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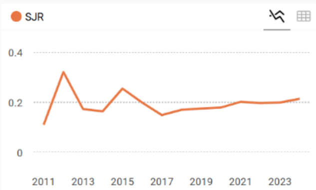

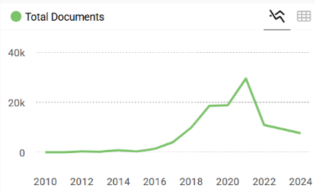

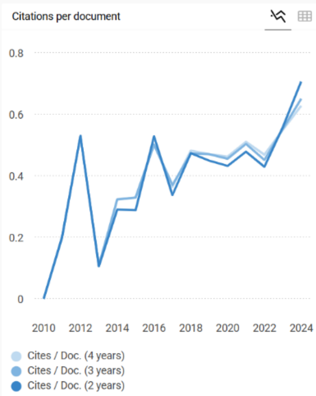

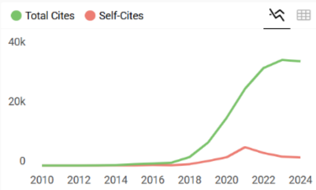

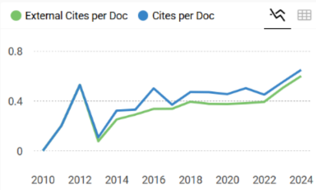

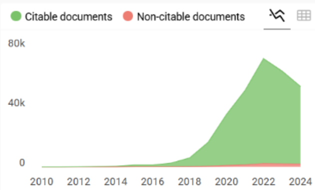

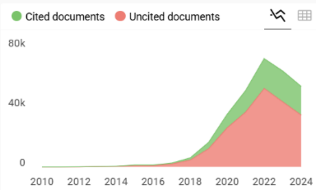

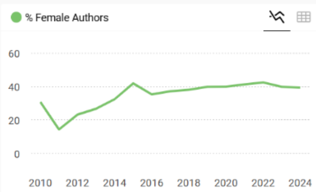

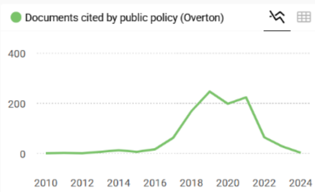

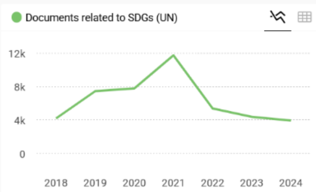

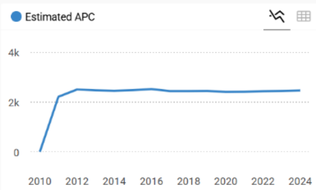

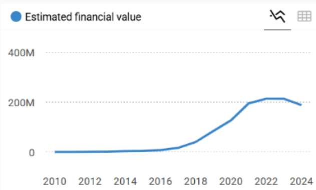

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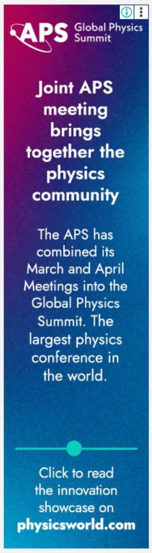

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IOP Conference Series: Earth and Environmental Science

Preface

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PREFACE

The 1st International Conference of Petroleum, Mining, Geology, Geoscience, Energy, and Environmental Technology (ICPMGET) 2024: *Empowering of Earth Resources for Sustainable Energy*

The 1st International Conference of Petroleum, Mining, Geology, Geoscience, Energy, and Environmental Technology (ICPMGET) 2024 is being organized by the Faculty of Earth Technology and Energy, Universitas Trisakti, Indonesia, and was held in a hybrid format on July 24-25, 2024, in Jakarta, Indonesia. The theme of the conference, *"Empowering of Earth Resources for Sustainable Energy,"* plays a part in shaping the future of energy. As the world confronts the dual challenges of meeting rising energy demands while ensuring environmental sustainability, it is important to explore new methods, technologies, and strategies to harness earth resources more efficiently and responsibly. This conference aims to create opportunities for academics, professionals, researchers, and students to collaborate, share, and discuss the innovations in resource management and environmental protection strategies that will drive the transition to a sustainable energy future.

The proceedings of ICPMGET 2024 capture the breadth and depth of the discussions that took place during the conference and peer-reviewed papers that cover a diverse range of topics:

- Earth natural resources and exploration
- Mineralogy and petrology
- Paleontology
- Vulcanology
- Water and Hydrology
- Geological science and engineering
- Geophysics and geochemistry
- Reservoir exploration
- Mining and metallurgical engineering
- Environmental and hazard mitigation
- Policy and energy sustainability.

The diversity of research showcased highlights the interdisciplinary nature of the challenges and solutions facing the energy and resource sectors. The conference was attended by more than 150 participants from Indonesia, South Korea, Japan, Vietnam, Australia, and Thailand and 78 contributed presenters. The output of the conference is well documented in the extended abstract of 66 reviewed papers. The conference proceeding can be beneficial for the authors, institutions, and worldwide scientific communities.

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We extend our deepest gratitude to the honorable speakers for their willingness to share the knowledge:

1. Prof. Shun Chiyonobu (Petroleum Geology, Akita University, Japan)
   Presentation topic: The Hydrocarbon Potential based on The Geological Analyses.
2. Prof. Kun Sang Lee (Petroleum Engineering, Hanyang University, South Korea)
   Presentation topic: Economic Analysis of CO2 Capture, Transportation, and Storage during Water Alternating Gas (WAG) Process.
3. Prof. Ir. Asep Kurnia Permadi, M.Sc., Ph.D (Petroleum Engineering, Institut Teknologi Bandung, Indonesia)
   Presentation Topic: The Potential of Integrated CO2 Enhanced Oil Recovery (EOR) and CCS/CCUS in Indonesia
4. Associate Prof. Dr. Hoai Nga Nguyen (Mining and Geology, Hanoi University and Mining Geology, Vietnam)
   Presentation Topic: Vision Zero and Sustainable and Responsible Mining in Southeast Asia
5. Associate Prof. Dr. Ir. Muhammad Burhannudinnur, M.Sc (Geological Engineering, Universitas Trisakti, Indonesia)
   Presentation Topic: Transition Energy – Leveraging the Opportunities of the Indonesian Oil and Gas Industry and Education.

We appreciate to all the authors, presenters, and participants contributions to sharing ideas and innovations. We also thank our sponsors and partners: BATM Trisakti, PT. Kideco jaya Agung, PT. Elnusa Tbk, PT. Cipta Kridatama, PT. Andamas Global Energi, Ikatan Alumni (IKA) Trisakti, Bank Negara Indonesia (BNI), and Bapak Silmy Karim (Chairman of IKA Trisakti). Special thanks go to the organizing committee, whose dedication and hard work ensured the smooth execution of the conference.

As the global demand for energy and resources rises, the need for continued innovation and sustainable practices has never been more urgent. We hope that the proceedings of ICPMGET 2024 will serve as an essential resource for researchers, professionals, and policymakers, inspiring continued collaboration and progress in the years ahead.

Sincerely,

Dr. Kartika Fajarwati Hartono
(Chairperson of ICPMGET 2024)

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Land Suitability Assessment for Lemongrass Cultivation at a University Technopark in Bogor Regency, West Java, Indonesia

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Abstract. A technopark is currently being developed at the Nagrak Campus of Universitas Trisakti, Bogor Regency, to support university-owned R&D. This university is conducting research on the use of lemongrass (*Cymbopogon citratus*) waste as a material for hygiene products. Given the importance of lemongrass in supporting research innovations at the Universitas Trisakti, the university hopes to integrate a lemongrass cultivation area into a technopark. The study aimed to assess the land suitability of the Nagrak Campus Technopark for lemongrass cultivation. A survey was conducted to assess the land characteristics and collect soil samples, followed by laboratory soil analysis. Land suitability was assessed by comparing the field data with the preferred growing conditions for lemongrass. The results showed that the Nagrak Campus Technopark is marginally suitable for lemongrass cultivation. The major limiting factors are nutrient retention (low base saturation and pH) and nutrient availability (low phosphorus content). Other limiting factors include high temperature, water availability (high rainfall and air humidity), rooting conditions (clay soil texture), and nutrient availability (low total nitrogen). Efforts to enhance land quality and crop production include the addition of agricultural lime and fertilizers to the soil. These efforts may improve land suitability from marginally to moderately suitable conditions.

1. Introduction

A technopark is an integrated area designed to accommodate the development and commercialization of technological innovation and serves as a center that can enhance networking and collaboration among various stakeholders [1]. Many universities have developed techniques to bridge the gap between academic research and commercial applications. Currently, Universitas Trisakti is developing a technopark at the Nagrak Campus, located in Bogor Regency, West Java. A technopark should be designed to facilitate the production and commercialization of technology through innovations owned by the university, which can be achieved by providing space for research collaboration or research materials. The technopark developed at the Nagrak Campus is expected to accommodate a space for agriculture, whose products can be used for research.

Universitas Trisakti is conducting research that utilizes lemongrass waste as a material for hygiene products such as hand sanitizers and mouthwashes [2]. Lemongrass (*Cymbopogon* *citratus*) has significant value due to its wide range of applications. Owing to the lemon-flavoring properties of lemongrass, its leaves are often used in food, herbal tea, and other culinary goods [3]. Essential oils produced from lemongrass have medicinal properties and are used in the pharmaceutical industry [3]. As a landscape plant, lemongrass can be utilized as a border plant for erosion control and landslide reduction [4]. The distinctive aroma enriches the sense of smell and enhances the attractiveness of the landscape. Essential oils produced from lemongrass are known to have antiviral, antibacterial, antioxidant, antifungal, and anticancer functions [5]. Considering the importance of lemongrass plants in supporting Universitas Trisakti's research and business innovations, the university hopes to utilize the available resources in the technopark to cultivate lemongrass.

The successful lemongrass cultivation requires specific environmental conditions. Many types of soils can support the growth of lemongrass [6], but the plant prefers well-drained sandy loam soils with a pH level ranging from 5.5 to 7.5 and a warm, humid climate with full sun [7]. Before proceeding with large-scale cultivation, performing a land suitability analysis is crucial to determine whether the technopark area is suitable for lemongrass cultivation. Currently, information on the suitability of the Technopark as a place for lemongrass cultivation remains unavailable. Thus, this study aimed to analyze the suitability of the land in Technopark Nagrak Trisakti Campus as a place to cultivate lemongrass. This study will help to identify potential limitations and offer recommendations for necessary adjustments or improvements to the land.

2. Methods

2.1 Study area

The study area is a site at the Nagrak Campus of Universitas Trisakti, Gunung Putri District, Bogor Regency, and will be used as a technopark (Fig. 1). The study was conducted between January and June 2024. The survey and soil sampling were conducted in January 2024.

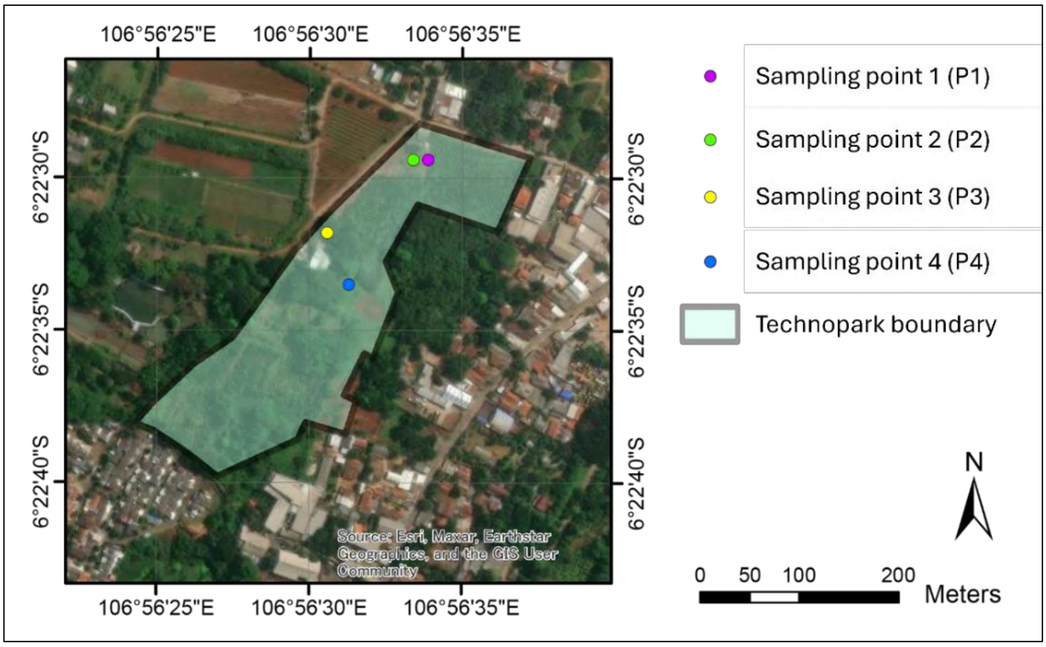

Figure 1. Study area (P1, P2, P3, P4 are soil sampling points).

This area is located at an altitude of 57-72 meters above sea level, with an area of approximately 4.5 hectares. The area is relatively flat or has a low slope and is in the range of 0-8%. Latosol was the most common type of soil in the research region. The average rainfall in the study area ranges from 3000-3500 mm/year. In 2023, the number of rainy days in Bogor Regency was 208 [8]. The average temperature in 2023 is 26.5°C with a minimum temperature of 20.0°C and a maximum temperature of 35.4°C. The humidity in the study area was relatively high, ranging from 70-90% with an average of over 80%.

2.2 Data collection

The required data for this research were land conditions, including soil physical and chemical properties, soil topography, and the climatic conditions of the study area, such as rainfall, temperature, and air humidity. Data on soil topography and climatic conditions were secondary data, whereas data on soil conditions were primary data obtained from soil samples analyzed in the laboratory. During the survey, field conditions, such as land use and potential locations, were observed to determine the sampling points. Based on the survey, soil samples were collected by purposive sampling at four points in the study area, as these points could potentially be used as lemongrass cultivation areas. The research samples were P1, P2, P3, and P4, as shown in Fig. 1.

2.3 Data analysis

The soil physical properties analyzed were soil texture and slope. The analyzed chemical properties include cation exchange capacity (CEC), base saturation, pH, organic C content, and nutrient availability. Other than the soil properties, the climatic elements that were analyzed include temperature, air humidity, and rainfall. After obtaining the study area's soil properties and climatic conditions, a matching analysis was conducted to assess the suitability of lemongrass-preferred growing conditions for the actual conditions of the study area. The matching process for determining suitability was divided into four classes: S1 (highly suitable), S2 (moderately suitable), S3 (marginally suitable), and N (not suitable). Class determination was based on the Land Evaluation Technical Guidebook [9]. Information on land suitability classes for lemongrass is limited; therefore, the characteristic assessment followed the criteria for Citronella. Since both species are from the same genus (*Cymbopogon* sp.) and have similar morphology, in this study, the land suitability criteria for lemongrass were considered the same as those for citronella.

3. Results and Discussion

3.1 Soil properties and land suitability

Based on four soil samples that were examined in the laboratory, the physical and chemical characteristics of the research site's soil were acquired. The laboratory test results showed that the four soil samples had the same physical properties, with only slight differences in soil chemical properties, specifically nutrient availability. This shows that the four soil samples can be considered as the same land unit so that land suitability analysis can be conducted collectively. Table 1 summarizes the actual field values from the four samples and land suitability classes in the study area. The actual land suitability shows the value of the current land suitability, whereas the potential land suitability shows the potential value after the land receives improvement efforts.

Table 1. Land suitability class of the study area

Land characteristics	Land suitability class				
	Field value	Actual land suitability		Improvement effort	Potential land suitability
Temperature (tc)			**S2**		**S2**
Average temperature	25-28	S2		-	S2
Water availability (wa)			**S2**		**S2**
Rainfall/year (mm)	3000-3500	S2		-	S2
Air humidity (%)	70-90	S2		-	S2
Rooting condition (rc)			**S2**		**S2**
Soil texture	Clay (smooth)	S2		-	S2
Nutrient retention (nr)			**S3**		**S1**
Cation exchange capacity	18.99-24.11	S1			S1
Base saturation (%)	12.19-44.70	S3		Liming++	S1
pH	4.26-4.92	S3		Liming++	S1
C-organic (%)	1.61-2.92	S1			S1
Nutrient availability (na)			**S3**		**S1**
Total N	0.15-0.25	S2		Fertilizing+	S1
Available P	2.49-12.96	S3		Fertilizing++	S1
Erosion hazard (eh)			**S1**		**S1**
Slope (%)	0-8	S1			S1
Erosion hazard	Very low	S1			S1
Assessment result	**Actual**	**S3**		**Potential**	**S2**

S1: highly suitable; S2: moderately suitable; S3: marginally suitable.
"++" high efforts needed; "+" moderate efforts needed.

Based on the matching process, the study area had a low level of suitability or was marginally suitable (S3) for lemongrass (Table 1). The limiting factors of S3 were found in two of the six characteristics assessed. Nutrient retention and availability were limiting factors causing land to fall into the S3 category. The main limiting factors are low base saturation, low pH, and a lack of available phosphorus (P) in the soil. Moderately suitable factors (S2) for supporting lemongrass growth included air temperature, rainfall, air humidity, soil texture, and total N (nitrogen). Air temperature, rainfall, and humidity at the study site were higher than the ideal conditions preferred by lemongrass, whereas total N was lower than that preferred by lemongrass. Other factors, such as cation exchange capacity (CEC), C-organic content, slope, and erosion hazard, were highly suitable (S1).

The "clay" texture type describes the soil in the study location. The soil has a very high clay content, with an average of 84.92%. Soil with a high clay content usually feels very sticky and plasticine-like when wet. Compared to other soil types, clayey soils can hold more water, tend to have a high CEC, and retain higher nutrient content [10]. In addition, the study site's soil pH was determined to be significantly acidic., with an average of 4.58. Acidic soil is a serious challenge for crop production because it can cause toxic effects, nutrient imbalances, and reduced microbiological activity in the soil [11]. These factors can result in poor plant growth and low production.

3.2 Limiting factors and efforts to improve land suitability

The limiting factors can be divided into two categories: temporary and permanent. Average temperature, precipitation, and air humidity are examples of unchangeable, permanent limiting factors [12,13]. In addition to precipitation, soil texture is an irreparable factor [14]. In summary, the climatic conditions and soil physical properties are permanent limiting factors. The chemical properties of soil are temporary limiting factors that can be improved by treatment.

Based on this analysis, the limiting factors in the study location were temperature (S2), water availability (S2), rooting conditions (S2), nutrient retention (S3), and nutrient availability (S3). Specifically, the factors were average temperature, air humidity, rainfall, soil texture, base saturation, soil pH, and total N and P availability. Among these, the major limiting factors for lemongrass cultivation are low base saturation, pH, and P availability, resulting in low land suitability. In contrast, factors such as average temperature, air humidity, rainfall, soil texture, and total nitrogen were less significant.

It is possible to make the land more suitable. The pH of the soil is mostly related to base saturation. Base saturation is more likely to be poor in soils with low pH. [15]. Increasing the soil pH should also increase base saturation. The addition of agricultural lime is an effective method for increasing soil pH and base saturation [16]. Concerning the constraints on nutrient availability, total N and available P can be improved by adding fertilizers [17]. N and P fertilization significantly influence soil total N, P, and C [18]. After implementing improvement efforts, land suitability may increase from marginally to moderately suitable. Temporary limiting factors, including nutrient retention and availability, can be enhanced. However, permanent limiting factors such as temperature, water availability, and rooting conditions cannot be improved.

4. Conclusion

Nagrak Campus Technopark is located in an area with high rainfall, air temperature, and humidity. The study area has a smooth soil texture with high clay content, high C-organic content, strongly acidic soil pH, and low base saturation. These soil properties indicate that the Nagrak Technopark campus is marginally suitable (S3) for lemongrass cultivation. Considerable effort and high costs would be required to improve the limiting factors in the study area. The major limiting factors include low base saturation, pH, and P availability. Other limiting factors include high temperature, high rainfall, high air humidity, clayey soil texture, and low total N. Efforts to improve land quality and crop production include the addition of agricultural lime and fertilizers to the soil.

Acknowledgements

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Land Suitability Assessment for Lemongrass Cultivation at a University Technopark in Bogor Regency, West Java, Indonesia

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Abstract. A technopark is currently being developed at the Nagrak Campus of Universitas Trisakti, Bogor Regency to support university-owned R&D. This university is conducting research on the use of lemongrass (*Cymbopogon citratus*) waste as a material for hygiene products. Given the importance of lemongrass in supporting research innovations at the Universitas Trisakti, the university hopes to integrate a lemongrass cultivation area into a technopark. The study aimed to assess the land suitability of the Nagrak Campus Technopark for lemongrass cultivation. A survey was conducted to assess the land characteristics and collect soil samples, followed by laboratory soil analysis. Land suitability was assessed by comparing the field data with the preferred growing conditions for lemongrass. The results showed that the Nagrak Campus Technopark is marginally suitable for lemongrass cultivation. The major limiting factors are nutrient retention (low base saturation and pH) and nutrient availability (low phosphorus content). Other limiting factors include high temperature, water availability (high rainfall and air humidity), rooting conditions (clay soil texture), and nutrient availability (low total nitrogen). Efforts to enhance land quality and crop production include the addition of agricultural lime and fertilizers to the soil. These efforts may improve land suitability from marginally to moderately suitable conditions.

1. Introduction

A technopark is an integrated area designed to accommodate the development and commercialization of technological innovation and serves as a center that can enhance networking and collaboration among various stakeholders [1]. Many universities have developed techniques to bridge the gap between academic research and commercial applications. Currently, Universitas Trisakti is developing a technopark at the Nagrak Campus, located in Bogor Regency, West Java. A technopark should be designed to facilitate the production and commercialization of technology through innovations owned by the university, which can be achieved by providing space for research collaboration or research materials. The technopark developed at the Nagrak Campus is expected to accommodate a space for agriculture, whose products can be used for research.

Universitas Trisakti is conducting research that utilizes lemongrass waste as a material for hygiene products such as hand sanitizers and mouthwashes [2]. Lemongrass (*Cymbopogon*

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citratus) has significant value due to its wide range of applications. Owing to the lemon-flavoring properties of lemongrass, its leaves are often used in food, herbal tea, and other culinary goods [3]. Essential oils produced from lemongrass have medicinal properties and are used in the pharmaceutical industry [3]. As a landscape plant, lemongrass can be utilized as a border plant for erosion control and landslide reduction [4]. The distinctive aroma enriches the sense of smell and enhances the attractiveness of the landscape. Essential oils produced from lemongrass are known to have antiviral, antibacterial, antioxidant, antifungal, and anticancer functions [5]. Considering the importance of lemongrass plants in supporting Universitas Trisakti's research and business innovations, the university hopes to utilize the available resources in the technopark to cultivate lemongrass.

The successful lemongrass cultivation requires specific environmental conditions. Many types of soils can support the growth of lemongrass [6], but the plant prefers well-drained sandy loam soils with a pH level ranging from 5.5 to 7.5 and a warm, humid climate with full sun [7]. Before proceeding with large-scale cultivation, performing a land suitability analysis is crucial to determine whether the technopark area is suitable for lemongrass cultivation. Currently, information on the suitability of the Technopark as a place for lemongrass cultivation remains unavailable. Thus, this study aimed to analyze the suitability of the land in Technopark Nagrak Trisakti Campus as a place to cultivate lemongrass. This study will help to identify potential limitations and offer recommendations for necessary adjustments or improvements to the land.

2. Methods

2.1 Study area

The study area is a site at the Nagrak Campus of Universitas Trisakti, Gunung Putri District, Bogor Regency, and will be used as a technopark (Fig. 1). The study was conducted between January and June 2024. The survey and soil sampling were conducted in January 2024.

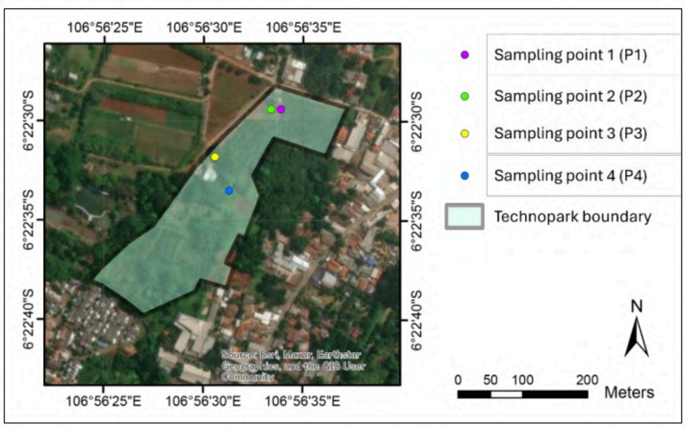

Figure 1. Study area (P1, P2, P3, P4 are soil sampling points).

This area is located at an altitude of 57-72 meters above sea level, with an area of approximately 4.5 hectares. The area is relatively flat or has a low slope and is in the range of 0-8%. Latosol was the most common type of soil in the research region. The average rainfall in the study area ranges from 3000-3500 mm/year. In 2023, the number of rainy days in Bogor Regency was 208 [8]. The average temperature in 2023 is 26.5°C with a minimum temperature of 20.0°C and a maximum temperature of 35.4°C. The humidity in the study area was relatively high, ranging from 70-90% with an average of over 80%.

2.2 Data collection

The required data for this research were land conditions, including soil physical and chemical properties, soil topography, and the climatic conditions of the study area, such as rainfall, temperature, and air humidity. Data on soil topography and climatic conditions were secondary data, whereas data on soil conditions were primary data obtained from soil samples analyzed in the laboratory. During the survey, field conditions, such as land use and potential locations, were observed to determine the sampling points. Based on the survey, soil samples were collected by purposive sampling at four points in the study area, as these points could potentially be used as lemongrass cultivation areas. The research samples were P1, P2, P3, and P4, as shown in Fig. 1.

2.3 Data analysis

The soil physical properties analyzed were soil texture and slope. The analyzed chemical properties include cation exchange capacity (CEC), base saturation, pH, organic C content, and nutrient availability. Other than the soil properties, the climatic elements that were analyzed include temperature, air humidity, and rainfall. After obtaining the study area's soil properties and climatic conditions, a matching analysis was conducted to assess the suitability of lemongrass-preferred growing conditions for the actual conditions of the study area. The matching process for determining suitability was divided into four classes: S1 (highly suitable), S2 (moderately suitable), S3 (marginally suitable), and N (not suitable). Class determination was based on the Land Evaluation Technical Guidebook [9]. Information on land suitability classes for lemongrass is limited; therefore, the characteristic assessment followed the criteria for Citronella. Since both species are from the same genus (*Cymbopogon* sp.) and have similar morphology, in this study, the land suitability criteria for lemongrass were considered the same as those for citronella.

3. Results and Discussion

3.1 Soil properties and land suitability

Based on four soil samples that were examined in the laboratory, the physical and chemical characteristics of the research site's soil were acquired. The laboratory test results showed that the four soil samples had the same physical properties, with only slight differences in soil chemical properties, specifically nutrient availability. This shows that the four soil samples can be considered as the same land unit so that land suitability analysis can be conducted collectively. Table 1 summarizes the actual field values from the four samples and land suitability classes in the study area. The actual land suitability shows the value of the current land suitability, whereas the potential land suitability shows the potential value after the land receives improvement efforts.

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Table 1. Land suitability class of the study area

Land characteristics	Field value	Land suitability class		
		Actual land suitability	Improvement effort	Potential land suitability
Temperature (tc)		**S2**		**S2**
Average temperature	25-28	S2	-	S2
Water availability (wa)		**S2**		**S2**
Rainfall/year (mm)	3000-3500	S2	-	S2
Air humidity (%)	70-90	S2	-	S2
Rooting condition (rc)		**S2**		**S2**
Soil texture	Clay (smooth)	S2	-	S2
Nutrient retention (nr)		**S3**		**S1**
Cation exchange capacity	18.99-24.11	S1		S1
Base saturation (%)	12.19-44.70	S3	Liming++	S1
pH	4.26-4.92	S3	Liming++	S1
C-organic (%)	1.61-2.92	S1		S1
Nutrient availability (na)		**S3**		**S1**
Total N	0.15-0.25	S2	Fertilizing+	S1
Available P	2.49-12.96	S3	Fertilizing++	S1
Erosion hazard (eh)		**S1**		**S1**
Slope (%)	0-8	S1		S1
Erosion hazard	Very low	S1		S1
Assessment result	**Actual**	**S3**	**Potential**	**S2**

S1: highly suitable; S2: moderately suitable; S3: marginally suitable.
"++" high efforts needed; "+" moderate efforts needed.

Based on the matching process, the study area had a low level of suitability or was marginally suitable (S3) for lemongrass (Table 1). The limiting factors of S3 were found in two of the six characteristics assessed. Nutrient retention and availability were limiting factors causing land to fall into the S3 category. The main limiting factors are low base saturation, low pH, and a lack of available phosphorus (P) in the soil. Moderately suitable factors (S2) for supporting lemongrass growth included air temperature, rainfall, air humidity, soil texture, and total N (nitrogen). Air temperature, rainfall, and humidity at the study site were higher than the ideal conditions preferred by lemongrass, whereas total N was lower than that preferred by lemongrass. Other factors, such as cation exchange capacity (CEC), C-organic content, slope, and erosion hazard, were highly suitable (S1).

The "clay" texture type describes the soil in the study location. The soil has a very high clay content, with an average of 84.92%. Soil with a high clay content usually feels very sticky and plasticine-like when wet. Compared to other soil types, clayey soils can hold more water, tend to have a high CEC, and retain higher nutrient content [10]. In addition, the study site's soil pH was determined to be significantly acidic., with an average of 4.58. Acidic soil is a serious challenge for crop production because it can cause toxic effects, nutrient imbalances, and reduced microbiological activity in the soil [11]. These factors can result in poor plant growth and low production.

3.2 Limiting factors and efforts to improve land suitability

The limiting factors can be divided into two categories: temporary and permanent. Average temperature, precipitation, and air humidity are examples of unchangeable, permanent limiting factors [12,13]. In addition to precipitation, soil texture is an irreparable factor [14]. In summary, the climatic conditions and soil physical properties are permanent limiting factors. The chemical properties of soil are temporary limiting factors that can be improved by treatment.

Based on this analysis, the limiting factors in the study location were temperature (S2), water availability (S2), rooting conditions (S2), nutrient retention (S3), and nutrient availability (S3). Specifically, the factors were average temperature, air humidity, rainfall, soil texture, base saturation, soil pH, and total N and P availability. Among these, the major limiting factors for lemongrass cultivation are low base saturation, pH, and P availability, resulting in low land suitability. In contrast, factors such as average temperature, air humidity, rainfall, soil texture, and total nitrogen were less significant.

It is possible to make the land more suitable. The pH of the soil is mostly related to base saturation. Base saturation is more likely to be poor in soils with low pH. [15]. Increasing the soil pH should also increase base saturation. The addition of agricultural lime is an effective method for increasing soil pH and base saturation [16]. Concerning the constraints on nutrient availability, total N and available P can be improved by adding fertilizers [17]. N and P fertilization significantly influence soil total N, P, and C [18]. After implementing improvement efforts, land suitability may increase from marginally to moderately suitable. Temporary limiting factors, including nutrient retention and availability, can be enhanced. However, permanent limiting factors such as temperature, water availability, and rooting conditions cannot be improved.

4. Conclusion

Nagrak Campus Technopark is located in an area with high rainfall, air temperature, and humidity. The study area has a smooth soil texture with high clay content, high C-organic content, strongly acidic soil pH, and low base saturation. These soil properties indicate that the Nagrak Technopark campus is marginally suitable (S3) for lemongrass cultivation. Considerable effort and high costs would be required to improve the limiting factors in the study area. The major limiting factors include low base saturation, pH, and P availability. Other limiting factors include high temperature, high rainfall, high air humidity, clayey soil texture, and low total N. Efforts to improve land quality and crop production include the addition of agricultural lime and fertilizers to the soil.

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Dibyanti Danniswari <dibyanti@trisakti.ac.id>

Paper(s) for ICPMGET-2024 entering Production
1 message

Morressier Team <discover@morressier.com> Thu, Jan 23, 2025 at 8:42 PM
To: dibyanti@trisakti.ac.id

IOP Publishing

Dear Dibyanti Danniswari,

We are pleased to inform you that the following Papers have passed the Publisher's checks and are being finalized for publication:

- Land Suitability Assessment for Lemongrass Cultivation at a University Technopark in Bogor Regency, West Java, Indonesia

The Papers are now entering the Production process to prepare them for publication on the IOPscience platform. An overview of the publication procedure is available here.

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