District, namely retention hara, hara available, and danger erosion.

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