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Assessment of Land Quality for Siamese Orange (*Citrus nobilis* var. *microcarpa*) Development in Pacitan Regency, Indonesia

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Abstract

Siamese oranges are one of the most widely developed horticultural crops in Indonesia. Arjosari and Ngadirojo are some of the sub-districts that produce Siamese orange in Pacitan Regency. One of the factors that can affect the development of citrus is land quality. This study aims to obtain land quality index data and improvement efforts for developing Siamese orange. Soil samples were taken from 25 land mapping units (LMUs) with 87 sample points. The soil sampling points were determined based on area or sampling density. Data analysis used for soil quality assessment includes correlation, principal component analysis (PCA), minimum data set (MDS), and calculation of climate quality index. The parameters used in this study are bulk density, porosity, moisture content, texture, pH, electrical conductivity (EC), cation exchange capacity (CEC), base saturation, total N, available P, available K, soil organic carbon (SOC), microbial biomass carbon (MBC), evapotranspiration, temperature, and solar radiation. Based on the results of soil quality analysis in the study area, it has a value range of 0.28 to 0.37, including low class, while the climate quality index is 1.39 with moderate class. The land quality index has a very low to low class with a value of 0.39 to 0.51. Intrinsic, extrinsic, and anthropogenic factors can influence soil quality. The study area's limiting factors for developing Siamese oranges are EC, total N, and available P, which can be improved by making furrow ponds, adding organic fertilizer, using urea fertilizer, and SP36 according to the dosage.

Keywords: climate quality index; land quality index; Siamese orange; soil quality index

INTRODUCTION

Soil is a non-renewable natural resource (Widiatmaka et al., 2015) and is a land-forming object for vegetation growth, so soil and land have a very close relationship. Land quality includes the state of the soil, climate, and natural vegetation, which can affect land use (Chen and Shi, 2020). Land use is a form of human intervention on land to fulfill the needs of clothing, food, and shelter (Sari et al., 2022).

Food crops, plantations, and horticulture dominate land use for agriculture in the Pacitan Regency. Horticultural crops can fulfill the needs of humans in terms of vitamins, minerals, and protein (Pitaloka, 2020). One type of horticultural crop is Siamese oranges. The community needs Siamese oranges because they contain vitamin C and other essential substances for human health (Saraswati et al., 2022) and are favored by

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all groups, so they have high economic value (Kristiandi et al., 2021). As a superior commodity, Siamese oranges influence the income of farmers and improve their welfare (Wulandari et al., 2014). Pacitan Regency has the highest Siamese orange production after banana, jackfruit, mango, and stinky bean (*petai*) production, so it has the potential to be developed. The total production of Siamese oranges in Pacitan Regency in 2021 was 45,661 quintals. The 802 quintals came from the Arjosari Sub-district and 360 quintals from Ngadirojo Sub-district (Statistic of Pacitan, 2022). Hopefully, the production of Siamese oranges in the Arjosari and Ngadirojo Sub-districts can be further developed after efforts are made to improve the limiting factors.

Regarding the importance of the land quality index (LQI) in plant growth and agricultural business development, obtaining information on land quality in Pacitan Regency to develop Siamese oranges is necessary. The LQI is assessed using the soil quality index (SQI) and climate quality index (CQI). Soil quality comprises physical, chemical, and biological indicators sensitive to soil changes (Li et al., 2022). The assessment of the SQI uses principle component analysis (PCA) to obtain a minimum data set (MDS) of predetermined soil indicators (Doran and Parkin, 1994). The CQI assessment comes from evapotranspiration data, air temperature, and the length of solar radiation (Ray et al., 2014).

Analysis of land quality is essential to support sustainable land use to ensure food security and social stability (Zhuang et al., 2022). Based on the search, there has been no research and data on land quality for developing Siamese orange plants in Arjosari and Ngadirojo Sub-districts, Pacitan Regency. So, this research needs to be done to determine the SQI, CQI, and LQI and improve soil quality to optimize Siamese orange production.

MATERIALS AND METHOD

The research was conducted in the Arjosari Sub-districts (111°13’22.00” to 111°21’42.35”E and 8°06’28.84” to 8°07’19.81”N) and Ngadirojo Sub-districts (111°19’31.72” to 111°17’55.51”E and 8°16’17.95” to 8°10’43.08”N), Pacitan Regency, East Java, Indonesia. The study used a survey method supported by laboratory analysis. Laboratory analysis was conducted at the Laboratory of Soil Chemical and Fertility in the Faculty of Agriculture, Universitas Sebelas Maret Surakarta. The research stages included determining the land mapping unit (LMU), conducting a soil sampling survey, laboratory analysis, and data analysis.

Determination of LMU consists of overlaying maps of soil type, land use, rainfall, slope, and geology. The 25 LMUs determine sample points based on area or sampling density. Soil sampling was conducted by taking disturbed soil composite results and non-disturbed soil. Soil parameters analyzed were bulk density (ring sample tool), moisture content (gravimetry), texture (pipette method), porosity (bulk density and particle density calculation), cation exchange capacity/ CEC (NH_4OAc 1 N pH 7 extraction), base saturation/BS (NH_4OAc 1 N pH 7 extraction), soil organic carbon/SOC (Walkley & Black method), microbial biomass carbon/MBC (fumigation and incubation method), total N (Kjeldahl method), available P (Olsen method), available K (NH_4OAc 1 N pH 7 extraction), pH H_2O (pH meter) and electrical conductivity/EC (EC meter).

The LQI is derived by multiplying the SQI with the CQI. It was chosen because soil is a medium for growing plants that contains important nutrients for plant needs. At the same time, climate is another major soil attribute that needs to be considered when assessing the LQI concerning plants. Each plant requires different climate requirements (Mandal et al., 2001). The SQI assessment used PCA to determine the MDS. Principal components (PC) that had an eigenvalue ≥ 1 were selected into the MDS, then weighting (Wi) and scoring (Si) were carried out to obtain the SQI. Bulk density and C-microbial weighting used Lal (1994) scoring, porosity and pH used Wander et al. (2002), EC, BS, CEC, total N, available P, available K, and SOC used Indonesian Soil Research Institute (2009) (Table 1). The calculation of the SQI was done using Equation 1.

$$SQI = \sum_{i=1}^{n} Wi \times Si \qquad (1)$$

Where, SQI = soil quality index, n = total soil quality MDS, Si = score on selected MDS, Wi = weighting index.

Table 1. Soil quality class

Soil quality	Range	Class
Very good	0.80 – 1.00	1
Good	0.60 – 0.79	2
Medium	0.39 – 0.59	3
Low	0.20 – 0.39	4
Very low	0.00 – 0.19	5

Source: Cantú et al. (2007)

The climate dataset consists of solar radiation, temperature, and rainfall, resulting in a CQI (Table 2). LQI assessment by multiplying the results of the SQI with the CQI (Table 3). Equations 2 and 3 are the calculation formulas for CQI and LQI (Ray et al., 2014).

$$CQI = ET_c \times T_q \times N_s \quad (2)$$

Where, ET_C = crop evapotranspiration (ET_0/rainfall), ET_0 = evapotranspiration, T_Q = $\Delta T/T$, ΔT = maximum – minimum temperature every month, T = monthly average temperature, $N_S = n/N_0$, N = number of hours of bright sunlight during the growing period, N_0 = total sun hours.

Table 2. Climate quality class

Climate quality	Value
High	< 1.15
Medium	1.15 – 1.81
Low	> 1.81

Source: Kamel et al. (2015)

$$LQI = SQI \times CQI \quad (3)$$

Where, LQI = land quality index, SQI = soil quality index, CQI = climate quality index.

Table 3. Land quality class

Land quality	Value
Very low	0.00 – 0.41
Low	0.41 – 0.55
Medium	0.56 – 0.70
High	0.71 – 0.85

Source: Sari et al. (2022)

RESULTS AND DISCUSSION

Pacitan Regency experienced an increase in Siamese orange production from 2016 to 2021. In 2021, Pacitan can produce 45,661 quintals of Siamese orange (Statistic of Pacitan, 2022). Based on this, Pacitan can potentially develop Siamese orange production. In supporting the development of Siamese orange, efforts can be made to assess the quality of the land. Land quality includes soil, climate, and vegetation. Pacitan has an average rainfall of 2,042.73 mm $year^{-1}$. Based on the Schmidt-Fergusson classification, it is an area with climate type C, which means it has a relatively wet climate (Sasminto et al., 2014). Pacitan has an average temperature of 28.5 °C with an average humidity of 78%.

Soil types in the study area are Entisols and Inceptisols, which are land used for gardens and moorland. Soil quality for each sampling point have different values. The average value of pH H_2O in the study area is 6.54, which includes neutral pH, with an average value of SOC of 1.39. Nutrients consisting of total N, available P, and available K are low, with average values of 0.19, 2.99, and 0.29, respectively, so efforts to support nutrient enhancement are needed.

Soil quality is the inherent capacity of soil to function within an ecosystem to maintain biological productivity, maintain environmental health, and improve living conditions for plants and animals that affect soil properties (Doran and Parkin, 1994; Ahmadi Mirghaed and Souri, 2022). Soil quality indicators include soil's physical, chemical, and biological properties. Correlation analysis can be used to determine the relationship between soil quality indicators. The correlation between indicators in the study area can be seen in Table 4.

Table 4 shows that there are significant ($p < 0.05$) and highly significant ($p < 0.01$) correlations, as well as negative and positive correlations between indicators. The indicator with a highly significant negative correlation is bulk density with porosity (r = -0.870), which means that an increase in one variable will affect a decrease in the other variable. The higher the porosity, the smaller the bulk density value (Jayanti and Mowidu, 2015). An increase in bulk density reduces soil porosity, which can reduce soil water storage (Pernitsky et al., 2016).

In the research area, pH is positively correlated with CEC because the increase in CEC occurs along with the rise in soil pH (Mustafa et al., 2022). Soil with a high pH means it has sufficient potassium and calcium content that affects the soil CEC (Mautuka et al., 2022). The CEC value is directly proportional to the soil base saturation because the base saturation is a description of the high number of cations in the soil colloidal

Table 4. Correlation analysis results of physics, chemistry, and biology indicators

	BD	Porosity	pH	EC	CEC	TN	AK	AP	SOC	MBC
Porosity	-0.870**									
Ph	0.031	-0.108								
EC	-0.047	0.151	0.057							
CEC	0.060	-0.229	0.759**	-0.025						
TN	0.006	0.087	0.363	-0.143	0.047					
AK	0.106	-0.008	-0.097	0.150	-0.294	0.409*				
AP	-0.337	0.273	0.032	0.071	-0.109	0.369	0.574**			
SOC	0.019	-0.166	0.873**	0.026	0.763**	0.273	-0.167	0.049		
MBC	0.118	-0.190	0.823**	-0.062	0.844**	0.379	-0.055	0.014	0.883**	
BS	-0.106	-0.020	0.618**	-0.071	0.612**	0.097	-0.069	0.083	0.529**	0.534**

Note: BD = bulk density; EC = electrical conductivity; CEC = cation exchange capacity; BS = base saturation; TN = total nitrogen; AP = available P; AK = available K; SOC = soil organic carbon; MBC = microbial biomass carbon; * = significant correlation at < 0.05 level; ** = significant correlation at < 0.01 level

Table 5. PCA analysis results

Eigenvalues	4.076	2.219	1.729	1.071
Proportion	37.054	20.172	15.714	9.733
Cumulative	37.054	57.226	72.940	82.672
Parameter	PC1	PC2	PC3	PC4
Bulk density	0.108	**-0.709**	0.650	0.111
Porosity	-0.236	**0.731**	-0.559	-0.040
pH	**0.925**	0.116	-0.011	0.083
EC	-0.053	0.164	-0.062	**0.959**
CEC	**0.894**	-0.133	-0.183	0.059
Total N	0.317	0.498	0.519	-0.301
Available K	-0.155	0.493	**0.735**	0.168
Available P	-0.009	**0.780**	0.332	0.023
SOC	**0.924**	0.061	-0.040	0.072
MBC	**0.940**	0.043	0.081	-0.018
Base saturation	0.698	0.142	-0.169	-0.038

Note: EC = electrical conductivity; CEC = cation exchange capacity; SOC = soil organic carbon; MBC = microbial biomass carbon; Bold = minimum data set (MDS)

complex (Husni et al., 2016). Base saturation is closely related to soil pH. Soils with low pH generally have low base saturation, while soils with high pH have high base saturation (Arabia and Royani, 2012). The activity of microorganisms is strongly influenced by soil pH. If the soil pH is low or acidic, the activity of microorganisms will be slow and fast when the pH is close to neutral (Oksana et al., 2012). SOC is an indicator that can affect several other indicators. According to Farrasati et al. (2020), SOC has an attachment to soil properties such as pH, CEC, texture, nitrogen content, and metal cations in the soil. The higher the SOC content, the higher the CEC; this is because SOC is able to accommodate cations.

Soil quality is the inherent capacity of soil to maintain biological productivity, environmental health, and improve living conditions for plants and animals that affect soil properties (Doran and Parkin, 1994; Ahmadi Mirghaed and Souri, 2022). SQI assessment is determined by PCA statistical analysis. PCA analysis produces PC values that are used to determine the MDS (Martín-Sanz et al., 2022). MDS is a data reduction method that helps select soil quality assessment indicators. PCs selected as MDS have an eigenvalue ≥ 1 (Li et al., 2013). PCA analysis resulted in 4 PCs with a cumulative value of 82.67%, meaning that the 9 indicators selected could represent 82.67% of the data. The results of PCA analysis can be seen in Table 5.

Table 6. Scoring and assessment of SQI

MDS	Wi	Si																								
		LMU																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
pH	0.11	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
CEC	0.11	4	3	3	3	3	4	3	3	3	3	3	3	3	4	4	3	4	3	3	3	4	3	4	3	3
SOC	0.11	2	2	1	2	2	2	1	2	2	2	2	2	2	2	2	1	3	2	2	2	2	1	3	2	1
MBC	0.11	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1	1
BD	0.08	5	4	5	5	5	5	5	5	5	5	4	5	5	5	5	3	4	4	4	5	4	5	5	5	5
Porosity	0.08	4	3	4	4	4	4	4	4	4	4	3	4	4	4	3	3	3	3	3	4	3	4	3	3	4
Available P	0.08	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Available K	0.19	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2
EC	0.12	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
SQI		0.33	0.30	0.31	0.32	0.32	0.37	0.31	0.32	0.32	0.32	0.30	0.32	0.32	0.33	0.33	0.28	0.34	0.30	0.30	0.32	0.32	0.31	0.35	0.33	0.31
Land use		G	M	M	M	G	G	M	M	G	G	G	G	M	G	M	M	G	M	M	G	M	M	G	G	M

Note: Si = score on selected MDS; Wi = weighting index; BD = bulk density; EC = electrical conductivity; CEC = cation exchange capacity; SOC = soil organic carbon; MBC = microbial biomass carbon; G = garden; M = moorland

Table 5 shows that the selection of indicators for MDS in PC1 represents 37.05%, with the selected indicators being pH, CEC, SOC, and MBC. PC2 represents 20.17% with selected indicators of bulk density, porosity, and available P. PC3 represents 15.71% of available K and PC4 represents 9.73% of EC. The SQI is calculated by multiplying the Wi value by Si, where Wi is the weighted value of the index while Si is the score. The Wi value is obtained through the division between proportion and cumulative. The proportion value is obtained from the total proportion value divided by the number of indicators per PC. The results of scoring and assessment of the SQI in the study area can be seen in Table 6.

The class of SQI is categorized as very low, low, medium, good, and very good (Cantú et al., 2007). Based on Table 6, the SQI assessment in the study area is classified as low, with values ranging from 0.28 to 0.37. A higher SQI value indicates a better soil quality. The importance of the SQI assessment based on land use is to compare soil quality in each land use. The SQI based on land use in the study area is presented in Figure 1.

Figure 1 shows that the average SQI of moorland in the study area has a lower value of 0.31, while garden land use has an average SQI value of 0.33. The smaller SQI on moorland can be caused by intensive tillage over a long period, reducing soil quality (Jambak et al., 2017). According to Ayuningtias et al. (2016), the denser the vegetation is, and without tillage, the better the soil quality value. In addition, SOC content and soil pH can be factors that can determine soil quality in land use types (Singh et al., 2014).

LQI assessment is based on the SQI and CQI results. The CQI consists of evapotranspiration, rainfall, temperature, and sunlight, which each plant needs differently (Ray et al., 2014). Pacitan Regency has an average temperature that meets the growing requirements of Siamese orange plants, which ranges from 27.4 to 29.3 °C (Table 7).

They calculated evapotranspiration using Cropwat 8.0 Software and a database from FAO consisting of initial and development stages, as well as mid-season and late-season stages. ETc calculation results can be seen in Table 8. Based on Table 8, plants' total evapotranspiration during the Pacitan Regency growth period is 24.81 mm day^{-1}. The results of the CQI calculation are in Table 9.

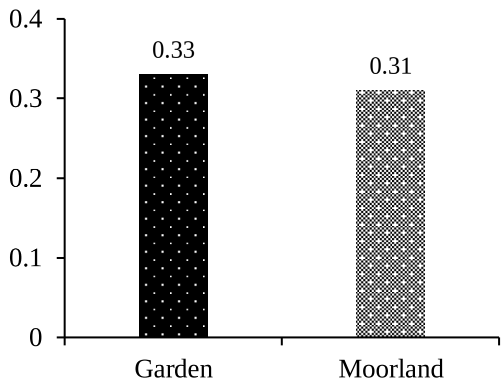

Figure 1. Average SQI based on land use

Table 7. Climate data in Pacitan Regency

Month	Temperature (°C) Minimum	Temperature (°C) Maximum	Temperature (°C) Average	Sunshine (Hours)
January	24.8	32.3	28.5	4.2
February	24.5	32.1	28.3	4.9
March	24.8	32.4	28.6	5.4
April	25.1	32.6	28.9	6.4
May	25.3	32.5	28.9	7.8
June	24.3	32.0	28.1	7.6
July	23.1	31.6	27.4	8.3
August	23.3	31.9	27.6	9.0
September	23.8	32.9	28.3	8.5
October	24.7	33.6	29.2	8.1
November	25.3	33.3	29.3	6.6
December	24.9	32.9	28.9	5.1
Average	24.49	32.52	28.50	6.83

Source: Meteorology, Climatology and Geophysics Agency (2022)

Table 8. Results of ETc in Pacitan Regency

Month	Decade	Stage	Kc	ETc (mm day^{-1})	Eff rain (mm dec^{-1})	Irr. Req. (mm dec^{-1})
December	1	Init	0.67	3.04	24.3	0.0
December	2	Init	0.70	3.02	54.5	0.0
December	3	Init	0.70	2.96	54.4	0.0
January	1	Init	0.70	2.90	53.9	0.0
January	2	Init	0.70	2.85	54.5	0.0
January	3	Init	0.70	2.87	54.0	0.0
February	1	Deve	0.70	2.89	53.4	0.0
February	2	Deve	0.69	2.88	53.0	0.0
February	3	Deve	0.68	2.83	52.3	0.0
March	1	Deve	0.67	2.78	51.6	0.0
March	2	Deve	0.66	2.73	51.0	0.0
March	3	Deve	0.65	2.71	49.4	0.0
April	1	Deve	0.64	2.68	48.2	0.0
April	2	Deve	0.63	2.66	47.0	0.0
April	3	Deve	0.62	2.65	44.0	0.0
May	1	Mid	0.61	2.65	41.2	0.0
May	2	Mid	0.61	2.69	38.6	0.0
May	3	Mid	0.61	2.63	34.1	0.0
June	1	Mid	0.61	2.58	29.4	0.0
June	2	Mid	0.61	2.52	25.0	0.2
June	3	Mid	0.61	2.58	21.1	4.6
July	1	Mid	0.61	2.63	17.0	9.3
July	2	Mid	0.61	2.68	12.9	13.9
July	3	Mid	0.61	2.82	10.2	20.9
August	1	Mid	0.61	2.97	6.6	23.1
August	2	Mid	0.61	3.11	3.2	27.9
August	3	Mid	0.61	3.20	4.4	30.8
September	1	Late	0.66	3.59	5.1	30.8
September	2	Late	0.67	3.72	5.3	31.9
September	3	Late	0.67	3.75	9.8	27.7
October	1	Late	0.67	3.79	14.1	23.7
October	2	Late	0.67	3.82	17.8	20.3
October	3	Late	0.67	3.67	24.2	16.1
November	1	Late	0.67	3.51	31.1	4.0
November	2	Late	0.67	3.36	37.3	0.0
November	3	Late	0.67	3.20	42.4	0.0
December	1	Late	0.67	3.04	24.3	0.0

Table 9. Results of the CQI calculation in Pacitan Regency

ETc	Temperature	Solar radiation	CQI
24.81	0.28	0.2	1.39

The calculation based on the CQI formula in Pacitan Regency produces a value of 1.39, which is included in the medium class. After obtaining the CQI value, the LQI is calculated by multiplying the SQI by the CQI. Land quality is a complex characteristic of land (Azis et al., 2016). Land quality refers to soil fertility and environmental quality that meet plant growth needs and safe food production (Sahetapy, 2009). The calculation results of the LQI and the LQI map can be seen in Figures 2 and 3.

Figure 2 shows that the LQI in the study area ranges from 0.39 to 0.51, with medium to high classes. High-class LQI values are found in LMU 6. Climatic conditions in the study area suit the requirements of Siamese orange plants, while the soil quality conditions are still relatively low.

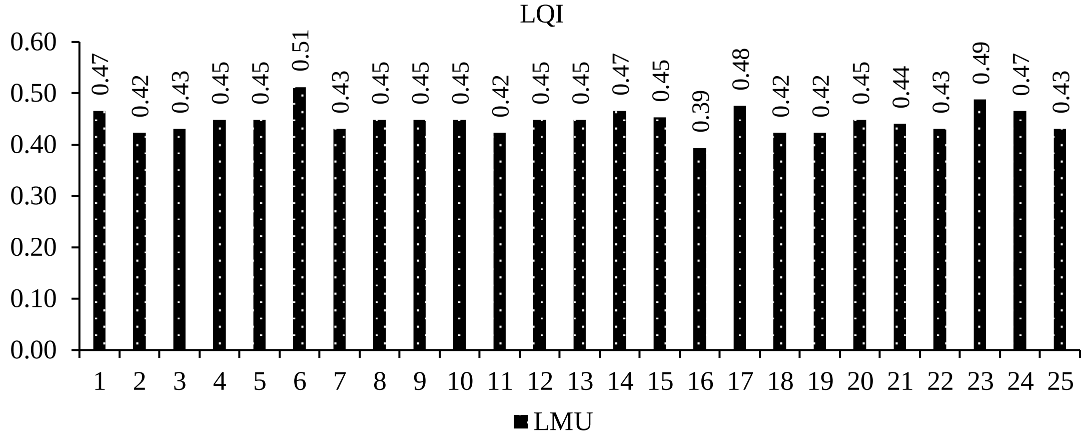

Figure 2. LQI in Pacitan Regency

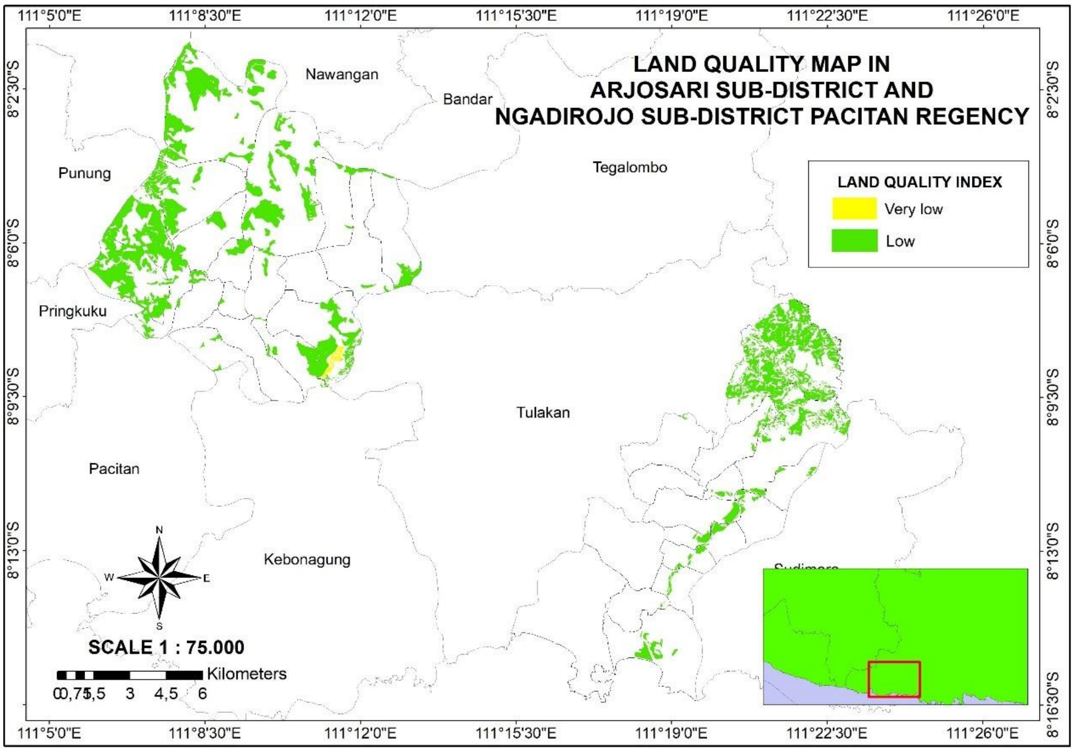

Figure 3. Map of LQI in Arjosari and Ngadirojo Sub-districts

Mandal et al. (2001) state that soil limitations can be a factor in reducing production yields. Soil limitations can be overcome by improving soil properties. Land quality is dynamic and constantly changing due to agronomic activities and weather (Bindraban et al., 2000). SQI and CQI can influence LQI. At the same time, several factors can influence the SQI. According to Bünemann et al. (2018), soil quality can be affected by several factors, namely intrinsic, extrinsic, and anthropogenic factors. Intrinsic factors are influenced by soil properties such as SOC, MOC, pH, texture, and CEC—environmental conditions, including parent material, climate, topography, hydrology. Extrinsic factors are influenced by vegetation. Anthropogenic factors can be influenced by land management and land use. Intensive land management can reduce the organic C content in the soil, affecting the decline in soil quality (Suleman et al., 2016).

There is a plan to develop Siamese orange plants in the Arjosari and Ngadirojo Sub-districts. It is necessary to analyze the limiting factors of

Table 10. Recommended dosage of fertilizer based on age in Siamese orange plants in general

Age (years)	Gram tree^{-1} year^{-1}			Frequency of fertilization each year
	Urea	SP36	ZK	
0 – 1	40	25	10	4 times
1 – 2	65	50	35	4 times
2 – 3	145	70	70	3 times
3 – 4	230	110	230	2 times
4 – 5	285	140	285	2 times
> 5	Measurements based on the amount of fruit production			2 times

soil quality to support the maximum productivity of citrus. Limiting factors for the development of citrus are focused on the condition of the soil, which is why the research area has a suitable climate for citrus plants. The limiting factors based on parameters not included in the MDS are EC, total N, and available P.

Efforts can be made to reduce salinity in the soil by using the furrow pond method and adding gypsum (Lufti et al., 2020). Meanwhile, efforts to improve the total N element are made by using organic fertilizer or urea fertilizer in a balanced manner (Ramadhani et al., 2016). Meanwhile, efforts to strengthen the available P element are made by applying organic or SP36 fertilizer by dosage. Recommendations for fertilizer doses of Siamese orange to increase the content of total N and available P in the soil can be seen in Table 10.

NPK fertilization combined with organic fertilizer can produce sustainably high yields (Sulaeman et al., 2017). Cow manure has a nutrient content of C 24.57%, N 1.63%, P 0.26%, and K 2.80% (Sudarsono et al., 2013). Improvement efforts can increase the value of soil quality. Improved soil quality can affect the production of Siamese oranges.

CONCLUSIONS

The study provided an overview of the SQI, CQI, and LQI in the Arjosari and Ngadirojo Sub-Districts. The SQI ranges from 0.28 to 0.37, a category of low class. The CQI is 1.39 with moderate class. The LQI has a very low to low class with a value of 0.39 to 0.51. The challenge faced in developing Siamese oranges in the study area is low nutrient content, which can affect the production. The effort to improve the Siamese orange development is by reducing intensive land cultivation, using inorganic fertilizers according to plant needs, and adding organic matter and organic fertilizer to increase soil nutrients. Intrinsic, extrinsic, and anthropogenic factors can influence soil quality. The study area's limiting factors for developing Siamese oranges are EC, total N, and available P, which can be improved by making furrow ponds and adding organic fertilizer, urea fertilizer, and SP36 according to the dosage.

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